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Effect of Educational Program for Interventional Cardiac Catheterization on Nurse's Knowledge at Karbala Center for Cardiothoracic Diseases and Surgery

A thesis

Submitted to Council of College of Nursing, University of Babylon

in partial fulfillment of the requirements for the Degree of Master in Nursing Sciences

By

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﴿وَلَقَدْ آتَيْنَا دَاوُودَ وَسُلَيْمَانَ عِلْمًا ۖ وَقَالَا الْحَمْدُ لِلَّهِ الَّذِي فَضَّلَنَا عَلَىٰ كَثِيرٍ مِنْ عِبَادِهِ الْمُؤْمِنِينَ﴾

صدق الله العظيم

سورة النمل آية (15)

Dedication

To

The soul of my ***Father***

To the pure spirit who gave me her blood, sole and love……..my lovely ***Mother***

To my magnificent ***Wife****, who's supported me and with her I face the challenges, with my endless love*

To my ***Brother and Sisters*** *with my love and respect*

Jawad

2021

Supervisor Certification

*I certify that this thesis, entitled (**Effect of Educational Program for Interventional Cardiac Catheterization on Nurse's Knowledge at Karbala Center for Cardiothoracic Diseases and Surgery**), submitted by **Jawad Badr Yaseen** was prepared under my supervision and guidance at the Department of Adult Nursing, College of Nursing, University of Babylon as a partial fulfillment of the requirement for the Degree of Master of Sciences in Nursing.*

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Certification

We, the examining committee, certify that we have read this dissertation (Effect of Educational Program for Interventional Cardiac Catheterization on Nurse's Knowledge at Karbala Center for Cardiothoracic Diseases and Surgery), which is submitted by (**Jawad Badr Yaseen**) from the department of Adult Nursing, and we have examined the student in its contents, and what is related to it and we decide that it is adequate for awarding the degree of (Master) in nursing Sciences with specialty of (Adult Nursing) and estimate of ( )

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Researcher

Jawad Badr Yaseen

Abstract

Any cardiac procedure is associated with a number of health risks. But in general, cardiac catheterization is not associated with any significant risks. Risk factors associated with cardiac catheterization are rare, and the risk of heart disease that requires catheter intervention increases in patients with diabetes, kidney disease, or those over 70 years of age.

A quasi-experimental study was conducted from September 27, 2020 to July 20, 2021 to evaluate the effect of the interventional educational program for cardiac catheterization on the knowledge of nurses in Karbala Center for Cardiothoracic Diseases and Surgery. The researcher designed the program and tools to reach the objectives of the study, and a group of 50 nurses was randomly selected to participate in the study, who were divided into the intervention group (25) nurses who were exposed to the educational program, and the control group (25) nurses who were not exposed to the educational program.

The impact of the interventional educational program for cardiac catheterization was evaluated through a questionnaire that includes (48) items related to cardiac catheterization. The data were analyzed using descriptive statistics (frequency, percentages, arithmetic mean, standard deviation) and inferential statistics to highlight the scientific differences between the two groups of intervention and control (t-test).

The results of the study revealed that the educational program aims to improve the nurses' knowledge of cardiac catheterization. It also shows that there are large statistically significant differences in the knowledge of nurses generally associated with the cardiac catheterization study group between the tests before and after the program, which is a good thing.

According to the results, the nurses have minimal knowledge about cardiac catheterization and need educational programs and sessions.

The study recommended the development and implementation of an educational program for nurses about cardiac catheterization, with a focus on cardiac catheterization nursing care and encouraging nurses to participate in educational programs to meet their needs in terms of defects and limitations in their practice.

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List of Abbreviations

Item	Meaning
C.S.	Comparison Significant
CCU	Coronary Care Unit
CT	Computed tomography
CVDs	cardiovascular diseases
D.f	Degree of freedom
ECG	Electrocardiography
F	Frequency
HS	Highly significant
ICN	International Council of Nurses
ICU	Intensive Care Unit
IHD	Ischemic Heart Diseases
ISIS	Islamic State of Iraq and Syria
K	Number of items
M.S	Mean of score
MI	Myocardial Infarction
NIBP	Blood Pressure Monitor Non Invasive
No.	Number
NS	Non significant
P.	Page
p.p.	Pages
PSS	Post Psychosocial Support
PTSD	Posttraumatic stress disorder
P-value	Probability value
RN	Registered Nurse
RT	Related to

RTA	Road traffic accidents
S	Significant
S.D	Standard Deviation
SATS	Standardized Test
SIGIR	Special Interest Group on Information Retrieval
SPSS-XX	Statistical Package of Social Sciences 20
TTE	Transthoracic Echocardiogram
USD	U.S. Dollar
WHO	World Health Organization
A	Alpha Cronbach

Symbol table

%	Percentage
E_i	Expected frequency
O_i	Observed frequency
σ_{ii}	Variance (not standard deviation) of item i
σ_{ij}	Estimated covariance between items i and j
χ^2	Chi-square
$\sum$	Sum

Chapter One
Introduction

Chapter One

1.1.Introduction

Globally, cardiovascular diseases (CVDs) constitute the leading cause of death. In 2015, there were around 56.4 million deaths registered worldwide (WHO, 2014). Thirty million people died as a result of the top ten major causes, which included Ischemic Heart Disease and stroke (Roth et al., 2017). IHD and stroke are the primary causes of death, accounting for 17.5 million deaths worldwide (WHO, 2017).

In the United States, cardiovascular diseases are the main cause of mortality, but coronary artery diseases account for 9.87 percent of all fatalities in Pakistan. Every 34 seconds, one of the 635,000 Americans has a heart attack (Go et al., 2013). In the United States, more than 385,000 people are diagnosed with coronary artery disease each year (Ramos, 2014). It has been discovered that deaths related to cardiovascular diseases, more than any other cause, are dramatically rising global mortality figures (IHME, 2015).

Similarly, the prevalence of cardiovascular disorders is rising in Iraq. Cardiovascular diseases (CVD), which claim the lives of about 200,000 people each year, are expected to account for 32,463 deaths, or 18.92 percent of all deaths. In Iraq, 12 individuals die from cardiovascular disease per hour (Hussain & Lafta, 2019).

Cardiac catheterization is one of the most common diagnostic and interventional procedures used by cardiologists today. It entails inserting a catheter into a vein or artery, commonly from a groin or jugular access site, and then guiding it into the heart using x-ray guidance. Through diagnostic catheters, the adequacy of blood supply through coronary arteries, blood pressures, blood flow throughout heart chambers, and getting minute information on the anatomy and function of the cardiac chambers, valves, and coronary arteries are all analyzed. For closure of septal defects,

enlargement of confined channels such as pulmonary stenosis, stent implantation, and opening of new passages such as foramen ovale, therapeutic one is an alternative to open-heart surgery (Yu et al., 2012).

Due to a low cardiac output, inadequate myocardial perfusion, an irregular cardiac rhythm, and severe valvular abnormalities, a cardiac patient is dangerously unwell. To diagnose and manage their complicated medical issues, this patient requires ongoing assessment and intervention (Morton & Fontaine, 2012).

The decannulation of the sheath (inserter) from either the femoral or radial approach, which takes place outside the catheterization room and is performed by a doctor or nurse, is a crucial aspect of the clinical performance. The process for decannulating the sheath from the artery basin can have an impact on the catheterization's final result. (Klemsová & Žiaková, 2014).

The overall prevalence of complications post cardiac catheterization is 1.5-9%. These complications are usually temporary and may comprise minor complication as bleeding, reaction to medications or dye, allergic skin reaction to latex ortape, bruising, abnormal heartbeats, temporary pain, minor infections, nausea and vomiting. There is also a possibility of more severe but infrequent complications which include serious bleeding, hematoma, heart or lung problems such as irregular heart rhythms and lung or heart failure, stroke, heart attack, blood vessel or nerve damage, blood clots in the legs or lungs, failure of medical equipment, and renal failure, with possible dialysis needed. Increased risk for vascular complications was found in patients who were older than 70 years, female, and had renal failure (Anderson et al., 2013).

Depending on the type of procedure, anticoagulation, closure devices, age, gender, and co morbidities, the total rate of vascular access unsafely measures has been observed to range from 1.5 percent to 9 percent

(Ahmed, 2015). In Karbala governorate, the number of cardiac catheterization reviews reached 1134 in 2019 and 1130 in 2020.

1.2. Importance of the Study

Nurse plays a key and holistic role on providing care for patient with cardiac problems as well as patient undergone cardiac catheterizations procedures. Nurse also responsible for assessing patient for any negative signs of a change in condition, safe transport, administering medication, helping with basic personal care needs, controlling of bleeding, maintenance of hemostasis. Using an approved protocol of care that is based upon the different educational needs of nurses and considers other relevant factors will help the patients to cope successfully with their condition and minimizing their vascular complications (Ali et al., 2015).

It is the responsibility of the cardiac catheterization team to ensure that the patient is safe from harm as a result of an unintentional encounter of health care providers, therefore ensuring patient safety is at the forefront of policies and practices. Affects patient safety risk awareness and skill, particularly when health-care providers are lacking in safety knowledge and skill to offer safe care to their patients. As a result, nurses' abilities are critical. After learning about the problems and factors related with cardiac catheterization, provide care to patients who require it (Arathy, 2011)

Moreover, nurses should be knowledgeable when preparing patients for the procedure and when providing care after procedure that includes close observation, continuous monitoring, and maintenance of hemodynamic stability. A well functioning unit with a culture of safety, demonstrated clinical quality results, and high internal/external client satisfaction scores to evade the dangers associated with a less reliable unit (Ahmed, 2015).

Despite the importance of nurse knowledge, it is necessary to be skilled in recognizing and interpreting significant prospective and/or

current catheterization issues. The patient's nursing care This process is critical to the test's success and safety. Because any invasive surgery has the potential to cause problems, prompt and correct nursing assessment and intervention are critical (Arathy, 2011).

The function of a nurse in ensuring a patient's safety during a catheterization operation has been described as "spider-in-the-web-like." Cardiovascular crises, such as rhythm detection, early defibrillation, and emergency medicine delivery, are best handled by a professional nurse (Yaqoob et al., 2019).

Between the attending consultants and the patients, nurses can play an important role. Caring as a "nurse" and curing as a "physician" are two facets of this transitional position that can be mixed. This function can only be appreciated if nurses demonstrate these abilities by gaining solid knowledge and mastering practical skills (Wit et al., 2012).

This study will add to the body of knowledge needed to address unsafety measures by allowing the nurses in this study's Center for Cardiothoracic Diseases and Surgery to understand their knowledge of cardiac catheterization safety measures in order to inform instruction of safety methods and meet state requirements.

Furthermore, the research in the field of instruction by offering insight into the expertise of nurses in the Center for Cardiothoracic Diseases and Surgery. Practitioners and participants may find this study useful in a variety of ways. It enhances understanding of cardiac catheterization safety precautions by implementing an instruction program.

1.4. Statement of the Problem

Effect of Educational Program for Interventional Cardiac Catheterization on Nurse's Knowledge at Karbala Center for Cardiothoracic Diseases and Surgery

1.5. Objectives of the Study

1. To assess the nurse's knowledge regarding interventional cardiac catheterization.
2. To determine the effectiveness of the educational program on nurse's knowledge regarding interventional cardiac catheterization.
3. To find out the relationship between the nurse's knowledge and their demographical characteristics.

1.6. Hypotheses

It is hypothesized that the result may reveal:

H1: There were significantly differences between the control and study groups in post-test knowledge scores.

H0: There were no significantly differences between the control and study groups in post-test knowledge scores.

1.6. Definitions of Terms

1.6.1. Effect

a. Theoretical

Is the ability to produce a desired output or the potential of delivering a desired result. When something is regarded effective, it means it achieves the desired result or leaves a lasting impression (Nsengimana, 2020).

b. Operational

In terms of cardiac catheterization safety measures, the ability to produce a precise conclusion or apply a certain quantifiable effect.

1.6.2. Intervention Program

a. Theoretical

Ways to better the situation of individuals who have become dependent on various substances or activities (Fuchs et al., 2003).

b. Operational

To deliver information to nurses about cardiac catheterization refer to a systematically prepared teaching plan.

1.6.3. Knowledge

a. Theoretical

It is the nurse's ability to provide individuals, families, and communities with standardized health care. These nurses' abilities are linked to their expertise (Hegarty et al., 2009).

b. Operational

Knowing something about nurses' knowledge of nursing care to catheterization safety precautions is a fact or situation.

1.6.4. Nurse

a. Theoretical

Nurses provide health care to individuals, families, and communities, as well as coordinating services with other organizations (ICN, 2012).

b. Operational

A person who has been formally educated and trained in the care of catheterization patients.

1.6.5. Cardiac Catheterization

a. Theoretical

Cardiac catheterization is an important diagnostic procedure that involves a thorough examination of the heart and its blood arteries (Rajesh, 2018).

b. Operational

Is a diagnostic and treatment method for specific cardiovascular diseases.

Chapter Two
Literature Review

Chapter Two

2.Review of Literature

2.1. Cardiac Catheterization: Historical Overview

Cardiac catheterization was first utilized on animals by Stephen Hals (1677-1761) and Claude Bernard (1813-1878). Dr. Werner Forssmann was the first to use cardiac catheterization in a clinical setting in 1929, when he placed a catheter into his forearm vein, guided it endoscopically into the right atrium, and x-rayed it. Despite this feat, Forsmann was fired from his post at the hospital due to his unusual techniques (DEXTER, 1981).

Dr. Werner Forssman pioneered cardiac catheterization in 1929, inserting a catheter into a vein to assist him, and her face laparoscopically to the right atrium to pick up her X-ray image (Meruane, 1992).

Despite this achievement, he was fired from his position as due to unusual tactics, Forssman is in the hospital. Andre Frederick Cornan, a physician at New York-Presbyterian/Columbia and Columbia-Bellevue, established the first catheter laboratory during World War II (Jeffrey, 2001).

For the creation of cardiac catheterization, Forssmann and Kornand shared the Nobel Prize in Physiology or Medicine. Dr. Eugene Ostad's study in the 1940s helped pave the path for cardiac catheterization in the United States (West, 2017).

The procedure of placing a catheter into the chamber or course of the heart is known as cardiac catheterization (cardiac catheterization). This is done for the objectives of diagnosis and treatment. A coronary heart catheter, which includes catheters for coronary artery disease, coronary artery, and myocardial infarction, is a common example (heart attack) (Hamid, 2014).

Today, a catheter is a tube that is inserted into the heart through a peripheral artery, such as the femoral or brachial arteries, to reach the heart's left ventricle or coronary arteries, textured contrast simple to detect where X-rays or the introduction of materials or therapeutic equipment are used for diagnostic purposes, such as left ventricular injection or coronary arteries textured contrast easy to see where X-rays or the introduction of materials or therapeutic equipment are used (Sanborn et al., 2014).

2.2. Uses of Cardiac Catheterization

Coronary angiography is a diagnostic procedure that permits coronary arteries to be seen. The vascular hollow of a two-dimensional projection is visualized using fluorescent endoscopy. There are procedures to open these arteries if you have a constriction or blockage in these arteries (Pollak et al., 2012).

The use of mechanical stents, balloons, and other devices to restore blood flow to previously obstructed veins is known as coronary intervention through the skin (blocked) (Çimen et al., 2016).

The catheter's ability to assess heart pressure is also a significant feature. Liquid-lined tunnels with catheters can convey pressure to pressure outside the body adapters. This enables pressure measurement in any location of the heart where catheter insertion is possible (Lehmkuhl et al., 2013).

Blood flow can also be measured using a variety of methods. The Fick concept and thermodilution are widely used to estimate flows. These approaches have drawbacks, but they provide estimates of cardiac gas production, which can be used to aid clinical decisions (such as cardiogenic shock or congestive heart failure). It can be used to aid persons who have survived cardiac arrest outside of the hospital by performing cardiac catheterization as part of a therapy plan (Camuglia et al., 2014).

During cardiac catheterization, endoscopy fluorescence is usually utilized to observe the catheter when it reaches the heart or coronary arteries. The coronary arteries are known as "epicardial vessels" because they are located in the epicardium, the outer layer of the heart (Madhu et al., 2017).

Fluoroscopical contrast involves applying contrast to arching rays, which can result in kidney harm in rare circumstances due to variance. People are frequently exposed to low levels of ionizing radiation during the proceedings (Christopoulos et al., 2016).

Those with certain conditions associated with (people who have many cases at the same time) are more susceptible to adverse outcomes during a cardiac catheterization. Comorbidity of these aortic aneurysms, aortic narrowing, and coronary artery comprehensive three-vascular, diabetes, uncontrolled high blood pressure, obesity, and chronic renal disease pressure, unstable angina (Kern et al., 2015).

2.3. Classification of Cardiac Catheterization

2.3.1. Left Cardiac Catheterization

Left catheter route (thin flexible tube) to the left side of the heart to acquire diagnostic information or to provide therapeutic measures in certain types of heart disease is known as cardiac catheterization. The test can be used to evaluate the pressure and blood flow in the heart's chambers, as well as collect blood samples from the heart and examine cardiovascular X-rays (fluoroscopy) (Feltes et al., 2011).

Use the left cardiac catheterization to check the patency of the coronary arteries and function of the left ventricle and coronary valve and aortic valve. Myocardial infarction, perforation of the heart or major blood arteries, and systemic embolism are all possible complications of arrhythmia. The procedure involved left heart catheterization and left ventricle retrograde catheterization. The catheter is typically placed into the

right brachial or femoral arteries and guided to the aorta and left ventricle. The catheter is then carefully withdrawn using an arterial pressure hemostasis manual or other procedures previously described. The stitching site should be covered with a sterile bandage if the doctor has conducted Hriyanja or intravenously (Kern, 2012).

After disinfecting the site with local anesthetic, a catheter is placed through a tiny incision in the femoral artery or brachial artery. The catheter is then placed into the heart, passing via the aorta and aortic valve, and into the left ventricle, guided by X-ray images termed fluoroscopy. A dye is injected into the heart and blood vessels after the catheter is placed, allowing the structures inside the heart and blood arteries to be seen (Mousa, 2014).

Cardiac catheterization is used to assess the condition of the left heart valve. The heart's function and blood supply are both important. Heart defects that are present at birth. To decide whether or not heart surgery is required. It can be used to fix specific types of cardiac abnormalities with a therapeutic catheter. Activate a clogged heart valve. Expands blocked arteries or cardiac grafts (Mohty et al., 2013).

2.3.2. Right heart catheterization

Doctors can use right heart catheterization (RHC) to determine the pressure inside the heart (the pressure inside the heart). Access to the heart is frequently gained through a vein or the internal jugular thigh. Arteries aren't utilised at all. The most commonly measured pressures are those in the right atrium, right ventricle, pulmonary artery, and pulmonary capillary "wedge" (Ranu et al., 2010).

Cardiac catheterization allows a doctor to grade cardiac output, which is the volume of blood that flows from the heart per minute, and the index of the heart, which is a dynamic component that ties the patient's body size to cardiac output cycle (Kurzyna et al., 2015).

Can evaluate the change in the degree of blood temperature over time in the final spot of the heart by releasing a small amount of cooled or room temperature saline solution in one area of the heart (Carmona-Rubio et al., 2020).

High blood pressure, pulmonary heart failure, and cardiac shock are all treated with right heart catheterization. it can either use a pulmonary artery catheter and have it removed, or you can grow it and have it monitored constantly. This approach can be performed in the Intensive Care Unit (ICU) for multiple measurements of circulatory system parameters in response to interventions (Mangi et al., 2020).

The parameters obtained from a right cardiac catheterization, according to Vizzardi et al., (2015), include:

2.3.2.1. Pulmonary artery pressure.

2.3.2.2. Pulmonary capillary wedge pressure.

2.3.2.3. Systemic vascular resistance.

2.3.2.4. Right atrial pressure.

2.3.2.5. Right ventricular pressure.

2.3.2.6. Pulmonary artery pressure.

2.3.2.7. Cardiac output.

2.3.2.8. Pulmonary vascular resistance.

2.3.2.9. Oxygenation of the blood.

2.3.3. Coronary catheterization

Coronary artery catheterization is a risky procedure that can result in stroke, heart attack, or death. Because the risks and benefits of every action must be weighed, this provision for persons who have symptoms of significant heart disease would never be used for screening purposes. When the diagnosis or confirmation of the diagnosis is ambiguous, it is preferable to employ additional non-invasive examinations (Zheng et al., 2016).

2.4. Indication of Cardiac Catheterization

Indicators for using catheters and coronary intervention in the treatment of angina, including stable and unstable angina, and myocardial infarction caused by a high ST (MI) (De Fer et al., 2011).

The basic principle is that when planning therapeutic intervention for a patient with symptoms, cardiac catheterization is recommended to confirm the presence of clinically suspected cases, determine the severity of anatomical and physiological abnormalities, and determine the presence or absence of associated cases (Stegemann et al., 2011).

Patients with ischemia syndrome of the acute coronary artery (unstable angina or severe heart) who believe the therapeutic intervention unjust myocardial infarction are the most prevalent indications for cardiac catheterization nowadays. For these individuals, the purpose of cardiac catheterization is to identify the underlying lesions and then restore blood channel patency through interference coronal through the skin. A catheter diagnostic may disclose other features in a few of these individuals (for example, many complex blood vessels or major left coronary artery disease, diseases of severe valves related), which is crucial information for making a decision and planning open heart surgery (Callahan et al., 2015).

Although cardiac catheterization is more typically used in adults to evaluate coronary artery disease and determine revascularization appropriateness (Bobbio et al., 2014), it is also suggested that:

2.4.1. Patients with probable restenosis following a previous percutaneous coronary intervention (PCI).

2.4.2. Prior to cardiac surgery.

2.4.3. Despite the fact that cardiac transplant recipients have no symptoms of atherosclerosis, they should get an angiography.

2.4.4. Before electrophysiological testing, determine whether patients with intractable arrhythmias have coronary artery disease.

2.4.5. For cardiomyopathy patients to determine whether coronary artery disease is the cause of symptoms and to assess left-ventricular dysfunction.

2.4.6. Obtain a cardiac biopsy in order to diagnose myocarditis.

2.4.7. To aid in the distinction between myocardial and pericardial constriction.

2.4.8. To assess the extent of valvular regurgitation.

2.4.9. To collect hemodynamic information in individuals with congenital heart disease, such as shunt size or pulmonary vascular resistance.

2.4.10. To see how pharmacological intervention affects the cardiovascular system.

2.5. Cardiac Catheterization Procedure

Cardiac catheterization is a broad word that refers to a variety of operations. A vein or a peripheral artery provides access to the heart. The radial artery and vein, as well as the internal jugular artery and femoral vein, are usually involved. Each vessel has its own set of benefits and drawbacks. Once you've gained access, the plastic catheter is moved to the heart and around using (tiny hollow tubes) and flexible wiring (Bergersen et al., 2011).

It comes in a variety of catheter shapes and lengths, as well as a variety of other specific features including electrodes and balloons. They are used for measuring or intervention after they have been produced. Catheterization necessitates imaging, which can include fluoroscopy as well as echocardiography (TTE, TEE, ICE) and ultrasound (IVUS) (Shaker, 2013).

The Seldinger procedure is used to get access to a vessel by puncturing it with a needle, inserting a wire through the needle into the vessel's lumen, and then swapping the needle for a bigger plastic sheath. It

can be difficult to detect the vessel with a needle, thus ultrasonography and fluoroscopy can be used to help find and confirm access. Wrappings typically have a side port for drawing blood or injecting fluids or drugs, as well as a final slot for the entry of catheters and cables, among other things, that are coaxial in the blood vessels (Enriquez et al., 2018).

What is injected into the container as soon as it is accessed is determined by the action taken. Some catheters have a unique shape that cannot be handled solely by inserting/removing the catheter from the sheath and rotating it. Internal structures, among other structures, may allow internal manipulation (for example, echocardiography within the heart). Finally, the catheter is scabbarded and withdrew after the surgery. Over time, the blood vessel hole close. Hemostasis can be accelerated with the use of vascular closure devices (Mishra et al., 2015).

2.5.1. Techniques

The thigh hole's objective is located halfway between the common origin of the artery epigastric femoral lower and the intricacy of the surface and deep branches, which are usually found in the center of the femoral head. At the center of the inguinal ligament course, crosses the femoral artery, and identifies an imaginary line connecting the top iliac and pubic symphysis bony landmarks. To improve the accuracy of location Puncture, place a buckle lead in the proposed site Puncture and perform a fast test Floro to validate the relationship with a thigh. Get some centers to do groin access under ultrasound guidance on a regular basis (Das et al., 2011).

In one published series, Sobolev et al. (2017) were able to reduce the risk of problems by 49 percent.

2.5.1.1. The femoral artery must be accessed in the proper location, where significant hemostasis can be achieved by applying manual pressure on the artery rather than the femoral head. Hole sites increase

the danger of retroperitoneal hemorrhage and minimize the possibility of aneurysm formation at puncture sites.

2.5.1.2. Improved access to blood arteries utilizing fluorescence endoscope or ultrasound to visualize anatomical features, as well as entry to the artery using a catheter with lower casings acupuncture flour, can lessen the likelihood of access site complications.

2.5.1.3. The radial artery is the most common place to reach in the hand, despite the use of the artery and the ulnar artery brachial in rare circumstances.

2.5.1.4. The radial artery should be accessed two centimeters proximal to the radial styloid. Before reaching the radial artery, an Allen or Barbut test must be conducted to confirm adequate blood circulation in the palm of the hand. Allen necessitates a pressure test on both arterial and radial ulnar until the palm bleaches, after which the artery ulnar is edited.

2.5.1.5. The hand's blush reaction is documented, and if the color in the palm returns within 10 seconds, the blood flow to the hand via the ulnar artery and palmar arch is deemed adequate. The Barbeau test eliminates the subjectivity of the Allen test, and the ipsilateral thumb is fitted with a pulse oximeter. Similar to the Allen test, both arteries are compressed until the pulse oximetry trace is muted.

2.5.1.6. If the pulse oximeter returns to normal within 10 seconds after releasing the pressure on the ulnar artery, the test is considered normal.

2.5.2. Equipment

According to Smith et al., (2012), a facility needs a lot of equipment to perform the various cardiac catheterization procedures.

2.5.2.1. Electrocardiography monitors.

2.5.2.2. External defibrillator.

2.5.2.3. Pressure transducers.

2.5.2.4. Sheaths.

2.5.2.5. Catheters.

2.5.2.6. Film or digital camera.

2.5.2.7. Electrocardiography monitors.

2.5.2.8. Fluoroscopy.

2.5.2.9. Pressure transducers.

2.6. Contraindications to Cardiac Catheterization

According to Mehta et al. (2006), coronary catheterization has no absolute contraindications. The following are examples of relative contraindications:

2.6.1. An infection that has gone untreated due to an unexplained fever.

2.6.2. Severe anemia, defined as hemoglobin levels below 8 g/dl.

2.6.3. Anticoagulation: the international normalized ratio (INR) should not exceed 2.

2.6.4. Active bleeding that is severe.

2.6.5. Gastrointestinal bleeding (acute).

2.6.6. Electrolyte imbalance (severe) (especially hyperkalaemia, as this predisposes to arrhythmias).

2.6.7. Hypertension that is uncontrolled.

2.6.8. Toxic effects of digitalis

2.6.9. Previous contrast allergy with no corticosteroid pretreatment.

2.6.10. A stroke that occurred recently (within a month).

2.6.11. Pregnancy.

2.6.12. Severe renal insufficiency or anuria, unless dialysis is scheduled.

2.6.13. Congestive heart failure that is uncontrolled.

2.6.14. Stabilization of an active endocarditis or other systemic infection.

2.7. Complications of Cardiac Catheterization

The risk of serious complications during diagnostic cardiac catheterization is typically less than 1%, with a fatality rate of 0.05 percent for diagnostic operations. Any patient's complications rate is governed by a number of factors, including the patient's demographics, the anatomy of blood vessels, and common pathological conditions, clinical presentation, and surgery performed, as well as the operator's expertise. Complications can range in severity from minor ones like soreness at the catheter site to major ones like death (Tavakol et al., 2012).

2.7.1. Local Vascular Complications

2.7.1.1. Hematoma/Retroperitoneal Bleeding

These are some of the most common problems that occur following cardiac catheterization. Typically, blood tumors develop after the sheath is removed and hemostasis is poorly managed. Most blood tumors are benign and self-limiting, but big blood tumors can cause circulatory system instability, necessitating resuscitation fluids and blood. In transradial access, the risk of this problem is greatly reduced. If there is a sudden change in the stability of the circulatory system with or without back pain in patients with access through the groin, you should assume retroperitoneal bleeding. Some of these individuals may not have edema in the thigh. Only about 0.2 percent of patients have this issue (Eisen et al., 2013).

It aids in the identification of this condition by combining high clinical suspicion with immediate imaging, usually CT. When a patient's circulatory system continues to deteriorate, it's critical to figure out where the bleeding is coming from. This is a potentially fatal bleed that occurs more frequently when an artery bursts above the inguinal ligament. Most patients are treated by reversing blood clotting and applying manual pressure healing size and surveillance. Patients who have a continual state

of degeneration and need to wrap the main source of bleeding, or who have had balloon angioplasty or stents that are coated with major vascular bleeding (Manda & Baradhi, 2018).

2.7.1.2. Pseudoaneurysm

The creation of a lively local block, termed as a false aneurysm, occurs when the tumor maintains continuity with the bleeding cavity of the artery. This will cause you to be perplexed during the examination. After the reverse common femoral artery, the surface femoral artery has low access. Doppler ultrasound or computed tomography angiography are commonly used to diagnose them. The deceptive tiny size of less than 2 to 3 cm can be healed by dilation of blood vessels, which can be automatically observed by successive Doppler examinations. Can treat aneurysms with large false symptoms with pressure directed ultrasonic cervical dilatation of blood vessels false or injection of thrombin via the skin with ultrasound guidance, or surgical intervention may be required (Sutherland et al., 2010).

2.7.1.3. Arteriovenous Fistula

The establishment of a fistula is associated with excitement or bewilderment when there is direct contact between the arterial puncture sites and the venous with continuous bleeding from the arterial access site. This will almost always necessitate surgical examination because it is unlikely to be treated on its own and has the potential to grow over time (Sousa et al., 2013).

2.7.1.4. Dissection

This is an uncommon condition that arises in patients with advanced atherosclerosis, twisted arteries, or traumatic sheaths. After removing the sheath, usually healed Altslejat that limit is flowing flow automatically. It can cause flow, which lowers the risk of aortic dissection due to the lack of acute ischemic parties, which must be treated

immediately with angioplasty and stents. Vascular surgery is usually reserved for individuals who are suffering from skin failure (Wilson, 2015).

2.7.1.5. Thrombosis and Embolism

Small blood arteries and the related peripheral arterial disease cavities, diabetes, female gender, scabbard with a big diameter, and catheter survival time for long periods are all risk factors. The occlusive sheath is removed, and percutaneous thrombectomy is performed in conjunction with vascular surgery consultation (Bhatty et al., 2011).

2.7.2. Vascular Complications after Transradial Access

After arriving through the arteries, the most prevalent concern is a 5% chance of radial artery blockage. If Allen tests naturally, this is a straightforward clinical issue. Patients who have an arc are treated by blocking the radial artery. Because the test is not normal, the palmar is incomplete, and symptoms of ischemic hand may be exacerbated (van Leeuwen et al., 2019).

The use of topical medicines for vasodilation and systemic anxiolytics helps prevent radial artery spasms and other recurrent problems. The radial artery hole is a rare problem that is usually controlled with external pressure for a long time and only rarely necessitates Vascular Surgery intervention (der Heijden, 2019).

2.7.3. Other Major Complications

Other consequences of cardiac catheterization from clinical outcomes and meta-analysis research, according to Werner et al., (2012), include:

2.7.3.1. Death: The diagnostic procedure of cardiac catheterization resulted in a mortality rate of less than 0.05 percent. Patients who have had their left ventricular systolic function deteriorated, as well as those who have been traumatized by a myocardial infarction, are more at risk. In some patient subgroups, the risk of death can be as high as 1%. Aging, multi-

vessel disease, left main coronary artery disease, or heart disease are all factors to consider. Valvular issues, such as significant aortic constriction, are all risk factors.

2.7.3.2. Myocardial Infarction: Ocean has a low incidence of myocardial infarction (less than 0.1%). This is regulated by a number of parameters, the majority of which are patient-related, such as the amount and severity of primary coronary artery disease, acute coronary syndrome artery contemporary, diabetes (which requires insulin), and technology features.

2.7.3.3. Stroke: Recently, it was discovered that the overall risk of ischemic stroke in this low-chain can range from 0.05% to 0.10% in diagnostic procedures and 0.18% to 0.40% in patient intervention. This could be due to restricted blood flow, which is linked to an increased risk of morbidity and mortality. Patients with severe atherosclerosis in the aorta and aortic arch are at higher risk. Anatomy is complicated. Procedures that involve repeated catheter replacements, extensive catheter manipulation, or the use of solid wire and large lumen catheters are also more sensitive.

2.7.3.4. Dissection and Perforation of the Great Vessels: Perforation of the chambers of the heart, as well as coronary artery perforation, are all uncommon complications. The danger is larger in interventional procedures than in diagnostic procedures alone. Aortic dissection type A, which includes the ascending aorta, will necessitate surgical intervention. Patients with a hole in the heart chamber or a hole in the coronary artery, which leads to the accumulation of blood in the space to pericardial pericarditis, will require paracentesis circulatory surgical and immediate consultation as soon as possible to restore the stability of paracentesis circulatory surgery.

2.7.3.5. Atheroembolism: Distal embolization in several vascular beds can be caused by cholesterol emboli from friable vascular plaques.

Digital discolouration (blue toes) and livedo reticularis are common symptoms. A neurological squeal or renal impairment may also be present. By switching catheters over a long wire and limiting catheter exchanges, the likelihood of this consequence is reduced. Hollenhorst plaque is caused by obstruction of the retinal artery.

2.7.3.6. Allergic Reactions: It could be a reaction to the local anesthetic, contrast agents, heparin, or other drugs used during the procedure. Contrast agent interactions can occur in up to 1% of patients, and those who had previously suffered reactions were treated with corticosteroids and antihistamines. The use of iso-osmolar drugs, as opposed to high osmolar agents, minimizes the risk. Severe reactions are treated with intravenous (IV) epinephrine in the same way as anaphylaxis is handled (initial dose 1 ml of 1:10000 epinephrine).

2.7.3.7. Acute Renal Failure: In patients having cardiac catheterization, the incidence rate of differential nephropathy was extremely diverse (ranging from 3.3 percent to 16.5 percent), resulting in a transitory elevation in serum creatinine levels in the blood following exposure to contrast materials. The prevalence of acute renal damage caused by the variation of 7.1 percent among patients undergoing coronary intervention is voluntary and urgent, according to the National Register of data cardiovascular. Patients with moderate to severe kidney disease, diabetes, the elderly, women, and those using diuretics, ACEI, or metformin are at higher risk. This issue can be avoided with proper pre-hydration, the use of iso-osmolar agents, and strategies to reduce the amount of dye utilized. Renal atheroemboli can induce renal failure and are linked to other embolization symptoms.

2.7.3.8. Infection: Cardiac catheterization is done using a sterile technique, and infection from the procedure is extremely unlikely. It is not

advised for routine endocarditis prophylaxis during cardiac catheterization operations.

2.7.3.9. Radiation Injury: Radiation injury to the patient's skin can range from minor erythema to profound ulceration if the patient is exposed to large doses of radiation in a specific location of the body. Biopsies of these sores on the skin should be avoided because they may exacerbate the problem. A multidisciplinary team of cardiologists, dermatologists, and plastic surgeons must handle the issues.

2.7.3.10. Arrythmias: A catheter, contrast material, or balloons that become clogged during the procedure may induce irritation or ischemia of the heart muscle, resulting in ventricular fibrillation or ventricular tachycardia. Among some situations, irregular heartbeats are more likely in persons who have had an acute myocardial infarction in the heart. Treatment for these irregular heartbeats includes cardioversion, as well as medicines for arrhythmia and reopening the blocked artery. During a self-limited disruption in the heart fibrillation systems, it might induce irritation of the right atrium and right heart catheterization.

2.8. Importance of Nurses Knowledge in cardiac catheterization

Stayt et al. (2015) investigated the importance of well-trained nurses and discovered that a mix of simulation (hands-on training) and classroom learning was more successful than classroom training alone. The combination learning group scored considerably higher on post-tests of knowledge in recognizing a worsening patient. Vernon and Papps (2011) define nursing competence as "skills, knowledge, and abilities acquired through structured, standardized, and unambiguous training that supports initial and ongoing competence.".

There is a significant gap in the literature about the standardization of training and understanding in the management of vascular access. Many of the writers stated that more research on the nursing intervention is required, as well as the development of a standard practice for the care of patients after catheterization (Rolley et al., 2009; Sulzbach-Hoke et al., 2010; Tagney & Lackey, 2005). Tagney and Lackey (2005) It's worth noting that, despite the proliferation of techniques, procedures, and cardiac centers, there hasn't been much work in VASC management to investigate the impact of intervention nursing, a tendency that has remained since their analysis.

Despite a rise in procedures, according to Rolley et al. (2009), there is a lack of data on nursing care for postcatheterization patients. They go on to say that the influence of nursing care prior to and after catheterization, as well as the development of nursing care guidelines, has yet to be studied. Despite advances in technology, Sulzbach-Hoke et al. (2010) emphasize a lack of broadly accepted evidence-based guidelines for nursing care of post-catheterization patients and persistent concerns with vascular consequences.

Table 2.1: Checklist for safe catheterization intervention in the lab

SIGN IN-before/as the patient arrives	TIME-OUT-prior to puncture/skin incision	SIGN OUT-before patient leaves
Equipment cleaned, functional and ready for use ▪ Infusion pump ▪ Oxygen tubing and mask Medrad pump emptied and cleaned ▪ SATS probe and BP cuff ▪ Diathemy (if applicable) Confirm the following information: ▪ Patient identity Consent ▪ Procedure to be done ▪ Access site Pregnancy status IV access ▪ Creatinine levels Diabetic status ▪ Patient notes Drug chart ▪ Blood cross-matched ▪ Infection control procotol (if requiered) Team-working ▪ All team members introduced themselves by name and role Allergy Does the patient have a know allergy Y/N Allergy is to…… If yes Anti-allergy protocol commenced	Anaesthesia Checklist completed by anaesthetic team Is there a difficult airway/aspiration risk Y/N Monitoring systems, functioning and attached, alarms set ▪ ECG/EPS references patches ▪ SpO2 ▪ NIBP/invasive BP ▪ Remote defib patches attached ▪ Diathermy patch applied in appropriate positions ▪ Other required equipment identified present and functional Anticipated adverse events ▪ Operator - are there any critical or unexplained steps, or specific equipment or drug requirements that the team has not yet prepared? ▪ Nurse - are there any patient specific concerns, drugs, equipment or blood needed? ▪ Anaesthetist - are there any patient specific concerns, drugs, equipment or blood needed? ▪ Cardiac physiologist - are there specific concerns or newly identified equipment needed? ▪ Radiographer - are there any concerns or are high radiation doses expected? ▪ Other relevant staff issues?	Nurse confirms with the team ▪ Amount of contrast used ▪ All counts are correct, if applicable ▪ Patients wound(s) intact and dressed appropriately Handover management ▪ Post procedural instruction given to recovery/ward/ICU Documentation completed ▪ ICP completed and put into the notes ▪ Procedure documented in ICP by doctor Radiographer confirms with the team Radiation dose within acceptable limits Cardiac Physiologist confirms with the team ▪ That the physiology report has been completed and filed in the notes ▪ Pacing programmed appropriately and adequately, if applicable Adverse events Was there an adverse clinical event(s) Y/N If yes ▪ Has there been a debrief? ▪ Has the event(s) been reported?

2.9. Theoretical Framework

The Evidence Based Practice Paradigm serves as the project's theoretical framework (Leach, 2006). The framework, which was first recognized in 1970, allows for program development and implementation to be based on the finest and most current research rather than anecdotal beliefs and historical techniques. The model is made up of five steps, as shown in the diagram (Figure 2-1). This methodology allows for the use of validated evidence in a circumstance where a need has been identified in a clear, simple, and transparent manner. In this section, we go over how to apply the paradigm to a research project (Figure 2-2).

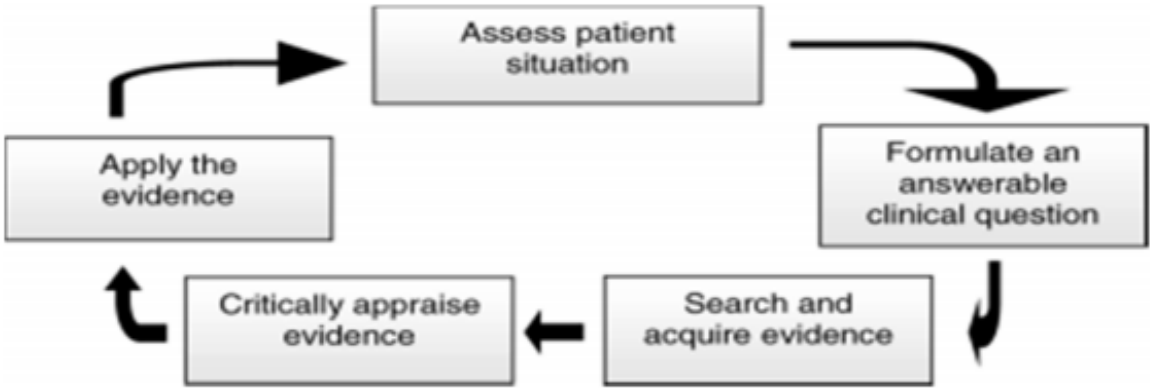

Figure 2-1. Evidence Based Practice Paradigm. From Evidence-based practice

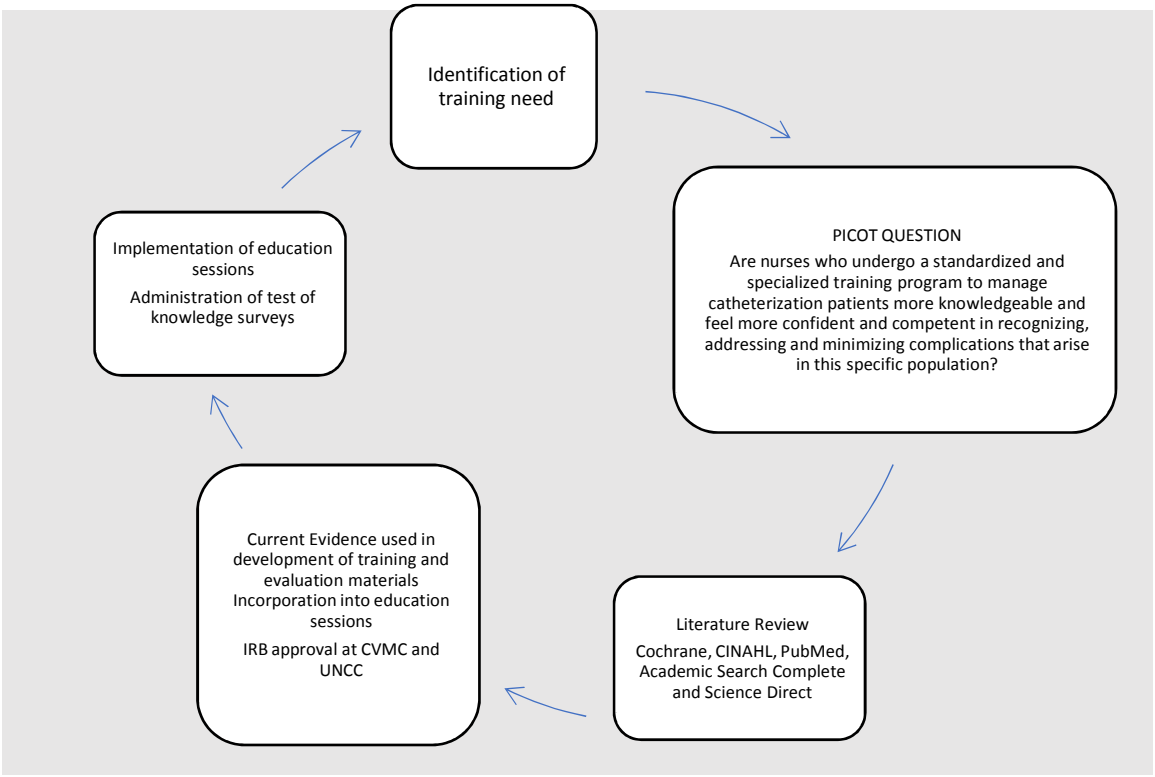

Figure 2-2: Application of Theoretical Framework to Scholarly Project

The evidence-based practice (EBP) framework emerged in the early 1970s as a means of improving clinical practice. This shift towards EBP allowed health professionals to move from a culture of delivering care based on tradition, intuition and authority, to a situation where decisions were guided and justified by the best available evidence. Despite the many advantages of EBP, many practitioners remain cautious about embracing

the model. Part of this opposition is due to a misunderstanding of EBP (Leach, 2006).

2.10. Prepare the patients for cardiac catheterization

2.10.1. Before the Tests

2.10.1.1. Cardiac catheterization is typically done in a hospital setting. The exam necessitates considerable preparation.

2.10.1.2. Patients undergoing catheterization should not eat or drink anything for at least 6 hours prior to the procedure, or as recommended by their physician. Anesthesia issues can be increased if a patient has food or drink in their stomach.

2.10.1.3. Inquire about diabetic meds and insulin if the patient has diabetes. Soon following the test, you should be able to eat and drink something.

2.10.1.4. Patients may be advised to cease using blood thinners including warfarin and aspirin, as well as Opeixaban, Dabijatran, and Revarocassapan, by their doctors.

2.10.1.5. Patients instruct for take all medications and supplements. It's best if take the original bottles so that doctor will know the exact dose take (Buzatto & Zanei, 2010).

2.10.2. Before the Procedure

The patients' blood pressure and pulse are measured. Also, go the restroom to empty your bladder. Patients must remove their teeth and sometimes their jewelry, particularly necklaces that could interfere with the heart images. It is necessary to wait in a preoperative room till the procedure is scheduled (Buzatto & Zanei, 2010).

2.10.3. During the Procedure

According to Ying Chair et al., (2012), patients get cardiac catheterization for the following reasons:

2.10.3.1. X-ray imaging tools are used to do cardiac catheterization in the operating room. sterile environment in a cardiac catheterization lab, such as an operating room.

2.10.3.2. When a patient is awake but under anesthesia, cardiac catheterization is frequently performed. While the patient is under general anesthesia, some therapies, such as valve removal, valve repair, or valve replacement, can be performed.

2.10.3.3. Any additional medications you may require during the procedure will be administered through an intravenous line in your hand or arm. During the test, you will be in charge of the patient's entry devices (electrodes) on his chest, which will be used to monitor his heart rate.

2.10.3.4. It can shave hair from the nurse or artistic place catheter insertion before surgery immediately. It must be given an anesthetic injection to numb the area before inserting a catheter into the artery. Before the start of anesthesia, patients may suffer inconvenience stinging brief.

2.10.3.5. After the patient has been anesthetized, the catheter will be implanted. It is cut into small pieces to provide access to the artery. The catheter will be placed in a plastic casing in the wound to allow the doctor to insert it.

2.10.4. After the Procedure

According to Carroll et al., (2017), the following actions should be taken after patients have their hearts cauterized:

2.10.4.1. After the operation, the patient will most likely spend several hours in the recovery room as the anesthetic effect wears off. Immediately after the operation, pull the plastic sheath that was inserted in the groin, neck, or arm.

2.10.4.2. When the patient leaves the recovery room, he is escorted to a regular hospital or outpatient room. After the catheter has been withdrawn, the sheath will be removed by clicking on the entry sites by a technical or nurse. If the artery is in the thigh, the patient must lie down for several hours following treatment to avoid significant bleeding and enable the artery to recover.

2.10.4.3. The patient should be able to eat and drink after surgery. Depending on your condition, you will choose the length of your hospital stay. If the patient needed more treatment, such as angioplasty and stenting, he or she could go home the same day the catheter was removed, or they could have to stay all night or longer.

2.111. Role of Nurses in cardiac catheterization

It is to get a brief biography and verify that biographical information and next of kin are valid, as well as to guarantee that medical records are current and that in the event of an emergency. Nurses' responsibilities and functions, according to Yan et al., (2011), include:

2.11.1. Explain what a coronary angiography is and what will happen during and after the operation to the patient and their family. Provide a procedure-related information booklet. Discussion and reassurance may help to alleviate some of the anxiety and panic that you are experiencing.

2.11.2. Determine whether the patient has any food, medication, or other substance allergies. If the patient is allergic to any of the medications that may be used during the surgery, tell the doctor.

2.11.3. Review your medication schedule. Metformin-associated lactic acidosis can be triggered by the contrast dye used during the surgery, hence it should be stopped 24 hours before the procedure.

2.12.4. Nephrotoxic medicines and non-steroidal anti-inflammatory drugs should be avoided for a few days prior to the procedure to reduce the risk of renal problems.

2.11.5. To achieve an INR of less than 2, warfarin should be stopped at least 48 hours before the surgery.

2.11.6. If the patient is taking low-molecular-weight heparin, the last injection should be administered at least 12 hours before the treatment.

2.11.7. Make sure you have a current full blood count, as well as urea and electrolyte blood results.

2.11.8. Examine the left and right pedal pulses for any abnormalities. This information will be compared when assessing peripheral pulses.

2.11.9. Make sure the patient has shaved their groin properly if it is not against their religious views.

2.11.10. Take measurements of the patient's height and weight. Some of the medications provided during the surgery may be determined based on the patient's weight.

2.11.11. Inform the patient of the hospital's pre-procedure fasting policy.

2.11.12. Allow patients to empty their bladders before to the surgery to make them feel more at ease.

2.11.13. Before the procedure, make sure that the informed consent form has been signed. This is a legal obligation.

2.11.14. The radiographer may ask the patient to sign a paper declaring her pregnancy status if she is a woman of childbearing age.

2.12. Nursing Care Plan for Patients

The nursing care plan for cardiac catheterization patients was given below, according to Carpenito-Moyet (2009):

Some of the goals of nursing care planning for patients who may undergo cardiac catheterization include strengthening appropriate ischemia, reducing fear and anxiety, providing training and information, and

preventing injury. After cardiac catheterization, the patient must be closely monitored in order to discover early abnormalities and reduce mortality and morbidity.

2.12.1. Nursing Diagnosis: Ineffective peripheral tissue perfusion may by RT clot formation at the puncture site.

Possibly evidenced by

2.12.1.1. Tingling feeling on the afflicted extremity.

2.12.1.2. Decreased or absent pulses distal to catheterization site.

2.12.1.3. Cool, mottled look of the affected extremity.

2.12.1.4. Pain.

Nursing Interventions	Rationale
Keep in mind the affected parties' color, temperature, and capillaries. It's necessary to make contact with remote impulses. For the first four hours, you must use the Doppler every 15 minutes, then every 30 minutes for three hours, then every four hours.	Clot formed in the drainage site, indicating that the patients is at danger of clots, which obstruct lengthy blood flow and cause tissue damage. Regular assessment allows the proper perfusion parties to intervene in a timely manner if necessary.

2.12.2. Hyperthermia may be RT reaction to the radiopaque contrast substance utilized during catheterization.

Possibly evidenced by

2.12.2.1. Increase body temperature within a few hours after surgery.

Nursing Interventions	Rationale
Measure body temperature every hour for the next 6 hours and repeat the procedure.	☒ It gives instructions on how to proceed. ☒ The adequacy of regular fluid intake and disposal is evaluated. ☒ Drinking more water aids in the removal of the dye.

2.12.3. Fare may be RT fear of needles and fear of exposure, invasive, painful procedure, separation from parents, risk of harm.

Possibly evidenced by

2.12.3.1. Concern expressed about upcoming surgery.

2.12.3.2. Nervousness.

2.12.3.3. Inattention.

2.12.3.4. Clinging to parent.

2.12.3.5. Protests in the form of words.

2.12.3.6. Withdrawal.

Nursing Interventions	Rationale
Examine the patient's knowledge of the catheter, as well as any concerns you may have.	Provides information and answers to specific questions; Fear and bewilderment about the process, as well as feelings of guilt and anxiety about pain and complications, are all sources of anxiety in patients. Other worries in patients may include separation from parents, dread of the unknown (if this is the first catheter), fear of mutilation and death, or remembering the fear and anguish (in the case of a repeat catheter).

2.12.4. Risk for injury may be RT altered hemostasis and trauma from a percutaneous puncture.

Possibly evidenced by

2.12.4.1. Consciousness level has dropped.

2.12.4.2. Reduced blood pressure and increased apical heart rate.

2.12.4.3. The catheterization site is bleeding.

2.12.4.4. Bruising.

Nursing Interventions	Rationale
For the first four hours, check vital signs every 15 minutes, then every 30 minutes for three hours, then every four hours.	☒ Internal bleeding, which can cause changes in vital signs and suggest blood loss, can be the first sign of a health condition. ☒ In order to evaluate post-catheter data. ☒ Hold the wound down to prevent bleeding. Bleeding or even leakage should not occur.

2.13. Patients Safety

To ensure patient safety and follow nurses' instructions, the patient must be accompanied by an adult for 24 hours after receiving a catheter. If patient feel dizzy the first time he get out of bed, call doctor right once. (E. Chambers et al., 2011).

2.13.1. Information about the trip home

The patient can leave the hospital after performing the catheterization on the same day or spend one night in the hospital and then leave the next day (Martin et al., 2010). Here are some instructions for the trip home:

2.13.1.1. Walking for 5-10 minutes every hour during the trip home.

2.13.1.2. Direct any inquiries or questions related to returning home to a member of the medical care team following his condition.

2.13.2. Site wound care

2.13.2.1. The medical dressing covering the wound or the place where the catheter was inserted can be easily removed the morning after the operation, after moistening the tape with water while showering.

2.13.2.2. The wound site is covered with an adhesive bandage after you finish bathing. It should be noted that it is normal for the wound site to turn black or blue for a few days. It is also possible that the wound site will swell and turn pink and a small tumor the size of a dirham will appear in that place.

2.13.2.3. Clean the wound area at least once a day, taking into account to avoid rubbing it and to just put a little soap on the palm of the hand or a clean cloth and clean the place gently and then wash it with water

2.13.2.4. Keep the wound area clean and dry all the time, except when taking a shower.

2.13.2.5. Avoid applying cream, lotion, or ointment to the wound area.

2.13.2.6. Refrain from washing, swimming or getting wet with water for a week after the catheterization procedure.

2.13.2.7. Avoid wearing tight clothing around the wound area (Evans et al., 2021).

2.13.3. Tips for resuming activities of daily living

The attending physician determines the period after which the patient can resume his normal routine activities, but the patient should be careful in the first two days after returning home, as he is expected to feel tired and weak the day after the catheterization procedure, and this must be done slowly so that he does not feel Dizzy, just walking around the house and resting during the day (Seto et al., 2018).

2.14. Previous related Studies

Patterson (2017)

Developing Confidence and Knowledge in Nurses Managing Post-Catheterization Patients

Aims: An evidence-based program was developed to provide education aimed at increasing nursing knowledge and to positively impact their attitudes about confidence and competence in caring for post-catheterization patients.

Methods: Thirteen 2-hour face-to-face education sessions were offered over three months to 141 nurses identified by nursing directors as nurses working on units that accept postcatheterization patients. A sample of 17 participants participated in the scholarly project with all completing a test of knowledge and most completing a survey about beliefs preand post-education. A statistically significant difference was measured in total score between pre-test (M=18.76, SD=2.04, SE=.50) and post-test (M=23.35, SD= 1.84, SE= .44); t(16)=-9.037, p=.000. Questions regarding management of complications provided some of the lowest initial scores and largest increase in scores on the post-test of knowledge. . No

statistically significant change in attitudes about nursing competence and confidence was measured.

Results suggest that while nurses gained knowledge about post-catheterization patients by attending the education sessions, experience may be more important to recognize and manage complications. As a result of time and practical constraints, hands-on experience was not possible during this study. This underscores the need for future education sessions offered concurrently with clinical hands-on experience managing vascular access sites and complications in a controlled setting.

Elgazzar & Keshk (2018)

Effect of a construction educational protocol on nurses' knowledge, performance and its effect on patient satisfaction undergoing cardiac catheterization

Aims: This study aimed to investigate the effect of a construction educational protocol on nurses' knowledge, performance and its effect on patient satisfaction undergoing cardiac catheterization.

Methods: This quasi-experimental study was conducting in catheterization, intensive care and cardiac care unit at general Port Said hospital in Port Said city – Egypt including all nurses were worked at those units (51) and all patients admitted to cardiac catheterization unit within 6 month. Data was collected through Socio -Demographic data sheet, structured questionnaire to assess knowledge, observational checklist to assess nurses' performance and tools to assess patient sociodemographic data and patient satisfaction.

Results: There was increase nurses knowledge and performance in the post educational protocol in all domains of care regarding cardiac catheterization. While, majority of patients were satisfied for the nursing care before, during and post cardiac catheterization procedure that rendered by nurses that have educational protocol. Also, strong positive correlation

between nurses' knowledge and patient satisfaction at post educational protocol with statistical significant differences.

Thabet et al., (2019)

Assessment of Nurse's knowledge and practice for patients undergoing Cardiac Catheterization

Aims: This study aimed to assess nurse's knowledge regarding patients undergoing cardiac catheterization.

Method: descriptive research design was utilized in this study. Setting: the study was conducted in cardiac catheterization unit at Assiut University Hospital. Participants: A convenience sample including all nurses working (24) at cardiac catheter unit who are willing to participate in the study. Tools: A) Structured interview questionnaire sheet. b) Observation checklist sheet.

Results: the results showed that; the highest percent of nurses (41.7%) their age was more than 30 years and have diploma degree; (62.5%). Their years of experience ranged from5 to 10years (41.7%). The majority of nurses (87.5%) had no in-service training courses related to cardiac catheterization and heart disease. nurses showed inadequacy of their knowledge regarding care of patients undergoing cardiac catheterization. Nurses are need for in-service training programs and refreshing courses to improve their knowledge which will reflect into their knowledge and practice while working with patients.

Obaid and Mohammed (2020)

Effectiveness of Educational Program on Nurses Knowledge toward Nursing Management for Patients Undergoing Percutaneous Coronary Intervention in Cardiac Center at Al-Dewaniyah City.

Aims: The study aims to evaluate the effectiveness of the educational program on nurses' knowledge towards nursing management for patients undergoing percutaneous coronary intervention (PCI), as well

as to find out the relationship between nurses' knowledge and some of their demographic characteristics (age, gender, level of education, and years of experience in cardiac units).

Methods: A Quasi-experimental as one group (pre and post test) study was conducted at the Heart Center in Al-Diwaniyah city for the period from December 7, 2019 to February 23, 2020. A sample of (40) nurses working in the heart center was chosen from different nursing addresses. The sample covered one group, (40) nurses and the crew had a face-to-face educational program on nurses' knowledge towards nursing administration for patients undergoing (PCI). Data were gathered during the utilization of the adopted questionnaire and interview technique. The questionnaire was consists of (53) multiple-choice questions(MCQ) related to Nursing management For Patients Undergoing PCI , the reliability of instrument for knowledge is (0.93) Sequentially, by using Cronbachs alpha, the data analysis done by using the statistical methods which include (descriptive, and inferential statistics).

Results: Vast majority of sample are at age of (31-40) years old, female (52.5%), educational level is diploma degree (37.5%), experience in cardiac units is (6-9)years , Participation in training course is (yes, 82.5%) ,number of training courses (2), Training course place is Inside Iraq (93.93%), and there are statistically significant differences between the pre and post tests in the main general areas with regard to the nurses' knowledge regarding the nursing management towards the patients undergoing PCI. The correct answer in the pre-test was 0.417% and in the post-test, these answers increased to 0.814%.

Chapter Three Methodology

Chapter Three

Methodology

This chapter covers the research concept and procedure of evaluating the effect of a nurse knowledge-based interventional cardiac catheterization educational program. This section also covers the study's administrative, data collection, and the a quasi-experimental tool's validity and reliability, as well as data analysis.

3.1. The Study Design:

The use of a quasi-experimental design study with the application of pre-test and post-test both intervention and control groups done during the period September 27th 2020 to July 20th 2021 was used to achieve the study's objectives.

3.2. Administrative Permission:

The official permissions were obtained from relevant authorities before collecting the study data as follow:

3.2.1. Approval from the Research Ethical Committee at the College of Nursing/ University of Babylon (Appendix A1).

3.2.2. Official permissions were also obtained from the Karbala Health Directorate and in order to formally Center for Cardiothoracic Diseases and Surgery (Appendix A2).

3.2.3. The permission is presented to Center for Cardiothoracic Diseases and Surgery (Appendix A3).

3.3. The Setting of the Study

In order to obtain valid and comprehensive data, the study is conducted at Karbala Center for Cardiothoracic Diseases and Surgery was the designated site for data collection. These center were chosen for the following reasons:

3.3.1. These center received all adult patients with cardiac problems who attended for treatment and follow up.

3.3.2. There are only Center for Cardiothoracic Diseases and Surgery in Holy Karbala City have.

3.3.3. A large number of nurses work in these center, allowing for data collection completion within a limited time period.

3.3.4. Cooperative staff for implementation of the educational program.

3.3.5. Availability of physical requirements such as classrooms, chairs, tables, data show, computers, speakers, and lights during the implementation of the program.

3.4. Sampling:

A non-probability "purposive" sample had been consisted of (50) nurses have been selected to obtained represent and accurate data. The size of sample is (50) nurses divided into two groups reach one consists of (25) nurses as control group and intervention group. The intervention group is exposed to the nursing educational program while the control group has not been exposed to the nursing educational program.

To obtain representative and accurate data, a purposive sample was chosen. The sample consisted of (50) nurses divided into two groups, each group (25) nurses as the intervention and control groups. The intervention group was given access to a nursing educational program, while the control group was not given education program.

3.4.1. Inclusion Criteria:

3.4.1.1. Nurses who are working in the cardiac center.

3.4.1.2. Male and female nurses who have one year of experience or more.

3.4.1.3. Nurses with different educational levels (Bachelor degree in nursing, Diploma in nursing and secondary school nurses).

3.4.1.4. Nurses who are working in both day and night shifts.

3.4.1.5. Nurses who scored less than 60% in the pre test (Appendix B).

3.4.2. Exclusion Criteria:

3.4.2.1. Nurses who refused to participate in the study.

3.4.2.2. Nurses who scored 60% or more in the pre-test.

3.4.2.3. Nurses with less than one year of experience.

3.4.2.4. Nurses who refused to complete the study.

3.5. Steps of the Study

The present study was conducted at the following steps:

3.5.1. Preliminary assessment of nurse's knowledge about Interventional Cardiac Catheterization

The objective of this assessment was to evaluate the knowledge of the nurse's needs about interventional cardiac catheterization. To accomplish this phase of the study, the researcher used a open questionnaire format. The content of the format was based on the review of related literature and subjective experiences of the knowledge questions. A test was applied on a sample consisting of (20) nurses working in Center for Cardiothoracic Diseases and Surgery. As for assessment of the nurses needs a questionnaire. Each nurse was given a time period between (15-20) minutes to answer the questions. The results of the assessment revealed that the majority (38%) of the nurses displayed knowledge deficit about What are the interventional cardiac catheterization concept and indications, medicines and diagnostic examinations for patients before, during and after cardiac catheterization.

3.5.2. Construction of the Nursing Educational Program

The educational program design was based on the results of nurse's needs assessment; and information gained from reviewing the relative scientific literature, previous studies and through the researcher's experience. The content of the program evaluated by experts in different field (Appendix C). Revision was made on the contents of the program

form based on these experts' recommendations and suggestions. They have agreed that the program was designed efficiently to improve nurses' knowledge toward educational program for interventional cardiac catheterization. The educational program was designed to provide the nurses with information development related to concept, indications, medicines and diagnostic examinations for patients before, during and after interventional cardiac catheterization (Appendix D).

3.5.3. Group Assignment

3.5.3.1. Control Group:

Nurses in the control group were exposed only to the usual activities of the units. Namely, the regular methods of information provided by the nurses or physicians. This information also included brief instructions, which was provided by the physician. If the nurses in the control group asked the researcher questions, they were instructed to refer their questions to appropriate members of the health team, e.g., nurses and the physician.

3.5.3.2. Intervention Group:

The intervention group got the same information as the control group, as well as an educational program aimed at improving the nurse's knowledge of interventional cardiac catheterization.

The program consisted of five sessions and was implemented for two weeks period in medical department. Each session deals the follows:

3.6. Educational Program

3.6.1.The first week :-

3.6.1.1. First Session: Overview about cardiovascular system, cardiac catheterization, indications and contraindications of it.

❖ **Session outlines:**

1- Overview about cardiovascular system.

2- Introduction about cardiac catheterization.

3- Indication and contraindication of cardiac catheterization procedure.

❖ **Session objective:**

At the end of the session, the participant (nurse) should be able to:

1) Explains of the anatomy and physiology of the cardiovascular system.

2) Discuss of cardiac catheterization.

3) Knowing the indications and contraindications for cardiac catheterization.

❖ **Session place:** Kerbala center for cardiac disease and surgery.

❖ **Time:** 60 minute.

Teaching instruments: Power point lecture, paper lecture, video, Whiteboard, Computer laptop.

3.6.1.2. Second session: Nursing management for patients with cardiac catheterization before procedure.

❖ **Session outlines:**

1- Diagnostic and laboratory test before cardiac catheterization procedure.

2- Medication that withheld and that use before, during and after cardiac catheterization procedure.

3- Physical preparation before cardiac catheterization procedure.

❖ **Session objective:**

At the end of the session, the participant (nurse) should be able to:

1- Explains of laboratory and radiological examinations in cardiac catheterization.

2- Knowing the medication for patients whose undergoing cardiac catheterization.

3- Discuss how to prepare the patient for cardiac catheterization.

❖ **Session place:** Kerbala center for cardiac disease and surgery.

❖ **Time:** 60 minute.

Teaching instruments: Power point lecture, paper lecture, video, Whiteboard, Computer laptop.

3.6.1.3. Third Session:- Nursing management during cardiac catheterization procedure.

- **Session outlines:**

1- Nursing management during cardiac catheterization procedure.

- **Session objective:**

At the end of the session, the participant (nurse) should be able to:

1- Knowing the role of the nurse in the cardiac catheterization theater.

2- Explains how to monitor patient vital signs and drug reactions during cardiac catheterization procedure.

3- Full coordination between the medical team in the operating theater and the cardiac catheter ward nurse.

- **Session place:** Kerbala center for cardiac disease and surgery.
- **Time:** 60 minute.

Teaching instruments: Power point lecture, paper lecture, video, whiteboard, computer laptop.

3.6.2. The second week :-

3.6.2.1. First Session: Nursing management after cardiac catheterization procedure.

- **Session outlines:**

1- Nursing management after cardiac catheterization procedure.

- **Session objective:**

At the end of the session, the participant (nurse) should be able to:

1- Knowing the role of the nurse in the cardiac catheterization ward.

2- Knowing nursing care to the patient after cardiac catheterization.

3- Continuous communication with the specialist doctor about occurs any changes in the patient's condition.

- **Session place:** Kerbala center for cardiac disease and surgery.

- **Time:** 60 minute.
- **Teaching instruments:** Power point lecture, paper lecture, video, Whiteboard, Computer laptop.

3.6.2.2. Second session: Most common risk factors and complications at cardiac catheterization procedure.

- **Session outlines:**

1- Knowing of the complications during and after at cardiac catheterization procedure.

2- Nursing care and avoid of complications during and after cardiac catheterization.

- **Session objective:**

At the end of the session, the participant (nurse) should be able to:

1- Explains the complications that may occur during and after cardiac catheterization.

2- Discuss how to nursing management for complications during and after cardiac catheterization.

3- Knowing avoid complications that may occur during and after cardiac catheterization.

- **Session place:** Kerbala center for cardiac disease and surgery.
- **Time:** 60 minute.
- **Teaching instruments:** Power point lecture, paper lecture, video, Whiteboard, Computer laptop.

3.7.Selection of Study Sample

A total of (97) nurses were working in the cardiac center during the time of the study period and met the study criteria and agree to participate. Ten nurses for pilot study were excluded from the study. Twenty nurses from the total sample have participated in the needs assessment also excluded from the study. The rest of nurses were divided into two groups as (25) to the intervention group and (25) to the control group.

3.8.Validity of the Questionnaire and the Program

The program's content validity, as well as the study instruments' knowledge tests, were determined by a panel of (15) experts with more than five years of experience in their field to investigate the content of the educational program and questionnaire for nurses' knowledge interventional cardiac catheterization (Appendix E). After a face-to-face discussion with each expert and after the instrument was considered valid after taking all of the comments and recommendations into consideration, those experts were asked to review the instruments; the program for content, clarity, relevancy, and adequacy; some items were excluded and others were added; some items were excluded and others were added after a face-to-face discussion with each expert and after the instrument was considered valid after taking all of the comments and recommendations into consideration. The final text was unanimously approved by all specialists.

3.9. Pilot Study

In order to find out the reliability of the questionnaire, a pilot study is carried out on 10 nurses. The nurses in the pilot study have the same criteria of the original study sample; it was conducted at Center for Cardiothoracic Diseases and Surgery during the period from March 17th May 4th 2021.

Participants are submitted to test and after four weeks exposed to retest. Finally, educational program applicator after complete the retest. The participants in the pilot study are excluded from the original study.

3.9.1. The Purpose of Pilot Study

1. To determine whether the contents of the questionnaire are clear and understandable to the study participants.
2. To determine the time required for answering each question.
3. To determine the reliability of the questionnaires.

3.9.2. Result of Pilot Study showed that:

1. Questionnaire was clear.
2. The time required for knowledge test to be answered was (20-25) minutes.
3. Time required for each session (60-90) minutes.

3.9.3. Reliability of the Instrument:

Reliability of the study instrument (questionnaire) was determined through the use of test and re-test approach on 10 nurses selected from those who are work at Center for Cardiothoracic Diseases and Surgery, and period was two weeks to determine of interval consistency of nurses' knowledge toward interventional cardiac catheterization. The scale had an acceptable level of internal consistency, as determined by a Cronbach's alpha as shown below:

Table3-1: Reliability of the Studied Questionnaire

Variable	Value of Cronbach's alpha		Actual value	Assessment
Knowledge 48 items	Test	Re-test	0.70	Pass
	0.74	0.83		

This table is statistically formed to show the reliability coefficient for the instrument of the present study. Its results show that the study instrument is reliable. The results of the pilot study reveal that the questionnaire is passing and reliable to study the phenomenon on the same population at any time in the future (Wood and Haber, 2014).

3.10. Ethical Considerations

Nurses were informed that their participation was voluntary in the study. The purpose and the benefits of the study was explained by the researcher. After they agreed to participate in the study, anonymous questionnaire was handed to them to maintain a complete confidentiality for the participants.

3.11. Measurements at Pre-Test (base line) and a 1-Month Follow up After the Educational Program (post-test)

Prior to the implementation of the constructed program, a pre– test was introduced to assess the nurses' knowledge. A list of (48) items were used to assess knowledge (Appendix D). The same items were used as a post–test which was applied two weeks after implementation of the program.

3.12. Methods of Data Collection

The implementation was carried out in the cardiac center throughout the period from May 5th to 21th 2021.

The implementation of the program which was introduced to intervention group included the following:

3.12.1. In the intervention and control groups, each nurse in the center for cardiothoracic diseases and surgery filled out a demographic data form.

3.12.2.A pre-test was given to all of the nurses in the study to assess their knowledge on an individual basis, the pre-test lasted (15-20) minutes.

3.12.3. At 12 p.m., they were summoned to the same classroom sessions to take part in an educational program.

3.12.4. There were (48) questions on the nurse's knowledge test. Both the intervention and control groups were given various alternatives. The examination was designed to evaluate the nurse's knowledge on concept, indications, medicines and diagnostic examinations for patients before, during and after cardiac catheterization. The post-test took the same amount of time as the pre-test.

3.12.5. Each class will take 60-90 minutes to complete.

3.12.6. In this study, all nurses in the intervention and control groups were given a posttest right at the end of the program.

3.12.7. The control group had the same procedures as the experimental group, with the exception of the nursing educational program.

3.12.8. These sessions included the following teaching materials: (classroom, lectures, white board, computer, data show, book late demonstrate, not book). All of the educational program's lectures were held in Karbala Center for Cardiothoracic Diseases and Surgery.

3.13. Methods of Statistics

The collected data of the study was analyzed using SPSS "Statistical Package of Social Sciences" version 20 and Microsoft Excel (2010):

3.13.1. Descriptive approach

A. Statistical tables Freq. and % which are:

$$\% = \frac{\boldsymbol{Frequency}}{\boldsymbol{Sample\ Size}}\ x100$$

B. Mean of scores.

The average score can be calculated by using the following:

$$M.S = \frac{\sum \text{ri} = 1\text{Fi x Si}}{\sum \text{ri} = \ 1\text{Fi}}\ x100$$

∑xi = sum of the ***1xIncorrect+2xCorrect*** for items.

(1) M.s.=1-1.33 is considered ***Fail***.

(2) M.s.=1.34-1.67 is considered ***Fair.***

(3) M.s.≥1.68 is considered ***Pass.***

C. The test of standard deviation S.d.

$$SD = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(Xi - \tilde{\chi})^2}$$

D. It employs the Cronbach alpha correlational coefficient in determining the research tool's internal consistency, which may be determined using the formula below:

$$\alpha = \frac{K}{K-1}\left[1 - \frac{\sum_{i=1}^{K}\sigma_{ii}}{\sum_{i=1}^{K}\sum_{j=1}^{K}\sigma_{ij}}\right]$$

K is the items number questions

σ_{ij} is the investigate covariance between the items

i and j. Note the σ_{ii} is the variance not standard deviation of item I

3.13.2. Inferential approach

1. t-test

❖ **Paired Sample t-test**

To assess the significance difference between pre-test and post-test in one group, such as pre-post study group.

❖ **Independent Sample t-test**

To assess the significance difference between two groups of measurement, such as pre-test of intervention group and pre-test of control group.

2. Chi-Squared Test

To see if there is a variation in the number of nominal standards of dichotomous random variables like nurses' knowledge and demographic characteristics.

$$\chi^2 = \frac{\sum_{all\ i}(O_i - E_i)^2}{E_i}$$

X^2=Chi-squared

$\sum$=sum

Where O_i is the observed frequency of group I

E_i is the expected frequency.

The following are shortcuts for measuring important in comparison to the level:

(1) **NS** :*Non significantly at probability-value>0.05*.

(2) **S** :*Significantly at probability-value<0.05*.

(3) **HS** :*Highly significantly at probability-value<0.01*.

Chapter Four Results of the Study

Chapter Four

Results of the Study

This chapter presents the results of data analysis systematically in tables and consistent with the aims of this study, as in the following:

Table 4-1: Descriptive Statistic of Socio-Demographic Characteristic of the Study Sample in both (Intervention and Control)

Demographic Data	Groups	Intervention Group		Control Group	
		Freq.	%	Freq.	%
Age / Years	20-29years	15	60.0	7	28.0
	30-39years	6	24.0	9	36.0
	40-49years	2	8.0	7	28.0
	50 and older	2	8.0	2	8.0
	Mean±SD	30.56±8.622		32.56±8.130	
Gender	Male	18	72.0	14	56.0
	Female	7	28.0	11	44.0
	Total	25	100.0	25	100.0
Education level	School nursing	5	20.0	5	20.0
	Diploma Nursing	11	44.0	6	24.0
	Bachelor's Nursing	8	32.0	11	44.0
	Master and above	1	4.0	3	12.0
	Total	25	100.0	25	100.0
Years of experience in Nursing	<5years	9	36.0	6	24.0
	5-10years	8	32.0	9	36.0
	>10years	8	32.0	10	40.0
	Total	25	100.0	25	100.0
Years of experience in Cardiac Catheterization	<5years	20	80.0	18	72.0
	>5yaers	5	20.0	7	28.0
	Total	25	100.0	25	100.0
Workplace	CCU	15	60.0	7	28.0
	Cardiac catheterization operation	4	16.0	6	24.0
	Cardiac catheterization room	5	20.0	6	24.0
	Cardiology consultant	1	4.0	6	24.0
	Total	25	100.0	25	100.0
Participation in training sessions	No	6	24.0	3	12.0
	One	14	56.0	12	48.0
	Two	4	16.0	7	28.0
	More than two	1	4.0	3	12.0
	Total	25	100.0	25	100.0
Sources of knowledge	No	9	36.0	8	32.0
	Social networking sites	0	0.0	2	8.0
	Internet of scientific sites	4	16.0	4	16.0
	Colleagues nurses	3	12.0	8	32.0
	Consult a specialist doctor	9	36.0	3	12.0
	Total	25	100.0	25	100.0

(Freq.): Frequency, (%): percentage,

This table represents the distribution of the nurses their demographic characteristics in term of frequencies and percentage

(intervention versus Control). The nurses' ages in study ranged from 20 to 29 years at mean age=30.56, while, the age of nurses ranged 30-39years in control group at mean age=32.56.

Gender related to results showed that male nurses predominated in both intervention and control classes, accounting for 72% and 56% of the total respectively.

In terms of education, forty-four percent who are diploma nurses graduated in intervention groups while, forty-four percent who are Bachelor's Nursing graduated in control group.

In regards with experience, in intervention group (36 percent) who have less than 5 years of experiences and express less than 5 years of experience in cardiac catheterization. While in control group (36 percent) who have more than 5 years of experiences and express less than 5 years of experience in cardiac catheterization; and work in coronary care unit and composed (60% and 28%) intervention-control respectively.

The majority of study finding had participated in one training session in both intervention-control sample (56% and 48%) respectively and no have sources of knowledge.

Table 4-2: Nurses Responses of Intervention Group at Pre-test Regarding to Knowledge of Interventional Cardiac Catheterization

Knowledge Items		Pre-test Intervention Group		
		Mean	SD	Ass.
1	Cardiac catheterization through the femoral or humeral artery is the most common method.	1.64	0.489	Pass
2	Cardiac catheterization provides important information about the nature of the work of the right and left atrium of the heart.	1.12	0.331	Fail
3	The purpose of cardiac catheterization is to assess the function of the right ventricle of the heart.	1.68	0.476	Pass
4	Cardiac catheterization is performed to evaluate and treat the functioning of the heart valves	1.12	0.331	Fail
5	The limb through which the therapeutic cardiac catheterization was performed remains fixed for 6-8 hours	1.16	0.374	Fail
6	Cardiac arrhythmias are evaluated and treated in some cases by performing cardiac catheterization	1.08	0.276	Fail
7	Chest pain can go away immediately after a cardiac catheterization procedure	1.16	0.374	Fail
8	Therapeutic cardiac catheterization is to determine the damaged site of the heart muscle	1.08	0.276	Fail
9	Coronary angiography is a medical term that means the medical procedures for performing a therapeutic cardiac catheterization.	1.08	0.276	Fail
10	The Fowler's position is appropriate for the patient on the bed after the cardiac catheterization procedure	1.24	0.435	Fail
11	Therapeutic cardiac catheterization is performed to evaluate congenital heart disease	1.20	0.408	Fail
12	Therapeutic cardiac catheterization is a term that describes a group of procedures aimed at restoring the work of the heart for future periods of time	1.16	0.374	Fail
13	Vascular vasovagal reactions are fairly common and can occur during cardiac catheterization resulting in only a slow heartbeat.	1.16	0.374	Fail
14	Any type of allergy that the patient suffers from must be documented before performing the cardiac catheterization procedure and inform the medical team in the operating room	1.16	0.374	Fail
15	Pulmonary edema after cardiac catheterization may lead to failure of the left atrium of the heart	1.20	0.408	Fail
16	Diagnostic and therapeutic cardiac catheterization cannot be performed together as it negatively affects the work of the left ventricle	1.48	0.509	Fair
17	Clopidogrel 75 mg reduces the incidence of heart attacks and stroke	1.20	0.408	Fail
18	One week after the cardiac catheterization procedure, a serum Creatinine test can be performed	1.20	0.408	Fail
19	Anticoagulants act directly and indirectly on fibrin to dissolve clots (converting plasminogen to plasmin, an enzyme that digests fibrin clot)	1.24	0.435	Fail
20	Anticoagulants only reduce the risk of myocardial infarction	1.28	0.458	Fail
21	Conducting the required laboratory and radiological tests about abnormal changes in the work of the heart that make the specialist doctor prefer the catheter intervention option	1.16	0.374	Fail
22	INR (International normalized ratio) test evaluates the risk of sudden cardiac arrest during cardiac catheterization	1.28	0.458	Fail
23	A blood urea test is very necessary during cardiac catheterization	1.28	0.458	Fail
24	Clopidogrel (75mg) should be stopped 24 hours before the cardiac catheterization procedure and 48 hours after it for the patient suffering	1.12	0.331	Fail

	from chest pain and diabetes.			
25	**Troponin test should be performed only before cardiac catheterization**	**1.40**	**0.500**	**Fair**
26	**Patient should not stop taking metformin before and after catheterization**	**1.32**	**0.476**	**Fail**
27	**Thrombolytic drugs work to remove damage to the tissues of the heart muscle**	**1.16**	**0.374**	**Fail**
28	**One of the medicines and medical supplies that the nurse brings when removing the catheter or sheath is atropine 600mcg.**	**1.12**	**0.331**	**Fail**
29	**If the patient is unstable after the cardiac catheterization procedure, the electrocardiogram should be done and compared with the previous one**	**1.40**	**0.500**	**Fair**
30	**If the patient is unstable after the cardiac catheterization procedure and complains of chest pain, the doctor should be informed of this to give him the appropriate treatment such as O2, painkillers and others**	**1.16**	**0.374**	**Fail**
31	**The patient's vital signs should be monitored before and after cardiac catheterization**	**1.20**	**0.408**	**Fail**
32	**When bleeding occurs at the catheter entry site, the nurse must advise the patient to press on the place for half an hour**	**1.20**	**0.408**	**Fail**
33	**The nurse must measure the vital signs of the unstable patient after the diagnostic cardiac catheterization procedure every 20 minutes for two hours**	**1.28**	**0.458**	**Fail**
34	**When the catheter or sheath is removed, continuous pressure is applied to the catheter entry site for a period of no less than 10 minutes if the catheterization process is curative, and 15-20 minutes if the catheterization process is diagnostic.**	**1.40**	**0.500**	**Fair**
35	**Measuring blood pressure and pulse of a diabetic patient before and after cardiac catheterization**	**1.44**	**0.506**	**Fair**
36	**Encouraging the patient to do deep breathing after performing a cardiac catheterization, and this process will increase the heart's need for oxygen and reduce chest pain.**	**1.28**	**0.458**	**Fail**
37	**Various arrhythmias (tachycardia or Bradycardia) may occur during diagnostic or therapeutic cardiac catheterization.**	**1.36**	**0.489**	**Fair**
38	**The patient who underwent cardiac catheterization should be advised to adhere to a high-sodium diet in order to improve the contraction and diastole process of the heart muscle.**	**1.12**	**0.331**	**Fail**
39	**To prevent the risk of hypoglycemic episodes or elevations during cardiac catheterization of a diabetic patient, the nurse should monitor the intramuscularly prescribed insulin and inform the physician if abnormal changes occur.**	**1.08**	**0.276**	**Fail**
40	**An uncommon complication of cardiac catheterization is pulmonary edema**	**1.16**	**0.374**	**Fail**
41	**The goal of providing nursing care before, during and after a cardiac catheterization procedure is to relieve chest pain**	**1.20**	**0.408**	**Fail**
42	**Complications that may occur after the late removal of the catheter or sheath is rapid breathing**	**1.20**	**0.408**	**Fail**
43	**Vital signs should be monitored before giving the patient the prescribed medications after the cardiac catheterization procedure**	**1.08**	**0.276**	**Fail**
44	**An uncommon complication of cardiac catheterization is myocardial infarction**	**1.28**	**0.458**	**Fail**
45	**Nursing care for the patient before, during and after cardiac catheterization should include psychological support to reduce the level of anxiety, which in turn increases myocardial oxygen consumption.**	**1.20**	**0.408**	**Fail**
46	**It is very common after cardiac catheterization to have a stroke**	**1.28**	**0.458**	**Fail**
47	**All interventions, nursing notes, and prosthetics located anywhere on the body must be documented in the patient's file**	**1.24**	**0.435**	**Fail**
48	**The patient should be educated about the upcoming lifestyle changes after cardiac catheterization to reduce risks and complications**	**1.12**	**0.331**	**Fail**

"Level of Assessment (Fail=1-1.33; Fair=1.34-1.67; Pass≥1.68"

Findings demonstrated assessment of the study sample responses at the pre- test for intervention group. The study results indicate that the intervention group at the pre-test are fail at all studied items except, items number (16, 25, 29, 34, 35 and 37) the responses were fair knowledge, as well as, the items number (1 and 3) the responses were pass knowledge.

Table 4-3: Overall Assessment of the Study Sample Responses at the Pre-test for Intervention Group

Overall Assessment for Intervention Group	Pre-test Intervention Group			
	Freq.	%	Overall Mean	Assessment
Fail	22	88.0	1.232	Fail Knowledge
Fair	2	8.0		
Pass	1	4.0		
Total	25	100.0		

"Level of Assessment (Fail=1-1.33; Fair=1.34-1.67; Pass≥1.68"

Findings illustrated that the majority of the intervention group responses at the pre-test are fail knowledge with a statistical mean equal to 1.232.

Table 4-4:Nurses Responses of Intervention Group at Post-test Regarding to Knowledge of Interventional Cardiac Catheterization

Knowledge Items		Post-test Intervention Group		
		Mean	SD	Ass.
1	Cardiac catheterization through the femoral or humeral artery is the most common method.	1.96	0.200	Pass
2	Cardiac catheterization provides important information about the nature of the work of the right and left atrium of the heart.	1.36	0.489	Fair
3	The purpose of cardiac catheterization is to assess the function of the right ventricle of the heart.	1.84	0.374	Pass
4	Cardiac catheterization is performed to evaluate and treat the functioning of the heart valves	1.92	0.276	Pass
5	The limb through which the therapeutic cardiac catheterization was performed remains fixed for 6-8 hours	1.76	0.435	Pass
6	Cardiac arrhythmias are evaluated and treated in some cases by performing cardiac catheterization	1.32	0.476	Fail
7	Chest pain can go away immediately after a cardiac catheterization procedure	1.84	0.374	Pass
8	Therapeutic cardiac catheterization is to determine the damaged site of the heart muscle	1.84	0.374	Pass
9	Coronary angiography is a medical term that means the medical procedures for performing a therapeutic cardiac catheterization.	1.72	0.458	Pass
10	The Fowler's position is appropriate for the patient on the bed after the cardiac catheterization procedure	1.52	0.509	Pass
11	Therapeutic cardiac catheterization is performed to evaluate congenital heart disease	1.84	0.374	Pass
12	Therapeutic cardiac catheterization is a term that describes a group of procedures aimed at restoring the work of the heart for future periods of time	1.48	0.509	Fair
13	Vascular vasovagal reactions are fairly common and can occur during cardiac catheterization resulting in only a slow heartbeat.	1.72	0.458	Pass
14	Any type of allergy that the patient suffers from must be documented before performing the cardiac catheterization procedure and inform the medical team in the operating room	1.88	0.331	Pass
15	Pulmonary edema after cardiac catheterization may lead to failure of the left atrium of the heart	1.80	0.408	Pass
16	Diagnostic and therapeutic cardiac catheterization cannot be performed together as it negatively affects the work of the left ventricle	1.88	0.331	Pass
17	Clopidogrel 75 mg reduces the incidence of heart attacks and stroke	1.80	0.408	Pass
18	One week after the cardiac catheterization procedure, a serum Creatinine test can be performed	1.76	0.435	Pass
19	Anticoagulants act directly and indirectly on fibrin to dissolve clots (converting plasminogen to plasmin, an enzyme that digests fibrin clot)	1.84	0.374	Pass
20	Anticoagulants only reduce the risk of myocardial infarction	1.80	0.408	Pass
21	Conducting the required laboratory and radiological tests about abnormal changes in the work of the heart that make the specialist doctor prefer the catheter intervention option	1.84	0.374	Pass
22	INR (International normalized ratio) test evaluates the risk of sudden cardiac arrest during cardiac catheterization	1.76	0.435	Pass
23	A blood urea test is very necessary during cardiac catheterization	1.80	0.408	Pass
24	Clopidogrel (75mg) should be stopped 24 hours before the cardiac catheterization procedure and 48 hours after it for the patient suffering	1.88	0.331	Pass

	from chest pain and diabetes.			
25	**Troponin test should be performed only before cardiac catheterization**	**1.88**	**0.331**	**Pass**
26	**Patient should not stop taking metformin before and after catheterization**	**1.84**	**0.374**	**Pass**
27	**Thrombolytic drugs work to remove damage to the tissues of the heart muscle**	**1.88**	**0.331**	**Pass**
28	**One of the medicines and medical supplies that the nurse brings when removing the catheter or sheath is atropine 600mcg.**	**1.88**	**0.331**	**Pass**
29	**If the patient is unstable after the cardiac catheterization procedure, the electrocardiogram should be done and compared with the previous one**	**1.84**	**0.374**	**Pass**
30	**If the patient is unstable after the cardiac catheterization procedure and complains of chest pain, the doctor should be informed of this to give him the appropriate treatment such as O2, painkillers and others**	**1.84**	**0.374**	**Pass**
31	**The patient's vital signs should be monitored before and after cardiac catheterization**	**1.80**	**0.408**	**Pass**
32	**When bleeding occurs at the catheter entry site, the nurse must advise the patient to press on the place for half an hour**	**1.88**	**0.331**	**Pass**
33	**The nurse must measure the vital signs of the unstable patient after the diagnostic cardiac catheterization procedure every 20 minutes for two hours**	**1.72**	**0.458**	**Pass**
34	**When the catheter or sheath is removed, continuous pressure is applied to the catheter entry site for a period of no less than 10 minutes if the catheterization process is curative, and 15-20 minutes if the catheterization process is diagnostic.**	**1.92**	**0.276**	**Pass**
35	**Measuring blood pressure and pulse of a diabetic patient before and after cardiac catheterization**	**1.80**	**0.408**	**Pass**
36	**Encouraging the patient to do deep breathing after performing a cardiac catheterization, and this process will increase the heart's need for oxygen and reduce chest pain.**	**1.88**	**0.331**	**Pass**
37	**Various arrhythmias (tachycardia or Bradycardia) may occur during diagnostic or therapeutic cardiac catheterization.**	**1.88**	**0.331**	**Pass**
38	**The patient who underwent cardiac catheterization should be advised to adhere to a high-sodium diet in order to improve the contraction and diastole process of the heart muscle.**	**1.88**	**0.331**	**Pass**
39	**To prevent the risk of hypoglycemic episodes or elevations during cardiac catheterization of a diabetic patient, the nurse should monitor the intramuscularly prescribed insulin and inform the physician if abnormal changes occur.**	**1.88**	**0.331**	**Pass**
40	**An uncommon complication of cardiac catheterization is pulmonary edema**	**1.84**	**0.374**	**Pass**
41	**The goal of providing nursing care before, during and after a cardiac catheterization procedure is to relieve chest pain**	**1.92**	**0.276**	**Pass**
42	**Complications that may occur after the late removal of the catheter or sheath is rapid breathing**	**1.80**	**0.408**	**Pass**
43	**Vital signs should be monitored before giving the patient the prescribed medications after the cardiac catheterization procedure**	**1.80**	**0.408**	**Pass**
44	**An uncommon complication of cardiac catheterization is myocardial infarction**	**1.88**	**0.331**	**Pass**
45	**Nursing care for the patient before, during and after cardiac catheterization should include psychological support to reduce the level of anxiety, which in turn increases myocardial oxygen consumption.**	**1.92**	**0.276**	**Pass**
46	**It is very common after cardiac catheterization to have a stroke**	**1.92**	**0.276**	**Pass**
47	**All interventions, nursing notes, and prosthetics located anywhere on the body must be documented in the patient's file**	**1.96**	**0.200**	**Pass**
48	**The patient should be educated about the upcoming lifestyle changes after cardiac catheterization to reduce risks and complications**	**1.84**	**0.374**	**Pass**

"Level of Assessment (Fail=1-1.33; Fair=1.34-1.67; Pass≥1.68"

Findings demonstrated assessment of the study sample responses at the post-test for intervention group. The study results indicate that the intervention group at the post-test are pass at all studied items except, items number (12 and 12) the responses were fair knowledge, as well as, the items number (6) the responses were fail knowledge.

Table 4-5: Overall Assessment of the Study Sample Responses at the Post-test for Intervention Group

Overall Assessment for Intervention Group	Post-test Intervention Group			
	Freq.	%	Overall Mean	Assessment
Fail	2	8.0	1.809	Pass Knowledge
Fair	1	4.0		
Pass	22	88.0		
Total	25	100.0		

"Level of Assessment (Fail=1-1.33; Fair=1.34-1.67; Pass≥1.68"

Findings illustrated that the majority of the intervention group responses at the post-test are pass knowledge with a statistical mean equal to 1.809.

Table 4-6: Statistical distribution of the Intervention Group by their overall responses with Significant Difference between Pre-test and Post-test Scores

Tested paired	Periods	Mean	N	SD	t-value	D.f.	p-value
Intervention group overall responses	Pre-test	1.232	25	0.183	10.115	24	0.000 HS
	Post-test	1.809	25	0.247			

"(SD) Standard deviation, (Ns): Non-significant (S): significant, (t- value): t-test, (D.f.): degree of freedom"

Findings illustrated that there is a high-significant difference between the intervention group overall responses in two periods of measurements (pre-test and post-test) at p-value less than 0.01, with respect to the statistical mean, the study results indicate that there is an improvement in the nurses knowledge at the post-test compared with pre-test scores.

Table 4-7: Nurses Responses of Control Group at Pre-test Regarding to Knowledge of Interventional Cardiac Catheterization

Knowledge Items		Pre-test Control Group		
		Mean	SD	Ass.
1	Cardiac catheterization through the femoral or humeral artery is the most common method.	1.96	0.200	Pass
2	Cardiac catheterization provides important information about the nature of the work of the right and left atrium of the heart.	1.40	0.500	Fair
3	The purpose of cardiac catheterization is to assess the function of the right ventricle of the heart.	1.68	0.476	Pass
4	Cardiac catheterization is performed to evaluate and treat the functioning of the heart valves	1.32	0.476	Fail
5	The limb through which the therapeutic cardiac catheterization was performed remains fixed for 6-8 hours	1.12	0.331	Fail
6	Cardiac arrhythmias are evaluated and treated in some cases by performing cardiac catheterization	1.12	0.331	Fail
7	Chest pain can go away immediately after a cardiac catheterization procedure	1.24	0.435	Fail
8	Therapeutic cardiac catheterization is to determine the damaged site of the heart muscle	1.16	0.374	Fail
9	Coronary angiography is a medical term that means the medical procedures for performing a therapeutic cardiac catheterization.	1.08	0.276	Fail
10	The Fowler's position is appropriate for the patient on the bed after the cardiac catheterization procedure	1.16	0.374	Fail
11	Therapeutic cardiac catheterization is performed to evaluate congenital heart disease	1.28	0.458	Fail
12	Therapeutic cardiac catheterization is a term that describes a group of procedures aimed at restoring the work of the heart for future periods of time	1.24	0.435	Fail
13	Vascular vasovagal reactions are fairly common and can occur during cardiac catheterization resulting in only a slow heartbeat.	1.12	0.331	Fail
14	Any type of allergy that the patient suffers from must be documented before performing the cardiac catheterization procedure and inform the medical team in the operating room	1.16	0.374	Fail
15	Pulmonary edema after cardiac catheterization may lead to failure of the left atrium of the heart	1.20	0.408	Fail
16	Diagnostic and therapeutic cardiac catheterization cannot be performed together as it negatively affects the work of the left ventricle	1.20	0.408	Fail
17	Clopidogrel 75 mg reduces the incidence of heart attacks and stroke	1.12	0.331	Fail
18	One week after the cardiac catheterization procedure, a serum Creatinine test can be performed	1.24	0.435	Fail
19	Anticoagulants act directly and indirectly on fibrin to dissolve clots (converting plasminogen to plasmin, an enzyme that digests fibrin clot)	1.16	0.374	Fail
20	Anticoagulants only reduce the risk of myocardial infarction	1.40	0.500	Fair
21	Conducting the required laboratory and radiological tests about abnormal changes in the work of the heart that make the specialist doctor prefer the catheter intervention option	1.28	0.458	Fail
22	INR (International normalized ratio) test evaluates the risk of sudden cardiac arrest during cardiac catheterization	1.20	0.408	Fail
23	A blood urea test is very necessary during cardiac catheterization	1.16	0.374	Fail
24	Clopidogrel (75mg) should be stopped 24 hours before the cardiac catheterization procedure and 48 hours after it for the patient suffering from chest pain and diabetes.	1.28	0.458	Fail
25	Troponin test should be performed only before cardiac catheterization	1.12	0.331	Fail
26	Patient should not stop taking metformin before and after catheterization	1.20	0.408	Fail

27	**Thrombolytic drugs work to remove damage to the tissues of the heart muscle**	**1.20**	**0.408**	**Fail**
28	**One of the medicines and medical supplies that the nurse brings when removing the catheter or sheath is atropine 600mcg.**	**1.12**	**0.331**	**Fail**
29	**If the patient is unstable after the cardiac catheterization procedure, the electrocardiogram should be done and compared with the previous one**	**1.24**	**0.435**	**Fail**
30	**If the patient is unstable after the cardiac catheterization procedure and complains of chest pain, the doctor should be informed of this to give him the appropriate treatment such as O2, painkillers and others**	**1.20**	**0.408**	**Fail**
31	**The patient's vital signs should be monitored before and after cardiac catheterization**	**1.28**	**0.458**	**Fail**
32	**When bleeding occurs at the catheter entry site, the nurse must advise the patient to press on the place for half an hour**	**1.24**	**0.435**	**Fail**
33	**The nurse must measure the vital signs of the unstable patient after the diagnostic cardiac catheterization procedure every 20 minutes for two hours**	**1.12**	**0.331**	**Fail**
34	**When the catheter or sheath is removed, continuous pressure is applied to the catheter entry site for a period of no less than 10 minutes if the catheterization process is curative, and 15-20 minutes if the catheterization process is diagnostic.**	**1.08**	**0.276**	**Fail**
35	**Measuring blood pressure and pulse of a diabetic patient before and after cardiac catheterization**	**1.08**	**0.276**	**Fail**
36	**Encouraging the patient to do deep breathing after performing a cardiac catheterization, and this process will increase the heart's need for oxygen and reduce chest pain.**	**1.08**	**0.276**	**Fail**
37	**Various arrhythmias (tachycardia or Bradycardia) may occur during diagnostic or therapeutic cardiac catheterization.**	**1.16**	**0.374**	**Fail**
38	**The patient who underwent cardiac catheterization should be advised to adhere to a high-sodium diet in order to improve the contraction and diastole process of the heart muscle.**	**1.12**	**0.331**	**Fail**
39	**To prevent the risk of hypoglycemic episodes or elevations during cardiac catheterization of a diabetic patient, the nurse should monitor the intramuscularly prescribed insulin and inform the physician if abnormal changes occur.**	**1.08**	**0.276**	**Fail**
40	**An uncommon complication of cardiac catheterization is pulmonary edema**	**1.40**	**0.500**	**Fair**
41	**The goal of providing nursing care before, during and after a cardiac catheterization procedure is to relieve chest pain**	**1.16**	**0.374**	**Fail**
42	**Complications that may occur after the late removal of the catheter or sheath is rapid breathing**	**1.16**	**0.374**	**Fail**
43	**Vital signs should be monitored before giving the patient the prescribed medications after the cardiac catheterization procedure**	**1.04**	**0.200**	**Fail**
44	**An uncommon complication of cardiac catheterization is myocardial infarction**	**1.16**	**0.374**	**Fail**
45	**Nursing care for the patient before, during and after cardiac catheterization should include psychological support to reduce the level of anxiety, which in turn increases myocardial oxygen consumption.**	**1.16**	**0.374**	**Fail**
46	**It is very common after cardiac catheterization to have a stroke**	**1.20**	**0.408**	**Fail**
47	**All interventions, nursing notes, and prosthetics located anywhere on the body must be documented in the patient's file**	**1.12**	**0.331**	**Fail**
48	**The patient should be educated about the upcoming lifestyle changes after cardiac catheterization to reduce risks and complications**	**1.28**	**0.458**	**Fail**

"Level of Assessment (Fail=1-1.33; Fair=1.34-1.67; Pass≥1.68"

Findings demonstrated assessment of the study sample responses at the pre-test for control group. The study results indicate that the control

group at the pre-test are fail at all studied items except, items number (1 and 3) the responses were pass knowledge, as well as, the items number (2, 20, and 40) the responses were fair knowledge.

Table 4-8: Overall Assessment of the Study Sample Responses at the Pre-test for Control Group

Overall Assessment for Control Group	Pre-test Control Group			
	Freq.	%	Overall Mean	Assessment
Fail	21	84.0	1.214	Fail Knowledge
Fair	3	12.0		
Pass	1	4.0		
Total	25	100.0		

"Level of Assessment (Fail=1-1.33; Fair=1.34-1.67; Pass≥1.68"

Findings illustrated that the majority of the control group responses at the pre-test are fail knowledge with a statistical mean equal to 1.214.

Table 4-9: Nurses Responses of Control Group at Post-test Regarding to Knowledge of Interventional Cardiac Catheterization

Knowledge Items		Post-test Control Group		
		M.s.	SD	Ass.
1	Cardiac catheterization through the femoral or humeral artery is the most common method.	1.96	0.200	Pass
2	Cardiac catheterization provides important information about the nature of the work of the right and left atrium of the heart.	1.44	0.506	Fair
3	The purpose of cardiac catheterization is to assess the function of the right ventricle of the heart.	1.72	0.458	Pass
4	Cardiac catheterization is performed to evaluate and treat the functioning of the heart valves	1.32	0.476	Fail
5	The limb through which the therapeutic cardiac catheterization was performed remains fixed for 6-8 hours	1.12	0.331	Fail
6	Cardiac arrhythmias are evaluated and treated in some cases by performing cardiac catheterization	1.16	0.374	Fail
7	Chest pain can go away immediately after a cardiac catheterization procedure	1.60	0.500	Fair
8	Therapeutic cardiac catheterization is to determine the damaged site of the heart muscle	1.20	0.408	Fail
9	Coronary angiography is a medical term that means the medical procedures for performing a therapeutic cardiac catheterization.	1.12	0.331	Fail
10	The Fowler's position is appropriate for the patient on the bed after the cardiac catheterization procedure	1.20	0.408	Fail
11	Therapeutic cardiac catheterization is performed to evaluate congenital heart disease	1.32	0.476	Fail
12	Therapeutic cardiac catheterization is a term that describes a group of procedures aimed at restoring the work of the heart for future periods of time	1.28	0.458	Fail
13	Vascular vasovagal reactions are fairly common and can occur during cardiac catheterization resulting in only a slow heartbeat.	1.16	0.374	Fail
14	Any type of allergy that the patient suffers from must be documented before performing the cardiac catheterization procedure and inform the medical team in the operating room	1.20	0.408	Fail
15	Pulmonary edema after cardiac catheterization may lead to failure of the left atrium of the heart	1.24	0.435	Fail
16	Diagnostic and therapeutic cardiac catheterization cannot be performed together as it negatively affects the work of the left ventricle	1.24	0.435	Fail
17	Clopidogrel 75 mg reduces the incidence of heart attacks and stroke	1.16	0.374	Fail
18	One week after the cardiac catheterization procedure, a serum Creatinine test can be performed	1.28	0.458	Fail
19	Anticoagulants act directly and indirectly on fibrin to dissolve clots (converting plasminogen to plasmin, an enzyme that digests fibrin clot)	1.16	0.374	Fail
20	Anticoagulants only reduce the risk of myocardial infarction	1.44	0.506	Fair
21	Conducting the required laboratory and radiological tests about abnormal changes in the work of the heart that make the specialist doctor prefer the catheter intervention option	1.32	0.476	Fail
22	INR (International normalized ratio) test evaluates the risk of sudden cardiac arrest during cardiac catheterization	1.24	0.435	Fail
23	A blood urea test is very necessary during cardiac catheterization	1.32	0.476	Fail
24	Clopidogrel (75mg) should be stopped 24 hours before the cardiac catheterization procedure and 48 hours after it for the patient suffering from chest pain and diabetes.	1.32	0.476	Fail
25	Troponin test should be performed only before cardiac catheterization	1.12	0.331	Fail
26	Patient should not stop taking metformin before and after	1.20	0.408	Fail

27	**Thrombolytic drugs work to remove damage to the tissues of the heart muscle**	**1.20**	**0.408**	**Fail**
28	**One of the medicines and medical supplies that the nurse brings when removing the catheter or sheath is atropine 600mcg.**	**1.12**	**0.331**	**Fail**
29	**If the patient is unstable after the cardiac catheterization procedure, the electrocardiogram should be done and compared with the previous one**	**1.24**	**0.435**	**Fail**
30	**If the patient is unstable after the cardiac catheterization procedure and complains of chest pain, the doctor should be informed of this to give him the appropriate treatment such as O2, painkillers and others**	**1.20**	**0.408**	**Fail**
31	**The patient's vital signs should be monitored before and after cardiac catheterization**	**1.28**	**0.458**	**Fail**
32	**When bleeding occurs at the catheter entry site, the nurse must advise the patient to press on the place for half an hour**	**1.24**	**0.435**	**Fail**
33	**The nurse must measure the vital signs of the unstable patient after the diagnostic cardiac catheterization procedure every 20 minutes for two hours**	**1.12**	**0.331**	**Fail**
34	**When the catheter or sheath is removed, continuous pressure is applied to the catheter entry site for a period of no less than 10 minutes if the catheterization process is curative, and 15-20 minutes if the catheterization process is diagnostic.**	**1.08**	**0.276**	**Fail**
35	**Measuring blood pressure and pulse of a diabetic patient before and after cardiac catheterization**	**1.08**	**0.276**	**Fail**
36	**Encouraging the patient to do deep breathing after performing a cardiac catheterization, and this process will increase the heart's need for oxygen and reduce chest pain.**	**1.08**	**0.276**	**Fail**
37	**Various arrhythmias (tachycardia or Bradycardia) may occur during diagnostic or therapeutic cardiac catheterization.**	**1.16**	**0.374**	**Fail**
38	**The patient who underwent cardiac catheterization should be advised to adhere to a high-sodium diet in order to improve the contraction and diastole process of the heart muscle.**	**1.12**	**0.331**	**Fail**
39	**To prevent the risk of hypoglycemic episodes or elevations during cardiac catheterization of a diabetic patient, the nurse should monitor the intramuscularly prescribed insulin and inform the physician if abnormal changes occur.**	**1.08**	**0.276**	**Fail**
40	**An uncommon complication of cardiac catheterization is pulmonary edema**	**1.44**	**0.501**	**Fair**
41	**The goal of providing nursing care before, during and after a cardiac catheterization procedure is to relieve chest pain**	**1.16**	**0.374**	**Fail**
42	**Complications that may occur after the late removal of the catheter or sheath is rapid breathing**	**1.16**	**0.374**	**Fail**
43	**Vital signs should be monitored before giving the patient the prescribed medications after the cardiac catheterization procedure**	**1.04**	**0.200**	**Fail**
44	**An uncommon complication of cardiac catheterization is myocardial infarction**	**1.16**	**0.374**	**Fail**
45	**Nursing care for the patient before, during and after cardiac catheterization should include psychological support to reduce the level of anxiety, which in turn increases myocardial oxygen consumption.**	**1.16**	**0.374**	**Fail**
46	**It is very common after cardiac catheterization to have a stroke**	**1.24**	**0.435**	**Fail**
47	**All interventions, nursing notes, and prosthetics located anywhere on the body must be documented in the patient's file**	**1.12**	**0.331**	**Fail**
48	**The patient should be educated about the upcoming lifestyle changes after cardiac catheterization to reduce risks and complications**	**1.28**	**0.458**	**Fail**

"Level of Assessment (Fail=1-1.33; Fair=1.34-1.67; Pass≥1.68"

Findings demonstrated assessment of the study sample responses at the post-test for control group. The study results indicate that the control

group at the post-test are fail at all studied items except, items number (1 and 3) the responses were pass knowledge, as well as, the items number (2, 7, 20, and 40) the responses were fair knowledge.

Table 4-10: Overall Assessment of the Study Sample Responses at the Post-test for Control Group

Overall Assessment for Control Group	Post-test Control Group			
	Freq.	%	Overall Mean	Assessment
Fail	20	80.0	1.240	Fail Knowledge
Fair	4	16.0		
Pass	1	4.0		
Total	25	100.0		

"Level of Assessment (Fail=1-1.33; Fair=1.34-1.67; Pass≥1.68"

Findings illustrated that the majority of the control group responses at the post-test are fail knowledge with a statistical mean equal to 1.240.

Table 4-11: Statistical distribution of the Control Group by their overall responses with Significant Difference between Pre-test and Post-test Scores

Tested paired	Periods	Mean	N	SD	t-value	D.f.	p-value
Control group overall responses	Pre-test	1.214	25	0.162	1.539	24	0.137 NS
	Post-test	1.240	25	0.169			

"(SD) Standard deviation, (Ns): Non-significant (S): significant , (t- value): t-test, (D.f.): degree of freedom"

Findings illustrated that there is a no significant difference between the control group overall responses in two periods of measurements (pre-test and post-test) at p-value more than 0.05, with respect to the statistical mean, the study results indicate that there is no improvement in the nurses knowledge at the pre-test compared with post-test scores.

Table 4-12: Mean Difference (Independent Sample t-test) between the Intervention and Control Group responses at pre-test and post -test

Periods of measurements	Groups	N	Mean	Std. Deviation	t-value	d.f.	p-value
Pre-test	Intervention	25	1.232	0.183	0.365	48	0.761 NS
	Control	25	1.214	0.162			
Post-test	Intervention	25	1.809	0.247	9.486	48	0.000 HS
	Control	25	1.240	0.169			

This table shows that there is a non-significant difference between the intervention and control groups in the pre-test at p-value more than 0.05, while there is a high significant difference between the intervention and control groups at the post-test with p-value less than 0.01. With respect to the statistical mean the study results indicate that there is an improvement in the intervention group responses after the application of the program compared with the control group.

Figure 4-7: Comparison between the Overall Intervention and Control Groups responses at two levels of measurement (pre-test and post-test)

Table 4-13: Relationship between the Intervention Group responses at the Pre-test Measurement and their Demographic Data

Demographic Data	Chi-Square Value	D.f	P-Value
Age /years	8.674	6	0.193 NS
Gender	0.875	2	0.646 NS
Education level	3.086	6	0.798 NS
Years of experience in Nursing	3.362	4	0.499 NS
Years of experience in Cardiac Catheterization	1.420	2	0.492 NS
Workplace	4.470	6	0.613 NS
Participation in training sessions	2.679	6	0.848 NS
Sources of knowledge	10.227	6	0.115 NS

Findings shows that there is a non-significant relationship between the intervention group knowledge (pre-test) and their demographic data at p-value more than 0.05.

Table 4-13: Relationship between the Intervention Group responses at the Post-test Measurement and their Demographic Data

Demographic Data	Chi-Square Value	D.f	P-Value
Age /years	2.273	6	0.893 NS
Gender	0.875	2	0.646 NS
Education level	7.244	6	0.299 NS
Years of experience in Nursing	6.313	4	0.177 NS
Years of experience in Cardiac Catheterization	0.852	2	0.653 NS
Workplace	2.273	6	0.893 NS
Participation in training sessions	3.003	6	0.808 NS
Sources of knowledge	5.556	6	0.475 NS

Findings shows that there is a non-significant relationship between the intervention group knowledge (post-test) and their demographic data at p-value more than 0.05.

Chapter Five
Discussion

Chapter Five

Discussion

Results of the nursing educational program application toward nurses' knowledge toward interventional cardiac catheterization safety for nurses who work in Karbala center for cardiothoracic diseases and surgery. The data are collected through the application of knowledge test, data have been analysis and interpreted according to the study objective. The educational program is designed to provide nurses adequate and important knowledge toward interventional cardiac catheterization.

5.1. Discussion the Demographic Variables

Table (1) distribution of the nurses their demographic characteristics in term of frequencies and percentage (Intervention versus Control). The nurses' ages in study ranged from 20 to 29 years at mean age=30.56, while, the age of nurses ranged 30-39years in control group at mean age=32.56.

This come with study of Hassan (2017), investigate among (50) nurses who were factor at Ibn Al Biter Specialist Center Cardiac Surgery, the most of them nurses' ages were (20-25) years old that were accounted for (36%). This results come because the nature of the nursing profession, male nurses were accounted for most of the nursing staff, and all nurses who work in intensive care unit need to be young to cover all duties in this units.

Gender related to results showed that male nurses predominated in both intervention and control classes, accounting for 72% and 56% of the total respectively.

These findings are supported by study of Yaqoob et al., (2019), who reported among their study participants the male nurses in coronary care unit are the majority. This may be due to the fact that males cover night duties while females does not.

In terms of instruction, forty-four percent who are diploma nurses graduated in study groups while, forty-four percent who are Bachelor's Nursing graduated in control group.

These findings agree with findings of Henedy and El-Sayad (2019), reported in their findings that the two-third of nurses works in coronary care unit at Shebien El koom, Menoufia Governorate, Egypt who are diploma degree. As well as, in study of Hassan (2017), most of participants were nursing college graduated

As being the diploma degree were considered the major proportion of staff nurses in health organization, due to the large number of institutions that graduate such degrees.

In regards with experience, in intervention group (36 percent) who have less than 5 years of experiences and express less than 5 years of experience in interventional cardiac catheterization. While in control group (36 percent) who have more than 5 years of experiences and express less than 5 years of experience in interventional cardiac catheterization; and work in coronary care unit and composed (60% and 28%) intervention-control respectively. The majority of study finding had participated in one training session in both intervention-control sample(56% and 48%) respectively and no have sources of knowledge.

With same regards, finding of study conducted in Azadi Teaching Hospital in Kirkuk City. Illustrated findings that (75.6%) of nurses in cardiac catheterization wards having (1-5) years of experience in the nursing profession, (95.6%) of the nurses had no training session in cardiac catheterization with totally depends on their academic studies without seeking to develop their knowledge (Sameen. 2018). The length of experience in nursing (63.6%) had experience of 1-5 years, duration of work for nurses (72.7%) in cardiac catheterization worked for 1-5 years,

and none of them attended any training program on cardiac catheterization in the Kurdistan region or abroad (Omer, 2020).

As being the few years of nursing experience in intensive care unit could be explained by the fact that have a frequent rotating from one unit to another within the hospital.

The above findings of demographic variables come in the same line with findings of study conducted in Public Hospitals in Sana'a City-Yemen. Their results of the study showed that 51 percent are males, and 52 percent have work experience of less than five years, and do not participate in training courses (Al-Gunaid, 2020).

Also, findings come consisting with study conducted in Baghdad City at critical care unit. The findings of this study illustrated that (64%) of the study sample were males and (58%) at age group (20-29) years old, were graduate from Institute, (66%) had (1-5 years) experience in critical unit (HadiAtiyah & Abdul-Wahhab, 2016).

While, the findings of Thabet et al., (2019), showed in their results that; the highest percent of nurses (41.7%) their age was more than 30 years and have diploma degree; (62.5%). Their years of experience ranged from5 to 10years (41.7%). The majority of nurses (87.5%) had no in-service training courses related to cardiac catheterization and heart disease.

5.2.Nurses knowledge towards Interventional Cardiac Catheterization at Pre Test for both Groups

Findings demonstrated assessment of the study sample responses at the pre- test for intervention-control groups. The study results indicate that the intervention group at the pre-test are fail knowledge towards interventional cardiac catheterization. These findings come consisting with findings of study conducted at General Hospital in Rania City. It is confirmed that there is no sufficient knowledge of nurses regarding cardiac catheterization, among all levels of nurses due to lack of training and

education program. It recommend the training course by ministry of health for nurses to improve the knowledge and health awareness regarding cardiac catheterization (Sharif et al., 2018).

Also, results agree with results of Kesieme et al. (2016), who conducted study deals with nurses knowledge at intensive care unit Nigerian semiurban university hospital. Their findings illustrated that nurses with poor knowledge and need more training to qualified it.

Nurses showed inadequacy of their knowledge and practice regarding care of patients undergoing cardiac catheterization. Nurses are need for in-service training programs and refreshing courses to improve their knowledge which will reflect into their knowledge and practice while working with patients (Thabet et al., 2019).

It was found that all of nurses (100%) had poor knowledge for patient safety. While (77.5%) of nurses had negative attitude and (22.5%) of them had positive attitude toward patient safety in cardiac catheterization unit. Instructional program should be done for nurses in cardiac catheterization about caring with patient to improve their knowledge and attitude for patient safety (Hasballah et al., 2019).

There was increase nurses knowledge and performance in the post educational protocol in all domains of care regarding cardiac catheterization. While, majority of patients were satisfied for the nursing care before, during and post cardiac catheterization procedure that rendered by nurses that have instructional protocol. Updating knowledge and performance of nurses through implementation continuing educational protocol about cardiac catheterization; strict observation of nurses' performance when caring for cardiac catheterization patients and provision of guidance to improve nursing intervention.

The deficit knowledge regarding interventional cardiac catheterization might be due to several reasons; lack of continuous of

training program, the nurses do not develop and update their knowledge continuously, most of nurses who work in health institutions quit book reading so they do not follow up and only indulge in nursing practices, consequently they became unable to remember some information particularly the knowledge that related to cardiac catheterization.

Knowledge level and practice of cardiac catheterization staff nurses regarding caring with patient increase with continuous educational program, exploiting the young energies of nurses who graduated from the bachelor's degree, and providing health resources relative to global standard (Henedy & El-Sayad, 2019).

The development of complications in patents after cardiac catheterization is minimal and this is attributed to the adequate knowledge of the staff nurses and the comprehensive nursing care which is performed to the patents. It recommends that Cardiac Center should regularly conduct an assessment for the nursing staff and an evaluation of their knowledge and practice so as to update the knowledge and to ensure their coping with the latest developments and equipment and techniques in the field (Bakhet, 2017).

5.3.Nurses knowledge towards Interventional Cardiac Catheterization at Post Test for both Groups

Findings demonstrated assessment of the study sample responses at the post- test for intervention group. The study results indicate that the intervention group at the post-test are good knowledge towards interventional cardiac catheterization, compared to control group at post test were fail knowledge.

Results of testing significant with reference of questionnaire's items are reported mostly highly significant differences at *p-value <0.01*, which assigned effectiveness of the studied educational program through raising knowledge grades regarding nurse staff in intervention group, and that be

enable to confirms importance or successfulness of applying the suggested program.

The nurses' level of knowledge post implementing the designed educational program was higher than pre implementation, with a higher. The designed educational program was effective in improving nurses' knowledge, which were positively associated with interventional cardiac catheterization knowledge among nurses in the intervention group. It is suggested equipping cardiac catheterization unit with continuous education training knowledge pre/post cardiac catheterization.

These findings come in the line with study of Obaid and Mohammed (2020), there is statistically significant differences between the pre and post tests in the main general areas with regard to the nurses' knowledge regarding the nursing management towards the patients undergoing PCI. The correct answer in the pre-test was 0.417% and in the post-test, these answers increased to 0.814%. The study recommended to provide nurses with continuous educational courses to enhances nurses knowledge, & the necessity of conducting similar studies on a larger sample.

Also, findings are supported by Ali and Ali (2019), who designed the effect teaching protocol regarding caring with patients after cardiac catheterization. Findings showed that nurses' level of knowledge post implementing the designed teaching protocol was higher than pre implementation, with a significant relationship between pre-post intervention The designed teaching protocol was effective in improving nurses' knowledge, which were positively associated with each other and lower incidence of vascular complications among patients in the intervention group. Study suggested equipping cardiac catheterization unit with simple illustrated guidelines protocol covering percutaneous coronary

intervention procedure practices knowledge pre/post cardiac catheterization.

As well as, Results of study revealed that the majority of nurses have a highly satisfactory level of knowledge and performance regarding caring with patient on cardiac catheterization post implementation the learning guideline than pre learning guideline. The learning guidelines are recommended for educating these nurses to promote knowledge and performance regarding caring with patient to decrease hazards following cardiac catheterization (Keshk & Elgazzar, 2018).

5.4.Relationship between the Intervention Group responses at the Pre-post test Measurement and their Demographic Data

Findings shows that there is a non-significant association between the intervention group knowledge (pre-post test) and their demographic data at p-value more than 0.05.

In a study of Sameen (2018), showed in their results of the questionnaire demonstrated that the nurses who are working in medical ICU and cardiac medical ward nurse’s knowledge towards caring with Patient after diagnostic Cardiac Catheterization were far from optimal and the socio-demographic characteristic of the sample of the study has no significant relationship with knowledge at (P value < 0.05).

Also, in Hassan and Aburaghif (2016), there is no statistical significant association between nurses' age, gender, nurses' level of education, years of service in nursing field, nurses' years of experience in heart centers and training course about cardiac catheterization and their knowledge concerning the complications of cardiac catheterization.

Conclusion from the discussion that the study results accepted the research hypothesis, the educational program will affect positively on nurses knowledge score post implementation educational program.

Chapter Six Conclusions & Recommendations

Chapter Six

Conclusions and Recommendations

6.1. Conclusions:

In light of the results discussion and their interpretations, our study concludes that:

6.1.1. In pre-test for both intervention and control groups, nurses expressed poor knowledge towards cardiac catheterization.

6.1.2. There is no differences between the knowledge in both intervention and control groups in the pre-test.

6.1.3. There were improving in nurses' knowledge after post-test for intervention group for educational program concerning interventional cardiac catheterization. While control group did not present any improvement in their knowledge at pre and post-test.

6.1.4. There is no training and educational system for the nursing staff working in the Kerbala Center for Cardiothoracic Diseases and Surgery on heart diseases and cardiac catheterization.

6.1.5. Thus accept the null hypothesis, and demonstrating that nurses in the intervention group achieved considerable benefit from educational program concerning interventional cardiac catheterization.

6.2. Recommendations:

The present study could recommend, based on the above stated conclusion, that:

6.2.1. Implementation of an educational program for nurses about cardiac catheterization.

6.2.2. Focusing on cardiac catheterization nursing care and encouraging nurses to participate in educational programs to meet their needs in terms of defects and limitations in their practice.

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Appendices

University of Babylon
College of Nursing
Research Ethics Committee

جـامـعة بـابـل
كـلية التمريـض
لجنة اخلاقيات البحث العلمي

Issue No: 28
Date: 23 / 2 /2021

Approval Letter

Jawad Badr Yaseen

The Research Ethics committee at the "**University of Babylon, College of Nursing**" has reviewed and discussed your application to conduct the research study entitled "**Effect of Cardiac Catheterization Safety Measures Instructional Program on Nurses' Knowledge at Kerbala Cardiac Center.**"

The Following documents have been reviewed and approved:

1. Research protocol
2. Research instrument/s
3. Participant informed consent

Committee Decision:

The committee approves the study to be conducted in the presented form. The Research Ethics committee expects to be informed about any changes occurring during the study, any revision in the protocol and participant informed consent.

Prof. Dr. Salma K. Jehad
Chair Committee
College of Nursing
Research Ethical Committee
23 / 2 /2021

Ministry of Higher Education and Scientific Research
وزارة التعليم العالي والبحث العلمي
University of Babylon
College of Nursing
جامعة بابل
كلية التمريض
لجنة الدراسات العليا

العدد : ٦٩١
التاريخ : ٢٠٢١/٣/٣

Ref. No. :
Date: / /

الى /دائرة صحة كربلاء/ مركز التدريب والتنمية البشرية
م/ تسهيل مهمة

تحية طيبة :

يطيب لنا حسن التواصل معكم ويرجى تفضلكم بتسهيل مهمة طالب الماجستير (جواد بدر ياسين خطاف) لغرض جمع عينة دراسة الماجستير والخاصة بالبحث الموسوم :

اثر البرنامج التدريبي حول اجراءات السلامة للقسطرة القلبية على معارف الممرضين في مركز كربلاء لامراض القلب

Effect of Cardiac Catheterization Safety Measures Instructional Program on Nurse's Knowledes at Kerbala Cardiac Center.

مع الاحترام ...

ا.م.د. حسام عباس داود
معاون العميد للشؤون العلمية والدراسات العليا
٢٠٢١/٣/٣

صورة عنه الى //
- مكتب السيد العميد للتفضل بالاطلاع مع الاحترام .
- لجنة الدراسات العليا
- الصادرة .

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محافظة كربلاء المقدسة
دائرة صحة كربلاء المقدسة
مركز التدريب والتنمية البشرية
شعبة ادارة المعرفة
وحدة البحوث
العدد: ٥٠٤
التاريخ / ٤ / ٣ / ٢٠٢١

جمهورية العراق

Holy Karbala governorate
Karbala Health Department
General manager's office
Training and Human Development Center

إلى/ مركز كربلاء لأمراض القلب

الموضوع/ بيان راي

السـلام عليكـم...

كتاب جامعة بابل / كلية التمريض ذي العدد ٦٩١ في ٢٠٢١/٣/٣

يرجى بيان رايكم حول تسهيل مهمة طالب الدراسات (جواد بدر ياسين خطاف) لانجاز بحثه الموسوم (اثر البرنامج التدريبي حول اجراءات السلامة للقسطرة القلبية على معارف الممرضين في مركز كربلاء لامراض القلب)

في مؤسستكم الصحية وترشيح مشرف عملي للبحث من قبل عضو لجنة البحوث على ان لاتتحمل دائرتنا اي نفقات مادية مع الاحترام.

الدكتورة
د/ تقوى خضر عبد الكريم
مدير مركز التدريب والتنمية البشرية
٤ / ٣ / ٢٠٢١

نسخة منه الى:-
-مركز التدريب والتنمية البشرية مع الأوليات
زينا /

العنوان/كربلاء المقدسة- حي الحسين(ع) – قرب دائرة كاتب العدل - رقم الهاتف / ٠٣٢٣٢٨٠٠٢
البريد الالكتروني / train.centerKH@yahoo.com - Email /

ت	الأسئلة	الإجابة الصائبة		الإجابة الخاطئة	
		التكرار	النسبة %	التكرار	النسبة %
١	الاصابة بالوذمة الرئوية بعد إجراء عملية القسطرة القلبية ربما تؤدي الى فشل عمل الأذين الايسر للقلب..	٦	%٣٠	١٤	%٧٠
٢	عملية القسطرة القلبية عن طريق الشريان الفخذي والعضدي هي الطريقة الاكثر استعمالا..	٦	%٣٠	١٤	%٧٠
٣	يجب على المريض عدم التوقف عن تناول علاج الـ(Metformin) قبل وبعد اجراء عملية القسطرة القلبية..	٨	%٤٠	١٢	%٦٠
٤	دواء (clopidogrel) يقلل من الاصابة بالنوبات القلبية والجلطة الدماغية.	١٠	%٥٠	١٠	%٥٠
٥	الادوية المذيبة للتخثر (Thrombolytic) تعمل على ازالة التلف في انسجة عضلة القلب..	٦	%٣٠	١٤	%٧٠
٦	يمكن ان يزول الم الصدر مباشرةً بعد اجراء عملية القسطرة القلبية العلاجية ..	٦	%٣٠	١٤	%٧٠
٧	القسطرة القلبية العلاجية يتم من خلالها تحديد المكان المتضرر من عضلة القلب ..	٧	%٣٥	١٣	%٦٥
٨	الفحوصات المختبرية التي يجب اجراءها قبل عملية القسطرة القلبية هي :- CBC ,Blood Urea, PT,INR, Serum electrolytes, Virology test	٩	%٤٥	١١	%٥٥
٩	التفاعلات الوعائية المبهمة شائعة إلى حد ما ويمكن أن تحدث أثناء قسطرة القلب مما يؤدي إلى بطء في نبضات القلب فقط ..	١٠	%٥٠	١٠	%٥٠
١٠	عند إزالة ال (sheath)يتم اجراء ضغط مستمر على مكان اجراء عملية القسطرة القلبية لمدة لا تقل عن ١٠ دقائق اذا كانت عملية القسطرة تشخيصية واذا كانت علاجية فيتم الضغط بشكل مستمر لمدة ١٥-٢٠ دقيقة.	٨	%٤٠	١٢	%٦٠
	النسبة الكلية	%٣٨		%٦٢	

Instructional Program about

Interventional Cardiac Catheterization

Jawad Badr Yaseen

Master student 2020-2021

Supervised by

Assist Prof.Dr. Hussam Abbas Dawood

The first week :-

First session :Overview about cardiovascular system, cardiac catheterization, indications and contraindications of it.

❖ **Session outlines:**

1- Overview about cardiovascular system.

2- Introduction about cardiac catheterization.

3- Indication and contraindication of cardiac catheterization procedure.

❖ **Session objective:**

At the end of the session, the participant (nurse) should be able to:

1) Explains of the anatomy and physiology of the cardiovascular system.

2) Discuss of cardiac catheterization.

3) Knowing the indications and contraindications for cardiac catheterization.

❖ **Session place:** Kerbala center for cardiac disease and surgery.

❖ **Time:** 60 minute.

Teaching instruments: Power point lecture, paper lecture, video, Whiteboard, Computer laptop.

Introduction:

If we carefully looked at how the heart works during the 70 years in the life of the average person, the heart will pump approximately 70 times per minute, 24 hours a day, and 365 days a year. The heart pumps about 5 quarts of blood a minute, 75 liters an hour, and 1,800 liters in a day. Although the work accomplished by this organ is out of proportion to its size, for most people, the heart functions normally throughout the life span. The pumping action of the heart moves blood, a vital substance, throughout the body, supplying oxygen and nutrients to cells, and removing waste. Without this action, cells die. (Morton & Fontaine, 2018)

Cardiac catheterization is a valuable diagnostic procedure which does a comprehensive examination of how the heart and its blood vessels

function. One or more catheters is inserted through a peripheral blood vessel in the antecubital artery or vein or femoral artery or vein with x-ray guidance. This procedure gathers information such as adequacy of blood supply through the coronary arteries, blood pressures, blood flow throughout chambers of the heart, collection of blood samples, and x rays of the heart's ventricles or arteries (Arathy, 2011).

1- **Overview about cardiovascular system:**

Anatomic and Physiologic Overview:

The heart is composed of three layers. The inner layer (figure (1)), or endocardium, consists of endothelial tissue and lines the inside of the heart and valves. The middle layer, or myocardium, is made up of muscle fibers and is responsible for the pumping action. The exterior layer of the heart is called the epicardium. The heart is encased in a thin, fibrous sac called the pericardium, which is composed of two layers. Adhering to the epicardium is the visceral pericardium.

Enveloping the visceral pericardium is the parietal pericardium, a tough fibrous tissue that attaches to the great vessels, diaphragm, sternum, and vertebral column and supports the heart in the mediastinum (Jacobson & Paul, 2016).

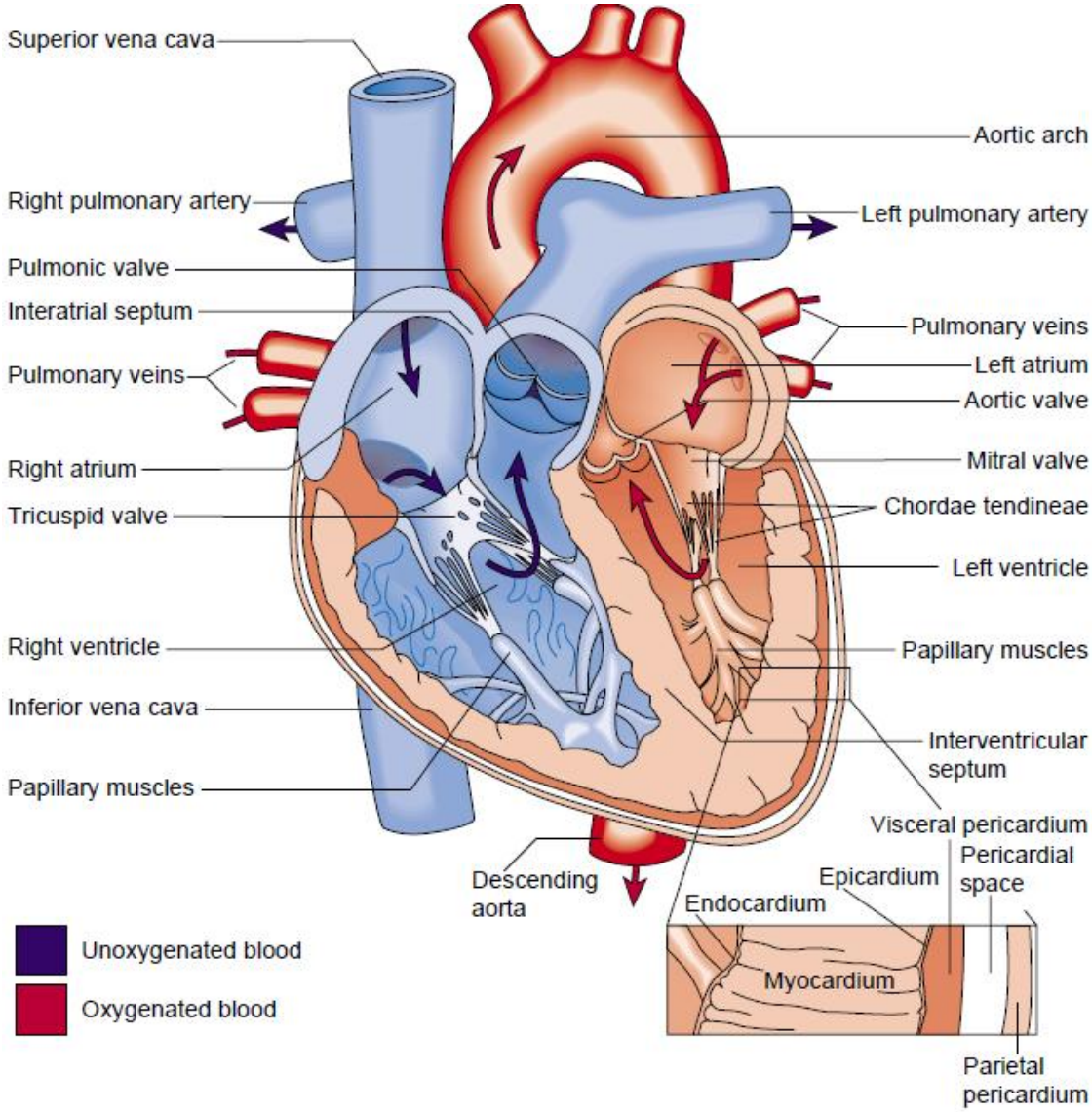

Figure (1) (Jacobson & Paul, 2016)

Heart Chambers:

The four chambers of the heart constitute the right and left sided pumping systems. The right side of the heart, made up of the right atrium and right ventricle, distributes venous blood (deoxygenated blood) to the lungs via the pulmonary artery (pulmonary circulation) for oxygenation. The right atrium receives blood returning from the superior vena cava (head, neck, and upper extremities), inferior vena cava (trunk and lower extremities), and coronary sinus (coronary circulation). The left side of the heart, composed of the left atrium and left ventricle, distributes oxygenated blood to the remainder of the body via the aorta (systemic circulation).

The left atrium receives oxygenated blood from the pulmonary circulation via the pulmonary veins. The relationships of the four heart chambers are shown in Figure (1) (Jacobson & Paul, 2016).

Heart valves:

The four valves in the heart permit blood to flow in only one direction. The valves, which are composed of thin leaflets of fibrous tissue, open and close in response to the movement of blood and pressure changes within the chambers. There are two types of valves: atrioventricular and semilunar (Jacobson & Paul, 2016).

Atrioventricular valves:

The valves that separate the atria from the ventricles are termed atrioventricular valves. The tricuspid valve, so named because it is composed of three cusps or leaflets, separates the right atrium from the right ventricle. The mitral, or bicuspid (two cusps) valve, lies between the left atrium and the left ventricle (see Fig.(1)). Normally, when the ventricles contract, ventricular pressure rises, closing the atrioventricular valve leaflets. Two additional structures, the papillary muscles and the chordae tendineae, maintain valve closure (Jacobson & Paul, 2016).

Semilunar valves:

The two semilunar valves are composed of three half-moon-like leaflets. The valve between the right ventricle and the pulmonary artery is called the pulmonic valve; the valve between the left ventricle and the aorta is called the aortic valve (Jacobson & Paul, 2016).

Coronary Arteries:

The left and right coronary arteries and their branches (Fig. 2) supply arterial blood to the heart. These arteries originate from the aorta just above the aortic valve leaflets. The heart has large metabolic requirements, extracting approximately 70% to 80% of the oxygen

delivered unlike other arteries, the coronary arteries are perfused during diastole.

An increase in heart rate shortens diastole and can decrease myocardial perfusion. Patients, particularly those with coronary artery disease (CAD), can develop myocardial ischemia (inadequate oxygen supply) when the heart rate accelerates. The left coronary artery has three branches. The artery from the point of origin to the first major branch is called the left main coronary artery (Jacobson & Paul, 2016).

Cardiac Muscle:

The myocardium is composed of specialized muscle tissue. Microscopically, myocardial muscle resembles striated (skeletal) muscle, which is under conscious control. Functionally, however, myocardial muscle resembles smooth muscle because its contraction is involuntary. The myocardial muscle fibers are arranged in an interconnected manner (called a syncytium) that allows for coordinated myocardial contraction and relaxation(Jacobson & Paul, 2016).

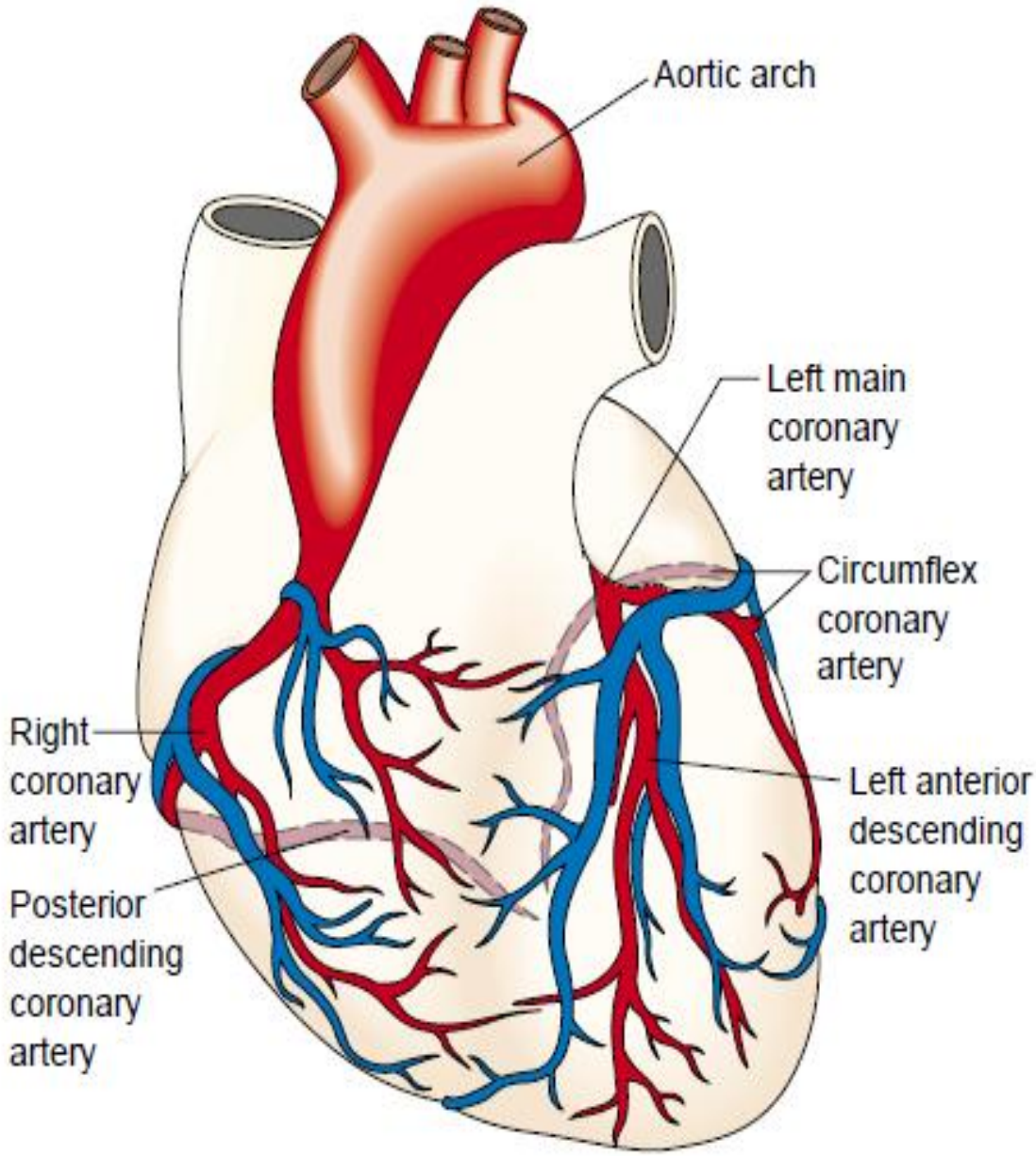

Figure (2)

(Jacobson & Paul, 2016)

2**- Introduction about cardiac catheterization.**

• **Cardiac catheterization** is the passage of a catheter into the left and/ or right heart to provide diagnostic information about the heart and/or blood vessels (Egziabher & Edwards, 2013).

Cardiac catheterization is a generic term that refers to a variety of procedures that are used to identify coronary artery disease, abnormalities of heart muscle (infarction or cardiomyopathy), abnormalities of the heart's

valves and congenital heart abnormalities. These procedures include angiography, ventriculography and right or left catheterization. As these procedures are invasive (Vitae, 1981).

Cardiac catheterization is widely used for diagnostic evaluation and therapeutic intervention in the management of patients with cardiac disease. Nurses have an important role in precatheterization teaching, intracatheterization, and postcatheterization care (Susan L. Woods, PhD, RN, FAHA et al., 2010).

Angioplasty:

Angioplasty is also known as PCI:

• Percutaneous — through the skin

• Coronary — having to do with the heart

• Intervention — the type of procedure used to open a narrowed artery

is similar to an angiogram. Both are done in the catheterization lab. Angioplasty is a procedure used to widen narrowed arteries of heart without surgery. The basic idea is to position a catheter with a small inflatable balloon in the narrowed section of the artery. Inflating the balloon catheter causes the balloon to push outward against the narrowing and surrounding wall of the artery. This process reduces the narrowing until it no longer interferes with blood flow.

The balloon is then deflated and removed from the artery. In many patients a stent is placed within the artery once it has been opened. A stent is a small metal mesh tube that is placed into blood vessel using a balloon catheter. The stent expands against the blood vessel wall as the balloon is inflated. The balloon is then deflated and removed, leaving the stent in place permanently, holding the blood vessel open and improving blood flow. Stents lower the risk of this area narrowing again.

There are several types of stents available. The doctor select the most appropriate type of stents for patients medical condition.(see figure 3) (Baim, 2007).

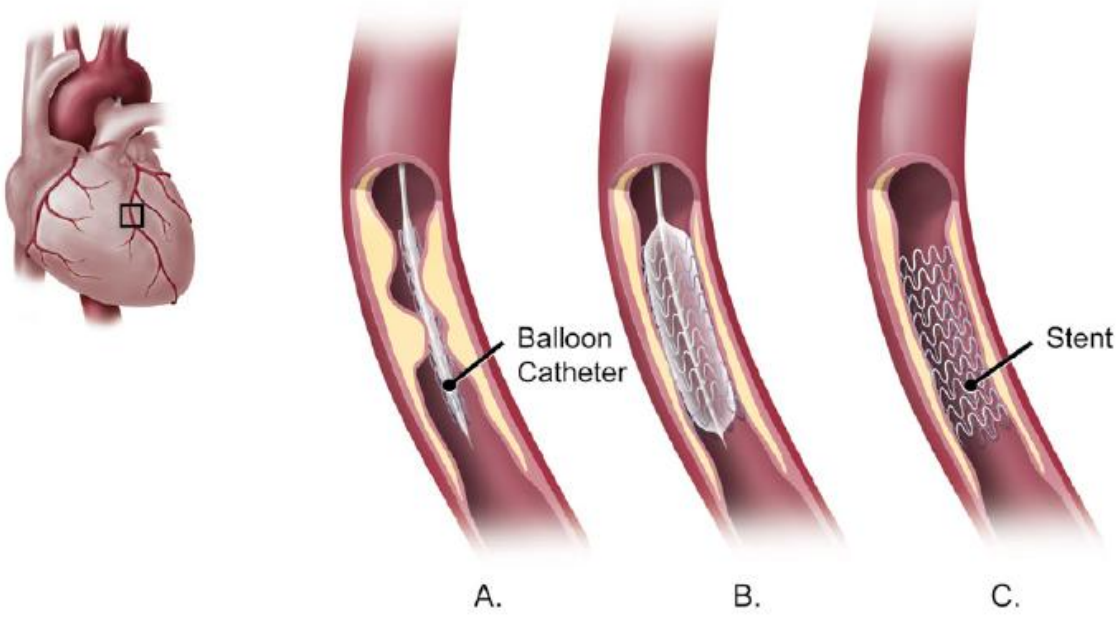

Figure (3)

(Baim, 2007)

Advantages of Angioplasty:

1- Over 90% of angioplasties are successful immediately.

2- Blood flow through the artery returns to normal or near normal.

3- Some people may not have complete relief, but their symptoms are improved, allowing them to be more active and comfortable.

4- There is no incision as this is not surgery and you are not put to sleep (general anesthesia).

5- Most people are up and walking on the same day.

6- Some people go home the same day, but some patients are required to stay overnight and go home the following morning (Baim, 2007).

Disadvantages of Angioplasty:

An artery may become narrow again after procedure it. This is called restenosis. Patients may feel angina again. The use of stents has reduced the restenosis rate. Restenosis is usually treated with a second angioplasty but, occasionally, bypass surgery is needed or medical therapy is used (Baim, 2007).

Angiography:

Cardiac catheterization is usually performed with angiography, a technique of injecting a contrast agent into the vascular system to outline the heart and blood vessels.

Common sites for selective angiography are the aorta, the coronary arteries, and the right and left sides of the heart (Jacobson & Paul, 2016).

Aortography:

An aortogram is a form of angiography that outlines the lumen of the aorta and the major arteries arising from it. In thoracic aortography, a contrast agent is used to study the aortic arch and its major branches. The catheter may be introduced into the aorta using the translumbar or retrograde brachial or femoral artery approach.(Jacobson & Paul, 2016).

Coronary Arteriography:

In coronary arteriography, the catheter is introduced into the right or left brachial or femoral artery, then passed into the ascending aorta and manipulated into the appropriate coronary artery. Coronary arteriography is used to evaluate the degree of atherosclerosis and to guide the selection of treatment. It is also used to study suspected congenital anomalies of the coronary arteries (Jacobson & Paul, 2016).

Arterial access:

There are three main arterial access sites for coronary angiography and therapeutic intervention:

1- The radial artery

2- The femoral artery

3- The brachial artery.

In practice, the radial and femoral arteries are used the most common (Collins, 2008).

3- Indications of cardiac catheterization procedure:

Cardiac catheterization is indicated in a wide variety of circumstances. The most frequent use of cardiac catheterization is:-

1. To confirm or define the extent of suspected CAD.
2. Anatomical and physiologic severity of the disease is determined, the presence or absence of related conditions is explored, and the need for PCI can be determined.
3. Cardiac catheterization also is used for the evaluation of patients with acquired or congenital heart disease.
4. Indications for coronary angiography are classified for specific clinical presentations, including risk stratification for patients with chronic stable angina and asymptomatic patients with ischemia on noninvasive stress testing, and patients with acute coronary syndrome: non-ST elevation myocardial infarction (NSTEMI) and ST elevation myocardial infarction (STEMI) (Susan L. Woods, PhD, RN, FAHA et al., 2010).
5. cardiac catheterization is a combined hemodynamic and angiographic procedure undertaken for diagnostic and often therapeutic purposes. As with any invasive procedure, the decision to perform cardiac catheterization must be based on a careful balance of the risk of the procedure against the anticipated benefit to the patient.

6. Indications for the use of catheterization and coronary intervention in the management of stable angina, unstable angina, and STelevation myocardial infarction (MI).
7. The goal of cardiac catheterization in such patients is to identify the culprit lesions and then to restore vessel patency via PCI.
8. In a few such patients, the diagnostic portion of the catheterization procedure may reveal other features (e.g., complex multivessel or left main coronary disease, severe associated valvular disease), which provide critical information for the decision and planning of open heart surgery in case this is needed (19: page 3-4).

Contraindications to cardiac catheterization:

There are no absolute contraindications for coronary catheterization. Relative contraindications include:

1. Unexplained fever, untreated infection;
2. Severe anemia with hemoglobin of less than 8 g/dl;
3. Anticoagulation: international normalized ratio (INR) should be less than 2
4. Severe active bleeding
5. Acute gastrointestinal bleeding
6. Severe electrolyte imbalance (especially hyperkalemia, as this predisposes to arrhythmias)
7. Uncontrolled hypertension
8. Digitalis toxicity
9. Recent stroke (within a month)
10. Pregnancy

11. Severe renal insufficiency or anuria, unless dialysis is planned after the procedure
12. Uncontrolled congestive heart failure
13. Active endocarditic or other systemic illness needing stabilization (Vitae, 1981).
14. Uncontrolled ventricular irritability.
15. Uncorrected hypokalemia.
16. Preexisting renal insufficiency, particularly in patients with diabetes.
17. Patients with prior anaphylactic reaction to contrast medium require special treatment before the procedure.
18. The patient's refusal of the therapeutic procedures to be directed by the catheterization results.
19. Anticoagulation is a relative contraindication. Routinely, oral anticoagulants should be withheld for 48 to 72 hours before catheterization to achieve an international normalized ratio below 2.0. In patients who must remain on anticoagulants, such as patients with prosthetic heart valves or hypercoagulable states, bridging therapy with heparin is used while prothrombin time is reversed or allowed to return to normal.(Susan L. Woods, PhD, RN, FAHA et al., 2010).

Second session: Nursing management for patients with cardiac catheterization before procedure.

- **Session outlines:**
  1. Diagnostic and laboratory test before cardiac catheterization procedure.
  2. Medication that withheld and that use before, during and after cardiac catheterization procedure.
  3. Physical preparation before cardiac catheterization procedure.
- **Session objective:**

  At the end of the session, the participant (nurse) should be able to:

  A. Explains of laboratory and radiological examinations in cardiac catheterization.
  B. Knowing the medication for patients whose undergoing cardiac catheterization.
  C. Discuss how to prepare the patient for cardiac catheterization.

- **Session place:** Kerbala center for cardiac disease and surgery.
- **Time:** 60 minute.

Teaching instruments: Power point lecture, paper lecture, video, Whiteboard, Computer laptop.

- **Introduction:**

Patients undergoing cardiac catheterization require careful preprocedure evaluation, including a recent history and physical examination to identify a history of contrast media allergy as well as a recent set of laboratory studies, including a complete blood count, prothrombin and partial thromboplastin time, International Normalized Ratio, and chemistry panel (serum potassium, creatinine, and blood urea nitrogen levels) (Morton & Fontaine, 2018)

Before arrival in the catheterization laboratory, the cardiologist responsible for the procedure should explain the procedure fully, including

the risks and benefits, and answer questions from the patient and family. Precatheterization evaluation includes obtaining the patient's history and ECG. Important components of the history that need to be addressed include diabetes mellitus (insulin or non–insulin requiring), kidney disease, anticoagulation status, and peripheral arterial disease as well as previous contrast media or latex allergy. Full knowledge of any prior procedures, including cardiac catheterizations, percutaneous coronary interventions, peripheral arterial interventions or surgery.

Patients should be fasting at least 6 hours, and an intravenous line should be established. Oral or intravenous sedation is usually administered (e.g., benzodiazepine). Pulse oximetry should be used to monitor respiratory status. Some laboratories premedicate patients with antihistamines such as diphenhydramine (25 mg intravenous push) for its antiallergic properties and to assist in sedation.

Oral anticoagulants should be discontinued and the INR should be less than 1.8 to avoid increased risk of bleeding. Aspirin or other oral antiplatelet agents are continued before the procedure. Patients with diabetes receiving metformin should have the medication discontinued the morning of the procedure and not restarted until renal function is stable at least 48 hours after the procedure (Davidson & Bonow, 2010).

Nursing care and patient preparation before cardiac catheterization:

Patients suspected of having an acute coronary syndrome would have a cardiac catheterization performed during their hospitalization. Elective cases are usually admitted for cardiac catheterization the day of the procedure. The physician performing the catheterization explains the procedure and obtains informed consent before procedure admission. Precatheterization orders usually include the following:

1. Standard 12-lead electrocardiogram (ECG).

2. Laboratory tests: complete blood count including platelets and differential, electrolytes, blood urea nitrogen (BUN), and creatinine.
3. Nothing by mouth after midnight (or after a light breakfast if catheterization is to be in the afternoon).
4. Premedication with a mild sedative may be given. During the procedure, a procedural sedation protocol should be followed.
5. Patients with renal insufficiency should be adequately hydrated before and after the procedure and a minimum amount of radiographic low-osmolar contrast medium should be used. The combination of N-acetylcysteine and sodium bicarbonate infusion before and after contrast infusion has shown to reduce the risk of contrast induced nephropathy in patients with renal insufficiency. The amount of hydration is dependent on the ventricular function and baseline fluid status. However, if tolerated, a total of 1 liter of normal saline administered between initiation and completion of the procedure is recommended. (Davidson & Bonow, 2010) .
6. Patients with a history of allergy to previous contrast administration, asthma, or drug or food allergies with iodine containing substances should receive low-osmolar contrast medium and pretreatment with steroids, antihistamine (diphenhydramine), and an H2 blocker (cimetidine or ranitidine) are also sometimes used.
7. Patients who are fasting should take a reduced dose of insulin or hold dose as directed by physician. Oral diabetic agents are usually held the morning of the procedure. Metformin is held the day of the procedure and 48 hours after the catheterization.
8. Anticoagulation issues are directed by the physician. Acetylsalicylic acid (ASA) and antiplatelet medications are usually given before catheterization. Warfarin is generally discontinued 3 to 4 days before

the procedure (Susan L. Woods, PhD, RN, FAHA et al., 2010). If the patient is receiving heparin therapy, heparin can be continued during the catheterization and discontinued for sheath removal.

9. Advice patient to void before going to catheterization laboratory.
10. There is no evidence-based data to support the prophylactic use of antibiotics.
11. Patients who wear dentures, glasses, or hearing aids should be sent to the laboratory wearing them. The patient is better able to communicate when dentures and hearing aids are in place. Glasses allow the patient to view the angiogram on the monitor and help keep the patient oriented to the surroundings (Susan L. Woods, PhD, RN, FAHA et al., 2010).
12. Most be bringing health card and all medications.
13. Bring a list of own questions to ensure that you have all the information need.
14. Make arrangements for transportation home on discharge. The patient is not allowed to drive. Discharge will take place approximately five to six hours after your procedure.
15. If patient live a considerable distance from the Heart center, check with the doctor to see if you should stay close to the hospital on the night of discharge. Arrangements for accommodations should be made in advance.
16. A nurse will do an assessment and take blood pressure and other vital signs.
17. A saline lock (intravenous catheter) may be inserted.
18. Pre-procedure teaching will be done and a video will be available for viewing.

19. Note the cardiologist's procedures.
20. Informed consent will be obtained.
21. A small area on both sides of groin or on wrist be prepped (Baim, 2007).
22. Patients should be fasting at least 6 hours, and an intravenous line should be established.
23. Oral anticoagulants should be discontinued and the INR should be less than 1.8 to avoid increased risk of bleeding.
24. To fully prepare and obtain the patient's consent and cooperation, it is essential to assess the patient's understanding and attitudes towards the procedure and address any misconceptions, including potential results and subsequent treatment.
25. Weight and height. Monitor and record of presence or absence of peripheral pulses (radial and pedal).
26. Patients with diabetes mellitus require measurement of blood glucose. Ensure all blood results are available if required.
27. Clopidogrel & aspirin — all patients undergoing for cardiac catheterization an (angiogram ± angioplasty) should receive a stat dose of clopidogrel and aspirin, unless contraindicated or the patient is having planned cardiac surgery. It is necessary for patients to fast, because the contrast medium can cause nausea and vomiting, or in severe disease, emergency surgery might be required. Patients should not receive food for up to 4h before the procedure. Clear fluids may be consumed up until the time of the procedure.
28. To decrease the risk of infection, the hair on the patient's arm or groin, depending on the site of access, should be clipped as close as possible to the time of procedure.

29. Ensure venous access—the left arm is preferable because of the positioning of the equipment and personnel on the right side of the patient during the procedure.
30. Document any prostheses.
31. If the patient has had a previous CABG, ensure that the operation notes are available.
32. Ensure that the documentation/checklist is complete.
33. If any observations/results are outside normal parameters, inform the operator (Collins, 2008).

Third session: Nursing management during cardiac catheterization procedure.

❖ **Session outlines:**

1- Nursing management during cardiac catheterization procedure.

❖ **Session objective:**

At the end of the session, the participant (nurse) should be able to:

1- Knowing the role of the nurse in the cardiac catheterization theater.

2- Explains how to monitor patient vital signs and drug reactions during cardiac catheterization procedure.

3- Full coordination between the medical team in the operating theater and the cardiac catheter ward nurse.

❖ **Session place:** Kerbala center for cardiac disease and surgery.

❖ **Time:** 60 minute.

Teaching instruments: Power point lecture, paper lecture, video, whiteboard, computer laptop.

❖ **Introduction:**

During cardiac catheterization, the patient has an intravenous line in place for the administration of sedatives, fluids, heparin, and other medications. Noninvasive hemodynamic monitoring that includes BP and multiple ECG tracings is necessary to continuously observe for dysrhythmias or hemodynamic instability. The myocardium can become ischemic and trigger dysrhythmias as catheters are positioned in the coronary arteries or during injection of contrast agents. Resuscitation equipment must be readily available during the procedure. Staff must be prepared to provide advanced cardiac life support measures as necessary (Jacobson & Paul, 2016).

The role of the nurse in catheterization lab :-

1. Once the patient arrives in the cath lab, they will be asked to lie down on the catheterization table.
2. Electrode stickers will be placed on their torso so that the ECG can monitor their heart rate and rhythm throughout the procedure .
3. A probe may be placed on the patient's finger to monitor their blood oxygen saturations and their blood pressure be monitored intravascularly throughout the procedure.
4. Unless it is against the patient's religious beliefs, the nursing staff ensure that the proposed access area has been shaved properly; then, the patient will be covered with sterile drapes .
5. Access to the arterial system may be via the femoral, brachial or radial artery . However, the most common vascular access site is the femoral and radial approach.
6. Once the patient is lying on the table, both inguinal areas of the thighs or radial area will be liberally cleaned with an antiseptic solution. Then, the patient will be covered with sterile cloth, leaving the femoral or radial artery uncovered.
7. Once the preparations to make the patient sterile are completed, a liberal amount of local anesthetic will be injected . The patient should be warned that they may experience some burning as the anesthetic is being injected . Once the area is anaesthetized, an introducer sheath is inserted into the femoral or radial artery.
8. The patient may feel some tugging and pushing around this time. Usually, there is a little spurt of blood out initially, which shows the physician that the sheath is in the artery. The introducer sheath has a one-way valve system which allows the doctor to insert the guidewires and angiogram catheters. This minimizes bleeding at the

puncture site and avoids stabbing the artery every time a catheter needs to be inserted.

9. So most patients experience little or no discomfort during the procedure, patients should be advised to let medical staff know if the local anesthetic begins to wear off so that more may be administered.
10. Patients should also be advised to let the nursing staff know if patient was experiencing any angina or chest pain so that suitable analgesia can be administered.
11. Once the doctor has the catheter in the appropriate position, the contrast dye is injected. Multiple views are taken of both coronary arteries from different angles to ensure that all proximal segments of the arteries are adequately visualized. For each view, 5–10 ml of contrast dye is injected by hand and a recording of each view is obtained. The angles that the pictures are taken at are usually 30◦, known as left anterior oblique, and 60◦ , known as right anterior oblique views. Looking at the coronary artery from these angles provides the physician with the best views to measure and assess a lesion in the coronary arteries.

Some people get embarrassed, as they feel that they have wet themselves, so they should be reassured that they have not. In order to get a better view, the patient may be asked to cough or stop breathing, without bearing down, for a short period of time during the procedure and a contrast dye be injected through this catheter to highlight the coronary arteries. Most patients experience a sensation of body warmth as the dye is injected or the urge to empty their bladder (Baim, 2007) .

12. Heparin is no longer needed for a longer period of time intravenously during routine coronary angiography, and the femoral sheath is usually removed at the end of the procedure. (Vitae, 1981).
13. Give medication to help for relax, but the patient be awake during the procedure.
14. So can give any instructions whether from the doctor or/and nurses.
15. The doctor will administer freezing to groin or wrist.
16. A small catheter will be threaded through a blood vessel up to the heart.
17. X-ray pictures will be taken throughout the procedure. The X-ray machine will move over patient very close to body.
18. During the procedure, patient may be asked to take a deep breath and hold it for a few seconds, or to cough.
19. The time for the procedure in the lab is usually from 30 to 90 minutes. If patient condition is complex, the procedure will be longer. Due to unforeseen circumstances (Baim, 2007).
20. There is others basic roles for nurses needed in a catheterization laboratory during a procedure are scrubber, recorder, and circulator. In some laboratories, the nurses scrub and assist in the procedure; in others, they are responsible for monitoring pressure and cardiac rhythm, assisting with hemodynamic studies such as CO determination, and administering IV procedural sedation.
21. The nurse may visit the patient before the procedure to give instructions and help in preparing the patient or after the procedure to evaluate puncture site stability. Ideally, must be the nurse has a background in intensive or coronary care and a thorough knowledge of cardiovascular drugs, arrhythmias, the principles of IV procedural sedation, sterile technique, cardiac anatomy and physiology,

pacemakers, and the concepts of catheter management for coronary angiography and intervention.

22. Changes in the patient's emotional status, alertness, vocal responses, and facial expressions are important indices of the patient's tolerance of the procedure. The nurse's alertness to these clues and early intervention with reassurance or appropriate medication may help to prevent more serious events.
23. Training in advanced cardiac life support is a requirement for catheterization laboratory nurses and those nurses caring for patients after the procedure.
24. Documentation of observations and nursing procedures from the beginning of the cardiac catheterization process to its end is very important (Susan L. Woods, PhD, RN, FAHA et al., 2010).

The second week :-

First session : Nursing management after cardiac catheterization procedure .

- **Session outlines:**

1- Nursing management after cardiac catheterization procedure .

- **Session objective:**

At the end of the session, the participant (nurse) should be able to:

1- Knowing the role of the nurse in the cardiac catheterization ward.

2- Knowing nursing care to the patient after cardiac catheterization.

3- Continuous communication with the specialist doctor about occurs any changes in the patient's condition.

- **Session place:** Kerbala center for cardiac disease and surgery.
- **Time:** 60 minute.
- **Teaching instruments:** Power point lecture, paper lecture, video, Whiteboard, Computer laptop.
- **Introduction:**

Once cardiac catheterization procedure is completed the patient be escorted back to the ward. On warding, the patient be attached to a cardiac monitor and blood pressure cuff so that the nurse can obtain vital signs of patient and the nurse check their puncture site to observe any bleeding, check the pedal pulse and the peripheral skin color and temperature of the limb below the puncture site.

Whilst on bed rest, the nurse should observe the access site every half-hour for signs of bleeding, swelling or hematoma formation. Patients should be advised to keep their leg straight, and press over the puncture site before coughing or sneezing. They should inform nursing staff if they feel any blood, wetness or stickiness. As tachycardia and a hypotension can indicate that the patient is losing blood, which may not be visible if it is a retroperitoneal bleed, the heart rate and blood pressure should be recorded

half-hourly. Often, a patient complaining of low backache is the first symptom of a retroperitoneal bleed.

The patient should be allowed to eat and drink immediately after the procedure. Patients should be encouraged to drink plenty of fluid following the procedure in order to compensate for the diuretic action of the contrast dye, as well as to flush out the myocardial and vascular depressant drugs in body systems, and to prevent hypotension. If the patient is unable to drink, intravenous fluids should be administered (Vitae, 1981).

Nursing management after cardiac catheterization procedure.

The purpose of frequent patient observation after cardiac catheterization is to detect arterial or venous puncture-related complications, and systemic or disease-related events and after procedure care includes:

1- Following hemostasis, if was cardiac catheterization during femoral site, the patient can lie at 45° for 1h. If no complications or signs of bleeding are observed, they can sit upright in bed. A total of 3h bed rest is recommended before mobilization.

2- The radial arterial pressure machine must be released slowly. The patient should rest on the bed / chair for one to two hours and avoid moving the affected arm after the catheterization procedure in the upper arm, and the sutures should be removed after 7 days, or after 10 days for diabetics. (Collins, 2008).

3- Measurement of a full set of observations—BP, HR, temperature, SpO 2 , and respiratory rate and blood sugar if the patient with diabetes mellitus.

4- Should be notes Colour, warmth, and sensation (CWS) of affected limb.

5- Presence or absence of pedal/radial pulses (relevant to arterial access site).

6- Wound site—observation for bleeding, hematoma formation, and signs of infection. If the patient is unstable or complaining of chest pain:

7- Attach patient to a cardiac monitor.

8- Perform a 12-lead ECG and compare with before procedure ECG findings to assess any detrimental changes/complications.

9- Repeat full set of require observations.

10- Report to operator/nurse in catheter ward.

11- If necessary, give appropriate treatment (e.g. O 2 , nitrate and analgesia). The frequency of observations should be determined by the patient's condition; however, the following can be used as a guide for stable or routine patients:

a- Monitor and record pulse and BP:

1- Every 30min for 2h

2- Every 1h until bed rest is complete

b- So measurement respiratory rate and SpO 2 if necessary.

c- Monitor and record CWS of affected limb condition, pedal/radial pulse and wound site check:

1- Every 30min to 1h until bed rest is complete

2- 1h post mobilization

3- On the morning after the procedure and/or before discharge

4- Also refer to the sheath-removal section (Collins, 2008).

12- Educate the patient to inform staff of any chest pain/breathlessness or bleeding/discomfort at the site of entry.

13- Explain how to apply pressure to the femoral site if required (for coughing, sneezing, or if the patient feels any warmth or wetness in the area).

14- Patients should only be given a light diet until after sheath removal, because this might induce vomiting.

15- Monitor urine output. If the patient fails to void urine within 6h of the procedure, or if the patient is in discomfort/has difficulty passing urine, a urinary catheter might be required.

16- Emphasize the importance of bed rest, because moving or sitting up immediately post procedure can induce bleeding or hematoma (Collins, 2008).

Care of Insertion Site:

Dressing:

1- May removed the clear dressing or bandage on the day after the procedure or with same day and replace it with a new dressing.

2- A small amount of dried blood on the old dressing and insertion site is normal.

3- Allow for patient may take a shower on the day after catheterization procedure, but do not allow the dressing to stay wet.

4- Do not take a tub bath within 48 hours of test.

5- May reapply a dry dressing for a few more days in order to keep the skin clean and reduce the risk of trauma or infection. The dressing may be removed 72 hours after the procedure.

6- Try to avoid wearing tight or restrictive clothing over the insertion site.

Examine of insertion site:

Examine the insertion site each day and notify physician if any of the following develops:

1- An expanding lump or persistent area of redness and warmth.

2- Yellow drainage from the insertion site.

3- Increasing numbness in the leg, hand, wrist or arm.

4- Severe discomfort at the insertion site.

Diet:

1- patient should try to drink more fluid than usual in the 48 hours after your procedure. This will help kidneys flush the dye by urination.

2- patient may resume usual diet after discharge.

Sheath removal:

Manual compression:

Sheath removal is usually performed immediately after a diagnostic angiogram, unless heparin has been administered (e.g. during a prolonged or complicated angiogram) or the patient has received thrombolytic or glycoprotein therapy. If this is the case, or if an interventional procedure has taken place, then sheath removal generally occurs after a period of 3–6h.

Removing a sheath from an artery is not without risk and potential complications include the following:

1- Bleeding at the site or retroperitoneal bleeding

2- Pseudoaneurysm

3- Arteriovenous fistula

4- Distal ischemia or necrosis

5- Hematoma formation

6- Arterial occlusion

7- Vasovagal response, resulting in hypotension and bradycardia.

In an attempt to reduce the occurrence of complications, it is important to gather the following information before the procedure:

8- Has heparin been administered? If so, it is important to determine the activated clotting time (ACT). This should usually be <150–165s.

9- What is the patient's BP? If the patient is hypertensive (systolic BP >150mmHg), prolonged pressure will be required to achieve hemostasis. Antihypertensive medication might be required prior to sheath removal. If the patient is hypotensive, the cause should be treated.

10- Presence of a hematoma? This can cause considerable discomfort to the patient and subsequently cause an in BP. Consider appropriate analgesia before sheath removal.

11- What is the patient's LV function? This information can be obtained from the patient's medical notes. If the patient has decrease in LV function, greater caution/more frequent observation is required in the event of plasma substitute administration following a vasovagal reaction (Collins, 2008).

Equipment required for femoral sheath removal:

1- Dressing trolley/tray

2- Sterile dressing pack

3- Sterile gauze swabs

4- Sterile gloves

5- Bioclusive dressing

6- Sterile normal saline sachet (for cleansing)

7- Protective goggles

8- Protective apron

9- Saline flush

10- Femostop ® equipment

11- Atropine 600mcg

12- Plasma substitute 500mL and blood-giving set.

Procedure:

1- Wash and dry hands.

2- Put on protective clothing/equipment.

3- Remove the bioclusive dressing and clean the area using an aseptic technique.

4- Locate the femoral pulse by palpation of the femoral groin (1–2cm above the puncture site). Place the index and middle fingers on the pulse and exert pressure while removing the sheath with the other hand. If a venous sheath was also inserted, it is advisable to remove the arterial sheath first and remove the venous sheath after 10min. The venous sheath is innermost.

5- Observe the patient for signs of complications—vasovagal response can induce bradycardia, hypotension, nausea, vomiting, yawning, sweating, pallor, and/or agitation.

6- If necessary, call the second nurse to administer atropine and/or plasma substitute, as required.

7- Apply continuous pressure for a minimum of 10min (diagnostic) or 15–20min (interventional). Release pressure slowly and continue to press lightly, as appropriate.

8- While applying reduced pressure with one hand, palpate the surrounding area with the other hand, to detect hematoma formation. The skin should be soft and pliable.

9- If bleeding persists or a hematoma is enlarging, apply further pressure and assess whether a compression device is required (Achieving hemostasis: closure devices).

10- When hemostasis is achieved, clean the area using sterile normal saline and apply a biocclusive dressing.

11- Document the time of hemostasis and any nursing procedures (Collins, 2008).

Discharge advices:

In order to protect the puncture site from bleeding, patients should be advised:

1. To feel the puncture site for signs of a growing lump over the next 2–3 days.

2. Patient may get a bruise around the puncture site and normally this gets bigger as gravity pulls it down the leg. Unless it is painful, they should not worry about this.

3.There may be a little bit of blood staining on their underwear. If the blood is bright red and spurting, they should send for an ambulance. Whilst waiting for the ambulance, they should lie down on a firm surface and press firmly just above the puncture site.

4. Although it is very rare for problems like these to occur but in order to minimise them, they should:

a- Shower in preference to bathing for the next 2–3 days; if they only have a bath, they should use tepid water;

b- Not scrub vigorously over the puncture site;

c- Avoid heavy lifting and pulling for the next 2–3 days ;

d- Avoid driving for a week (Vitae, 1981).

5. Report the following symptoms to physician if they occur:

a- New bleeding or swelling at the catheterization site. (If marked bleeding occurs, press hand firmly over the area of bleeding.

b- Increased tenderness, redness, drainage, or pain at the catheterization site

c- Fever

d- Change in color (pallor), temperature (coolness), or sensation (numbness) in the leg or arm used for catheterization.

6. Acetaminophen or other non-aspirin-containing analgesic may be taken every 4 hours as needed for pain unless contraindicated

7. If stitches are present, wear an adhesive bandage and remove as directed by physician. Otherwise, cover site with an adhesive bandage for 24 hours

8. Patient to see physician for follow-up appointment.

9. Continue prescribed medications as before unless otherwise indicated by physician.

10. Avoid strenuous activity for 48 hours and do not lift anything heavier than 5 lb for the next 48 hours

11. Limit excessive stair climbing.

12. Patient must be driven home and be accompanied by a responsible adult until the next morning.

13. If pain or pressure occurs in chest, arms, shoulders, neck, or jaw:

a- Take nitroglycerin if it is prescribed for the patient

b- Notify cardiologist of chest pain if it is relieved with nitroglycerin If chest pain is not relieved.

14. Follow diet as prescribed by cardiologist, usually a low-salt, low-fat diet (Susan L. Woods, PhD, RN, FAHA et al., 2010).

Second session: Most common risk factors and complications at cardiac catheterization procedure.

❖ **Session outlines:**

1- Knowing of the complications during and after at cardiac catheterization procedure.

2- Nursing care and avoid of complications during and after cardiac catheterization.

❖ **Session objective:**

At the end of the session, the participant (nurse) should be able to:

1- Explains the complications that may occur during and after cardiac catheterization.

2- Discuss how to nursing management for complications during and after cardiac catheterization.

3- Knowing avoid complications that may occur during and after cardiac catheterization.

❖ **Session place:** Kerbala center for cardiac disease and surgery.

❖ **Time:** 60 minute.

❖ **Teaching instruments:** Power point lecture, paper lecture, video, Whiteboard, Computer laptop.

❖ **Introduction:**

There is a very low mortality and morbidity associated with cardiac catheterization. Analysis of complications in more than 200,000 patients indicated that the risk of death was less than 0.1%, myocardial infarction less than 0.05%, stroke less than 0.07%, serious ventricular arrhythmia less than 0.5% and major vascular complication (thrombosis, bleeding requiring a transfusion, pseudoaneurysm) less than 1% (Vitae, 1981) .

Other variations in risk are based on the type of procedure being performed (diagnostic catheterization, coronary intervention, and so on)

and to some extent on the experience and familiarity of the operator with that particular procedure (19; page 77).

1-**Knowing of the complications during and after at cardiac catheterization procedure.**

Prevention and detection of complications are the main aims of nursing care, both during and after cardiac catheterization (angiography or angioplasty).

Although complications are rare, they do occur and can be life threatening, therefore, early detection and intervention are essential. It is important to recognize complications. The complications discussed here are related to both angiography and angioplasty (PCI), and we can separate these complications as follows: (Collins, 2008).

1- Death:

a- Death as a Complication of Diagnostic Catheterization: as a Complications of Diagnostic Catheterization Death has declined progressively over the last 30 years. Whereas a 1% mortality was seen with diagnostic catheterization in the 1960s, the first Society for Cardiac Angiography registry of 53,581 diagnostic catheterizations performed in 1979-1981 showed a 0.14% procedure-related mortality.4 By the second registry of 222,553 patients catheterized in 1984-1987, procedure-related mortality for diagnostic catheterization had fallen further, to 0.1% (i.e., 1 in 1 ,000). This small reduction in mortality, however, belies the fact that the second registry included many more patients who fell into a high-risk subgroup for the procedure.

b- Left Main Disease: Although there has been a progressive reduction in the overall mortality of diagnostic cardiac catheterization over the last 25 years , patients with severe left main coronary disease remain at increased risk.

c- Left Ventricular Dysfunction: Patients with cardiogenic shock in the setting of acute myocardial infarction or severe chronic left ventricular dysfunction , also have a several-fold increased risk of procedural morbidity and mortality.

d- Valvular Heart Disease: Despite the preponderance of coronary artery disease as the indication for diagnostic cardiac catheterization patients with severe valvular heart disease are also at increased risk for dying during cardiac catheterization.

e- Death in the Course of an lnterventional Procedure: Because they involve the use of more aggressive catheters, superselective cannulation of diseased coronary arteries, and brief interruption of coronary or even systemic flow, interventional procedures tend to carry higher mortality than purely diagnostic catheterizations.

f- Prior Coronary Artery Bypass Graft Surgery: Patients who have previously undergone coronary bypass surgery make up a growing subgroup of diagnostic and interventional catheterizations. They are typically 5 years older, have more diffuse coronary and generalized atherosclerosis, worse left ventricular function, and require a lengthier and more complex procedure to image both native coronary arteries and all grafts.

2- Myocardial infarction: Although transient myocardial ischemia is relatively common during diagnostic catheterization and occurs routinely during coronary intervention, myocardial infarction is an uncommon but important complication of diagnostic cardiac catheterization.

a- interventional Procedures: Coronary interventions may produce myocardial infarction by a variety of mechanisms that include dissection, abrupt vessel closure, occlusion of side branches, spasm of the epicardial or arteriolar vessels (no reflow), thrombosis, or distal embolization.

3- Cerebrovascular complications: Cerebrovascular accidents (strokes) are uncommon but potentially devastating complications of diagnostic cardiac catheterization.

4- Local vascular complications: Local complications at the catheter introduction site are among the most common problems seen after cardiac catheterization procedures, and probably are the single greatest source of procedure-related morbidity. Specific problems include vessel thrombosis, distal embolization, dissection, poorly controlled bleeding at the puncture site, the development of pseudoaneurysm, arteriovenous fistula, retroperitoneal hematoma, and the development of femoral neuropathy.

a- Femoral Artery Thrombosis: Femoral artery thrombosis can occur in patients with a small common femoral artery lumen (peripheral vascular disease, diabetes, female gender) , in whom a large-diameter catheter or sheath (e.g., an intraaortic balloon pump) has been placed, particularly when the catheter dwell time is long or when prolonged postprocedure compression is applied.

b- Femoral Vein Thrombosis: Femoral venous thrombosis and pulmonary embolism are rare complications of diagnostic femoral catheterization. A small number of clinical cases have been reported, however, particularly in the setting of venous compression by a large arterial hematoma, sustained mechanical compression, or prolonged procedures with multiple venous lines (e.g., electrophysiologic studies).

c- Hemorrhagic Complications: Although thrombotic complications do occur, poorly controlled bleeding from the arterial puncture site is a more common problem after cardiac catheterization by the femoral approach 52 Uncontrollable free bleeding around the sheath suggests laceration of the femoral artery.

d- Retroperitoneal Bleeding: Retroperitoneal bleeding or hematoma is a relatively rare complication that is associated with high morbidity and mortality.

e- Femoral Neuropathy: Femoral neuropathy is another rare complication of femoral artery access. It can occur from direct trauma to the femoral nerve, from compression by a hematoma, or from direct prolonged compression during achievement of hemostasis.

f- Pseudoaneurysm and Arteriovenous Fistula: A pseudoaneurysm may develop if a hematoma remains in continuity with the arterial lumen (i.e., following dissolution of the clot plugging the arterial puncture site.

5- Arrhythmias or conduction disturbances: Various cardiac arrhythmias (tachycardia or bradycardia) or conduction disturbance may occur during the course of diagnostic or therapeutic cardiac catheterization.

a- Ventricular Fibrillation: Ventricular ectopy or even brief (three- to five-beat) runs of ventricular tachycardia are not uncommon during passage of catheters into the right or left ventricle.

b- Atrial Arrhythmias: Atrial extrasystoles are common during catheter advancement from the right atrium to the superior vena cava, or during looping of the catheter in the right atrium to facilitate passage in a patient with enlargement of the right-sided heart chambers. These extrasystoles usually subside once the catheter is repositioned, although they may progress to atrial flutter or fibrillation in sensitive patients. Both rhythms tend to revert spontaneously over a period of minutes to hours, but may require additional therapy if they produce ischemia or hemodynamic instability.

c- Bradyarrhythmias: Transient slowing of the heart rate used to occur commonly during coronary angiography, particularly at the end of a right

coronary artery injection performed using a high-osmolar ionic contrast agent.

6- Perforation of the heart or great vessels: Perforation of the cardiac chambers , coronary arteries , or the intrathoracic great vessels is fortunately a rare event in diagnostic catheterization. In the cooperative study from 1968,88 100 patients (0.8%) had perforation during diagnostic catheterization. Most involved the cardiac chambers, particularly the right atrium (33 cases), right ventricle (21 cases), left atrium (10 cases), and the left ventricle (10 cases) . Most (30 of 33) right atrial perforations involved transseptal catheterization. The right ventricle was the most common site for perforation in the remaining (non-transseptal) diagnostic procedures , related to the use of stiff catheters (woven Dacron right heart catheters [i.e. , Cournand] , endomyocardial biopsy, or temporary pacing catheters). Elderly women (age older than 65 years) seem particularly susceptible, because the walls of the right-sided heart chambers tend to be thinner.

7- Infections and pyrogen reactions: Because cardiac catheterization is an inherently sterile procedure, infection is extremely unusual. Recommended technique includes shaving and cleaning the catheter introduction site with chlorhexidine gluconate, use of a nonporous drape, and adequate operator clothing (including a scrub suit, gown, and sterile gloves).

8- Allergic and anaphylactoid reactions: Cardiac catheterization may precipitate allergic or anaphylactoid reactions to three materials: (a) local anesthetic; (b) iodinated contrast agent; or (c) protamine sulfate. True allergies to local anesthetic do occur, but are more common with older ester agents (e.g., procaine) than with newer amide agents (lidocaine, bupivacaine).

9- Ontrast- induced nephropathy/acute kidney injury: Temporary or permanent renal dysfunction is a serious potential complication of cardiac

angiography. The potential mechanisms of contrast-induced nephropathy (CIN) include vasomotor instability, increased glomerular permeability to protein, direct tubular injury, or tubular obstruction.

10- Other complications:

a- Hypotension: Reduction in arterial blood pressure is one of the most common problems seen during catheterization. This reduction represents the final common manifestation of a variety of conditions including the following: (a) hypovolemia, owing to inadequate prehydration, blood loss, or excessive contrast-induced diuresis ; (b) reduction in cardiac output, owing to ischemia, tamponade, arrhythmia , or valvular regurgitation; or (c) inappropriate systemic arteriolar vasodilation, owing to vasovagal, excessive nitrate administration, or a vasodilator response to contrast or mixed inotrope-vasodilator drugs such as dopamine or dobutamine. Few places, however, are as well-equipped as the cardiac catheterization laboratory to recognize, diagnose, and treat hypotension.

b- Volume overload: Patients in the cardiac catheterization laboratory are prone to volume overload owing to the administration of hypertonic contrast agents , myocardial depression or ischemia induced by contrast, poor baseline left ventricular function, as well as their supine position and attempts to volume load patients at risk for contrast-induced renal dysfunction.

c- Anxiety/Pain: Cardiac catheterization procedures should be well tolerated with oral sedative pretreatment (midazolan 1 to 2 mg, and fentanyl 25 to 50 pg) and liberal use of local anesthetic at the catheter insertion site.

d- Respiratory insufficiency: Problems with adequate ventilation or oxygenation are not uncommon in the cardiac catheterization laboratory; they may result from pulmonary edema, baseline lung disease, allergic

reaction, obstructive sleep apnea, or oversedation. Patients are monitored throughout the procedure with a finger pulse oximeter to detect progressive desaturation.

e- Retained equipment: Although diagnostic and therapeutic cardiac catheters have a high degree of reliability, failures can and do occur whereby devices knot, become entrapped, or leave fragments in the circulation (19; page 77-101).

Risks of cardiac catheterization (Angiogram and Angioplasty):

Angiogram and angioplasty (with or without stent implantation) are common procedures. Your physician has carefully considered your clinical condition and believes that the benefits of the procedure outweigh the risks. However, since these procedures are invasive, there are risks associated with them (Baim, 2007).

Common risks include:

Bleeding at the catheter insertion site or other organs due to blood thinning medication (anticoagulants).

Less common but potentially more serious risks include:

1- Heart attack

2-Stroke

3- Unknown dye allergy

4- Kidney problems, including kidney failure requiring dialysis

5- Emergency heart surgery

6- Death

7- Other rare and unpredictable complications

In 1% to 2% of angioplasty cases, the artery collapses or is damaged by the wire or balloon. A stent can often fix this, but sometimes patients need emergency coronary artery bypass surgery.

Angioplasty is not a cure for coronary artery disease. Coronary disease needs lifelong management. Can control condition with a healthy lifestyle:

a- Get enough exercise

b- Maintain a healthy weight and reduce waist size

c-Quit smoking

Can control risk factors by taking the medication that doctor prescribes. doctor may prescribe medication for:

a- High blood pressure

b- High cholesterol

c- High blood sugar (Collins, 2008).

2- Nursing care and avoid of complications during and after cardiac catheterization.

The nursing care of patients both during and after cardiac catheterization is directed toward the prevention and detection of complications. The risk of a major complication (myocardial infarction, death, or major embolization) during diagnostic cardiac catheterizations is below 1%.

Severe peripheral vascular disease is a risk factor for major complication with all procedures. The SCAI **(society for Cardiovascular Angiography and Interventions)** registry reported the incidence of complications during cardiac catheterization and coronary angiography: vascular complications, 0.43%; contrast reactions, 0.37%; MI, 0.05%; cerebrovascular accident, 0.07%; and mortality, 0.11%.

Although complications are rare, they do occur and may be life threatening. Early detection and intervention are essential in prevention. Local vascular problems at the catheter entry site are the most commonly seen complications after cardiac catheterization procedures. These

problems include minor or major oozing, ecchymosis, hematoma, or poorly controlled bleeding at the puncture site.

Other vascular complications that are less common are vessel thrombosis, distal embolization, or dissection, pseudoaneurysm and arteriovenous fistula. Ventricular arrhythmias occur in response to catheter manipulation or contrast medium injection and tend not to recur after the predisposing stimulus is removed.

Bradycardia is common in response to injection of the coronary arteries with contrast or during sheath insertion or removal. The catheterization laboratory nurse must be familiar with IABP (intra-aortic balloon pump) set-up and management, because the IABP is often used when patients become hemodynamically unstable during a catheterization procedure. The nurse must also be familiar with other equipment used in the laboratory—IVUS (Intravascular Ultrasound).

Doppler and pressure wires, balloon catheters and stents, thrombectomy devices, and atherectomy equipment. Additional skills include access site management, including sheath removal, manual pressure for hemostasis, and use of closure devices or FemoStop for hemostasis, and a thorough knowledge of drugs commonly used during a procedure, such as heparin, bivalirudin, low-molecular-weight heparins, glycoprotein IIb/IIIa receptor inhibitors, antiarrhythmics, vasoactive drugs, and drugs used for procedural sedation (Susan L. Woods, PhD, RN, FAHA et al., 2010).

There are many from nursing actions during and after cardiac catheterization very important to reduce complications.

1- Continually assess patient vital signs, oxygenation, level of consciousness, and cardiac rhythm per institutional protocol.

2- Alert attending physician to significant changes in vital signs, oxygenation, and presence of malignant cardiac dysrhythmias (eg,

premature ventricular contractions (PVCs), ventricular tachycardia, ventricular fibrillation (VF)).

3- Should be always prepared to initiate cardiac resuscitation with emergency equipment and medications.

4- Instruct the patient to inform the physician and team of any chest pain experienced.

5- Remind the patient to lie still.

6- Reassure the patient and allay anxiety.

7- Encourage and answer the patient's questions.

There are many nursing actions after transfer patient to recovery room.

1- Ensure that patient vital signs are stable before transfer.

2- Check catheterization site dressing for bleeding and integrity.

3- Check distal pulse below catheterization site; if femoral site was used, check distal pulse, extremity color, capillary refill, and neurosensory status.

4- If operation was during transfemoral approach, keep extremity straight and instruct patient not to bend leg or arm.

5- If operation was during transradial approach ensure that hemostasis band is properly placed and inflated. Follow manufacturer's instructions regarding deflation/removal.

6- Maintain IV infusion per physician order or institutional protocol.

7- Maintain supplemental oxygenation support as ordered or indicated.

8- Encourage oral fluids as ordered.

9 Check patient's coagulation status per institutional protocol before sheath removal.

10-When femoral artery catheter is removed:

11-Apply direct pressure over puncture site for 20 to 30 minutes to prevent bleeding or apply commercial hemostatic compression device per institutional protocol.

12- Check distal extremity for pulse, color, capillary refill, and sensorium.

13- Remind patient to lie flat for 4 to 6 hours per institutional protocol.

14- Check puncture site dressing every 4 to 6 hours for bleeding and integrity (Morton & Fontaine, 2018)

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البرنامج التعليمي حول القسطرة القلبية

طالب الماجستير

جواد بدر ياسين

٢٠٢١-٢٠٢٠

بأشراف

أ.م.د. حسام عباس داود

<u>الأسبوع الأول:</u> -

الجلسة الأولى: - نظرة عامة حول الجهاز القلبي الوعائي وقسطرة القلب ودواعي وموانع إجراؤها.

- **العناوين الرئيسية للجلسة: -**

١- نظرة عامة حول الجهاز القلبي الوعائي.

٢- مقدمة حول القسطرة القلبية.

٣- دواعي وموانع اجراء القسطرة القلبية.

- **الأهداف: -**

في نهاية الجلسة، يجب أن يكون المشارك (الممرض) قادرًا على:

١) يشرح تشريح ووظائف الجهاز القلبي الوعائي.

٢) مناقشة قسطرة القلب.

٣) معرفة دواعي وموانع اجراء القسطرة القلبية.

- **مكان الجلسة: - مركز كربلاء لأمراض وجراحة القلب.**
- **الوقت: - ٦٠ دقيقة.**
- **الأدوات التعليمية: - محاضرة (عرض تقديمي)، محاضرة ورقية، فيديو، سبورة بيضاء، كمبيوتر محمول.**
- **المقدمة: -**

إذا نظرنا بعناية في كيفية عمل القلب خلال السبعين عامًا من حياة الشخص العادي، فسيضخ القلب حوالي ٧٠ مرة في الدقيقة، و٢٤ ساعة في اليوم، و٣٦٥ يومًا في السنة. يضخ القلب حوالي ٥ ليترات من الدم في الدقيقة، ٧٥ لترًا في الساعة، و١٨٠٠ لترًا في اليوم. على الرغم من أن العمل الذي ينجزه هذا العضو لا يتناسب مع حجمه، إلا أن القلب يعمل بشكل طبيعي بالنسبة لمعظم الناس طوال فترة الحياة. يعمل ضخ القلب على نقل الدم، وهو مادة حيوية، في جميع أنحاء الجسم، ويمد الخلايا بالأكسجين والمواد المغذية، ويزيل الفضلات. بدون هذا الإجراء ، تموت الخلايا (Morton & Fontaine, 2018).

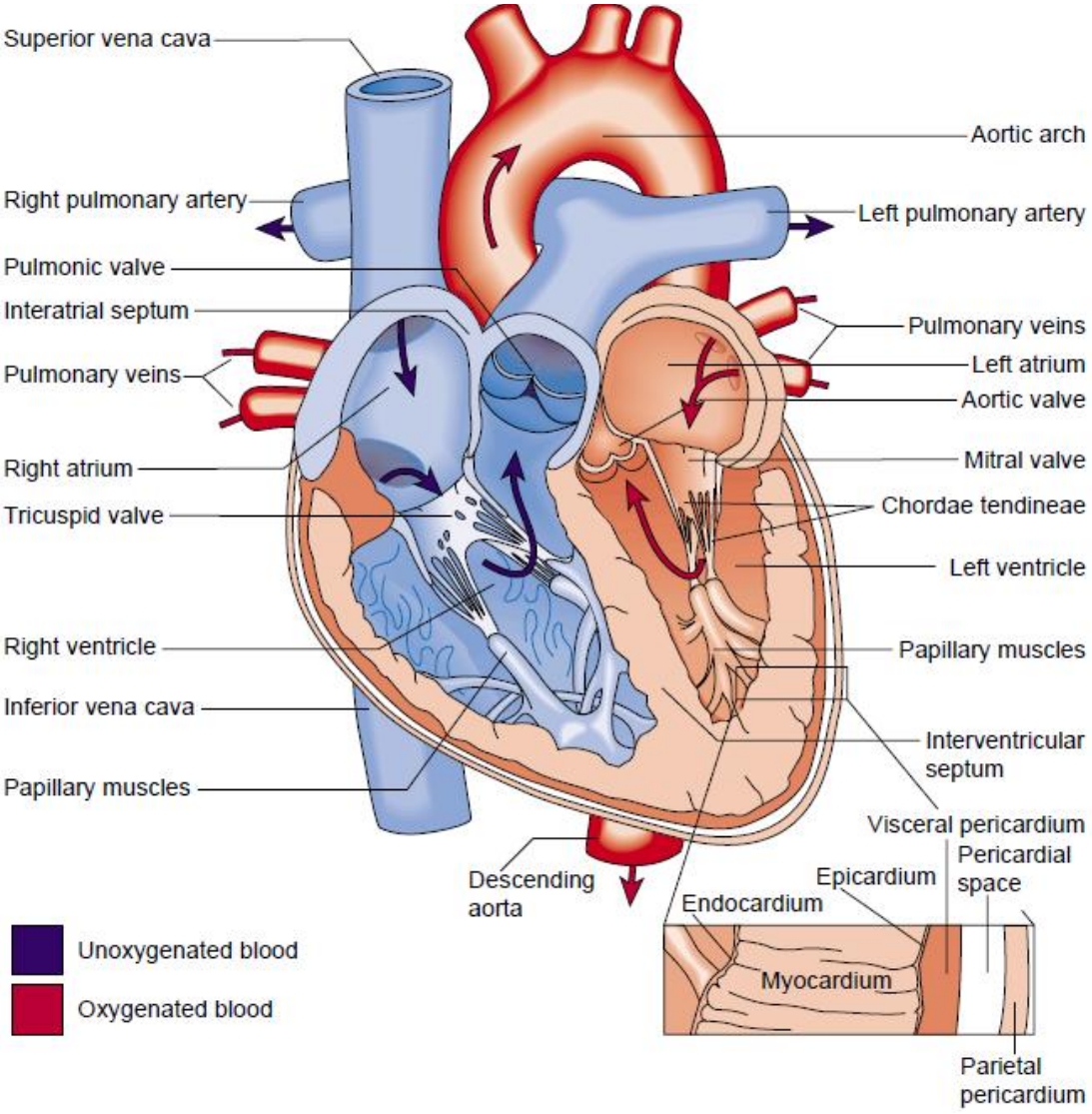
قسطرة القلب هي إجراء تشخيصي ذو قيمة يقوم بفحصٍ شامل لكيفية عمل القلب والأوعية الدموية. يتم إدخال قسطرة واحدة أو أكثر من خلال وعاء دموي محيطي في الشريان أو الوريد المرفقي أو الشريان أو الوريد الفخذي باستخدام الأشعة السينية. يجمع هذا الإجراء معلومات مثل كفاية إمداد

الدم عبر الشرايين التاجية ، وضغط الدم ، وتدفق الدم في جميع أنحاء غرف القلب ، وجمع عينات الدم ، والأشعة السينية لبطينات القلب أو الشرايين .(Arathy, 2011)

١- نظرة عامة حول الجهاز القلبي الوعائي:

نظرة عامة تشريحية وفسيولوجية: يتكون القلب من ثلاث طبقات. تتكون الطبقة الداخلية (الشكل (١))، أو الشغاف، من نسيج بطاني وخطوط داخل القلب والصمامات. تتكون الطبقة الوسطى، أو عضلة القلب، من ألياف عضلية وهي مسؤولة عن عملية الضخ. تسمى الطبقة الخارجية للقلب بالنخاب. يُغلف القلب بكيس ليفي رقيق يسمى التامور، ويتكون من طبقتين. التمسك بالنخاب هو التامور الحشوي.

يغلف التامور الحشوي التأمور الجداري ، وهو نسيج ليفي صلب يتصل بالأوعية الكبيرة والحجاب الحاجز والقص والعمود الفقري ويدعم القلب في منتصف عظم القص (mediastinum) (Jacobson & Paul, 2016)



تجاويف القلب:

تشكل غرف القلب الأربع أنظمة الضخ على الجانبين الأيمن والأيسر. يقوم الجانب الأيمن من القلب، المكون من الأذين الأيمن والبطين الأيمن، بتوزيع الدم الوريدي (الدم غير المؤكسج) إلى الرئتين عبر الشريان الرئوي (الدورة الرئوية) لتتم عملية الأكسجة. ويتلقى الأذين الأيمن الدم العائد من الوريد الأجوف العلوي (الرأس والرقبة والأطراف العلوية) والوريد الأجوف السفلي (الجذع والأطراف السفلية) والجيوب التاجية (الدورة التاجية). يقوم الجانب الأيسر من القلب، المكون من الأذين الأيسر والبطين الأيسر، بتوزيع الدم المؤكسج إلى باقي الجسم عبر الشريان الأبهر (جهاز الدوران). يستقبل الأذين الأيسر الدم المؤكسج من الدورة الدموية الرئوية عبر الأوردة الرئوية. العلاقات بين غرف القلب الأربعة موضحة في الشكل (١) .(Jacobson & Paul, 2016).

صمامات القلب:

تسمح الصمامات الأربعة في القلب بتدفق الدم في اتجاه واحد فقط. الصمامات ، التي تتكون من وريقات رفيعة من الأنسجة الليفية ، تفتح وتغلق استجابة لحركة الدم وتغيرات الضغط داخل الغرف. هناك نوعان من الصمامات: الأذيني البطيني والنصف القمري (Jacobson & Paul, 2016).

الصمامات الأذينية البطينية:

تسمى الصمامات التي تفصل الأذينين عن البطينين بالصمامات الأذينية البطينية. يفصل الصمام ثلاثي الشرف، الذي سمي بهذا الاسم لأنه يتكون من ثلاث شرفات أو وريقات، الأذين الأيمن عن البطين الأيمن. يقع الصمام التاجي أو الصمام الثنائي الشرف بين الأذين الأيسر والبطين الأيسر (انظر الشكل (١)). عادة، عندما ينقبض البطينين، يرتفع ضغط البطين، مما يؤدي إلى إغلاق وريقات الصمام الأذيني البطيني. وتحافظ العضلات الحليمية والأوتار القلبية، على إغلاق الصمام (Jacobson & Paul, 2016).

الصمامات الهلالية:

يتكون الصمامان الهلاليان من ثلاث وريقات تشبه نصف القمر. يسمى الصمام الواقع بين البطين الأيمن والشريان الرئوي بالصمام الرئوي. يسمى الصمام الواقع بين البطين الأيسر والشريان الابهر بالصمام الأبهري (Jacobson & Paul, 2016).

الشرايين التاجية:

الشرايين التاجية اليمنى واليسرى وفروعهما (الشكل ٢) تزود القلب بالدم الشرياني. تنشأ هذه الشرايين من الشريان الأورطي فوق وريقات الصمام الأبهري. للقلب متطلبات استقلابية كبيرة، حيث يستخرج ما يقرب من ٧٠٪ إلى ٨٠٪ من الأكسجين الذي يتم توصيله على عكس الشرايين الأخرى، حيث يتم تروية الشرايين التاجية أثناء الانبساط.

تؤدي زيادة معدل ضربات القلب إلى تقصير الانبساط ويمكن أن تقلل من نضح عضلة القلب. يمكن للمرضى، وخاصة المصابين بمرض الشريان التاجي (CAD)، أن يصابوا بنقص تروية عضلة القلب (نقص إمدادات الأكسجين) عندما يتسارع معدل ضربات القلب. للشريان التاجي الأيسر ثلاثة فروع. يسمى الشريان من نقطة الأصل إلى أول فرع رئيسي بالشريان التاجي الأيسر الرئيسي (Jacobson & Paul, 2016).

عضلة القلب:

تتكون عضلة القلب من نسيج عضلي متخصص. مجهريًا، تشبه عضلة القلب العضلة المخططة (الهيكلية)، والتي تكون تحت السيطرة. ومع ذلك، من الناحية الوظيفية، تشبه عضلة القلب العضلة الملساء لأن تقلصها لا إرادي. يتم ترتيب ألياف عضلة القلب بطريقة مترابطة تسمى (syncytium) تسمح بتقلص واسترخاء عضلة القلب بشكل منسق(Jacobson & Paul, 2016)

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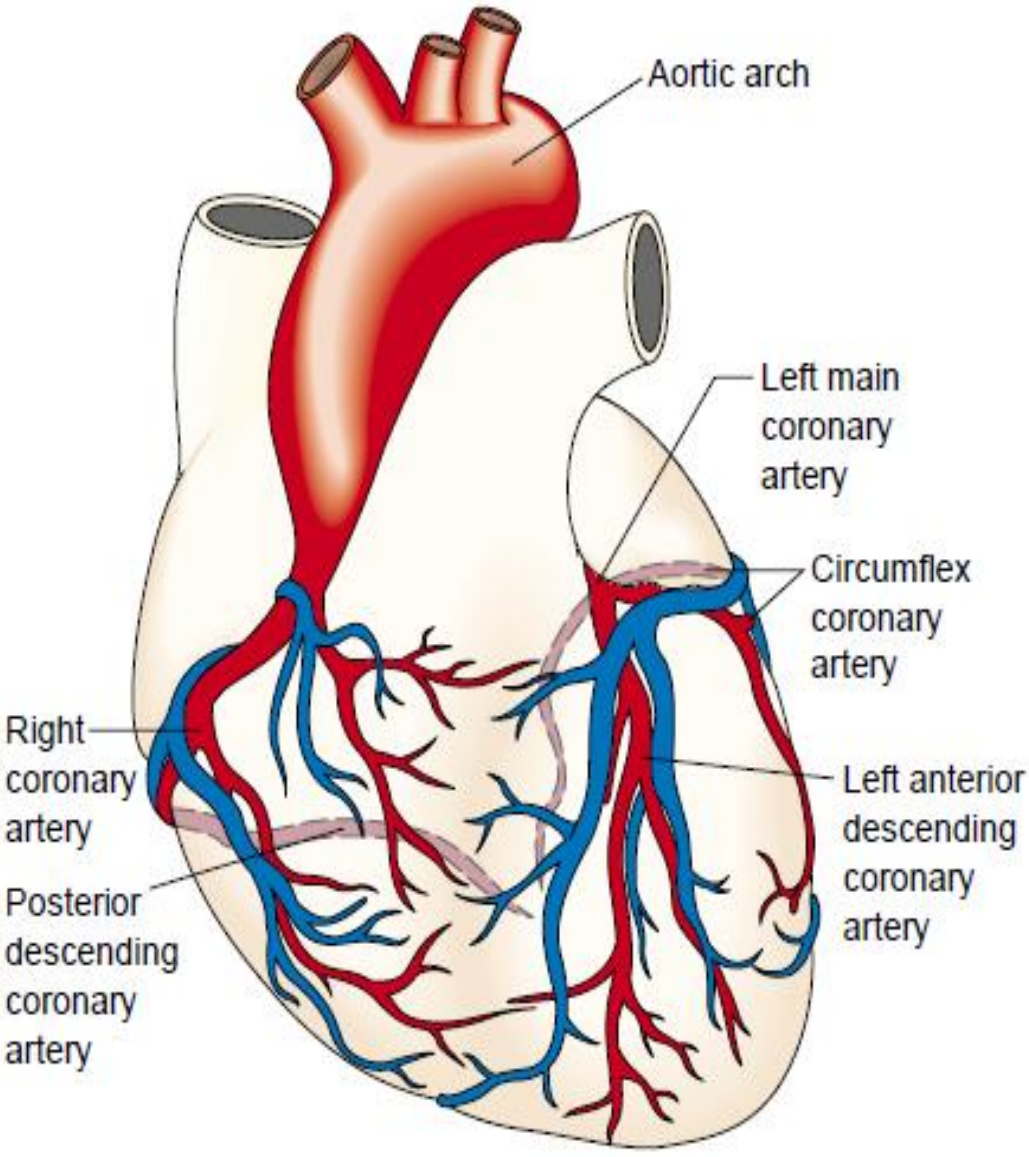


٢ـ مقدمة عن قسطرة القلب.

• قسطرة القلب :- هي تمرير قسطرة إلى القلب الأيسر و / أو الأيمن لتوفير معلومات تشخيصية عن القلب و / أو الأوعية الدموية (Egziabher & Edwards, 2013).

القسطرة القلبية هي مصطلح عام يشير إلى مجموعة متنوعة من الإجراءات التي تُستخدم لتحديد مرض الشريان التاجي ، وتشوهات عضلة القلب (احتشاء أو اعتلال عضلة القلب) ، وتشوهات صمامات القلب وتشوهات القلب الخلقية. تشمل هذه الإجراءات تصوير الأوعية الدموية وتصوير البطين والقسطرة اليمنى أو اليسرى. مثل هذا الاجراء هو توسعي (Vitae, 1981).

تستخدم القسطرة القلبية على نطاق واسع للتقييم التشخيصي والتداخل العلاجي في إدارة مرضى القلب. وللممرضين دور مهم في التثقيف قبل القسطرة ، والرعاية داخل القسطرة ، والرعاية بعد القسطرة (Susan L. Woods, PhD, RN, FAHA et al., 2010).

القسطرة العلاجية: (Angioplasty)

تُعرف القسطرة العلاجية أيضًا باسم :PCI

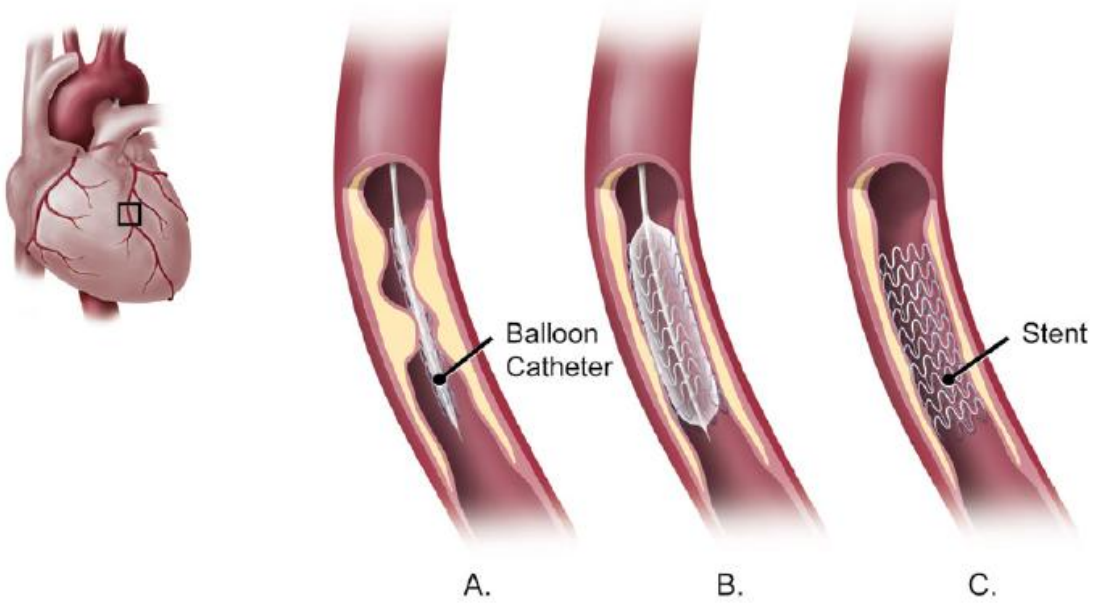
• عن طريق الجلد – (Percutaneous)

• الشريان التاجي - له علاقة بالقلب. (coronary)

• التداخل - نوع الإجراء المستخدم لفتح الشريان الضيق. (Intervention)

يشبه تصوير الأوعية الدموية. كلاهما يتم في مختبر القسطرة. القسطرة العلاجية هو إجراء يستخدم لتوسيع شرايين القلب الضيقة بدون جراحة. الفكرة الأساسية هي وضع قسطرة ببالون صغير قابل للنفخ في الجزء الضيق من الشريان. يؤدي نفخ القسطرة البالونية إلى دفع البالون للخارج مقابل الجدار الضيق والشريان المحيط به. تقلل هذه العملية من التضيق حتى لا يعود يتعارض مع تدفق الدم. ثم يتم تفريغ البالون وإزالته من الشريان. في كثير من المرضى يتم وضع دعامة داخل الشريان بمجرد فتحه. الدعامة عبارة عن أنبوب شبكي معدني صغير يتم وضعه في الأوعية الدموية باستخدام قسطرة بالون. تتمدد الدعامة مقابل جدار الأوعية الدموية حيث يتم نفخ البالون. ثم يتم تفريغ البالون وإزالته ، وترك الدعامة في مكانها بشكل دائم ، مما يؤدي إلى فتح الأوعية الدموية وتحسين تدفق الدم. تقلل الدعامات من خطر تضييق هذه المنطقة مرة أخرى.

تتوفر عدة أنواع من الدعامات. يختار الطبيب أنسب نوع من الدعامات للمرضى (انظر الشكل ٣) . (Baim, 2007)



الشكل (٣) (Baim, 2007)

مزايا أو محاسن القسطرة العلاجية:

١- أكثر من ٩٠٪ من عمليات اصلاح الاوعية الدموية تنجح على الفور.

٢- عودة تدفق الدم عبر الشريان إلى طبيعته أو شبه الطبيعي.

٣- قد لا يشعر بعض الأشخاص بالراحة الكاملة ، ولكن تتحسن أعراضهم ، مما يجعلهم أكثر نشاطًا وراحة.

٤- لايوجد شق لان هذه ليست عملية جراحية ولا ينام المريض (تخدير عام).

٥- ينهض معظم الناس ويمشون في نفس اليوم.

٦- يعود بعض الأشخاص إلى منازلهم في نفس اليوم، ولكن يُطلب من بعض المرضى البقاء طوال الليل والعودة إلى المنزل في صباح اليوم التالي (Baim, 2007).

مساوئ القسطرة العلاجية:

قد يضيق الشريان مرة أخرى بعد العملية. وهذا ما يسمى عودة التضيق. قد يشعر المرضى بالذبحة الصدرية مرة أخرى. استخدام الدعامات يقلل من معدل عودة التضيق. عادة ما يتم علاج التضيق من خلال القسطرة العلاجية الثانية ، ولكن في بعض الأحيان ، يلزم إجراء جراحة المجازة أو استخدام العلاج الطبي (Baim, 2007).

تصوير الأوعية الدموية:

تُجرى القسطرة القلبية عادةً باستخدام تصوير الأوعية، وهي تقنية لحقن عامل تباين في نظام الأوعية الدموية لمجمل القلب والأوعية الدموية. المواقع الشائعة لتصوير الأوعية الانتقائي هي

الشريان الأبهر والشرايين التاجية والجانب الأيمن والأيسر من القلب (Jacobson & Paul, 2016).

تصوير الشريان الأبهر:

تصوير الشريان الأبهر هو شكل من أشكال تصوير الأوعية التي تحدد تجويف الشريان الأبهر والشرايين الرئيسية الناشئة عنه. في تصوير الأبهر الصدري يتم استخدام عامل التباين لدراسة قوس الأبهر وفروعه الرئيسية. يمكن إدخال القسطرة في الشريان الأبهر باستخدام طريق الشريان العضدي أو الشريان الفخذي(Jacobson & Paul, 2016) .

تصوير الشرايين التاجية:

في تصوير الشرايين التاجية، يتم إدخال القسطرة في الشريان العضدي الأيمن أو الأيسر أو الشريان الفخذي، ثم يتم تمريرها إلى الشريان الأبهر الصاعد وتتم المعالجة في الشريان التاجي المناسب. يستخدم تصوير الشرايين التاجية لتقييم درجة تصلب الشرايين وللتوجيه لاختيار العلاج. كما أنها تستخدم لدراسة التشوهات الخلقية المشتبه بها في الشرايين التاجية (Jacobson & Paul, 2016).

المسلك الشرياني:

هناك ثلاثة مواقع رئيسية للوصول إلى الشرايين لتصوير الأوعية التاجية والتداخل العلاجي:

١- الشريان الكعبري

٢- شريان الفخذ

٣- الشريان العضدي.

في الممارسة العملية ، يتم استخدام الشرايين الكعبرية والفخذية الأكثر شيوعًا (Collins, 2008).

٣- دواعي إجراء القسطرة القلبية:

يشار إلى قسطرة القلب في مجموعة متنوعة واسعة من الظروف. الاستخدام الأكثر شيوعًا لقسطرة القلب هو: -

١- لتأكيد أو تحديد مدى الاشتباه في أمراض الشرايين التاجية.

٢- يتم تحديد شدة المرض التشريحية والفسيولوجية، واستكشاف وجود أو عدم وجود حالات ذات صلة، ويمكن تحديد الحاجة إلى القسطرة القلبية العلاجية.

٣- تستخدم القسطرة القلبية أيضا لتقييم المرضى المصابين بأمراض القلب المكتسبة أو الخلقية.

٤- يتم تصنيف مؤشرات تصوير الأوعية التاجية للعروض السريرية المحددة ، بما في ذلك التقسيم الطبقي للمخاطر للمرضى الذين يعانون من الذبحة الصدرية المستقرة المزمنة والمرضى الذين يعانون من نقص التروية في اختبار الإجهاد غير التوسعي ، والمرضى الذين يعانون من متلازمة

الشريان التاجي الحادة: احتشاء عضلة القلب غير المرتفع (NSTEMI) وارتفاع احتشاء عضلة القلب (STEMI) (Susan L. Woods, PhD, RN, FAHA et al., 2010).

٥- القسطرة القلبية هي إجراء لديناميكية الدم وتصوير الأوعية يتم إجراؤه لأغراض تشخيصية وعلاجية في كثير من الأحيان. كما هو الحال مع أي إجراء جراحي، يجب أن يعتمد قرار إجراء قسطرة القلب على توازن دقيق بين مخاطر الإجراء والفوائد المتوقعة للمريض.

٦- مؤشرات لاستخدام القسطرة والتداخل الشرياني التاجي في علاج الذبحة الصدرية المستقرة والذبحة الصدرية غير المستقرة واحتشاء عضلة القلب (MI).

٧- الهدف من القسطرة القلبية في هؤلاء المرضى هو التعرف على الآفات المسببة ومن ثم استعادة سالكية الأوعية الدموية عن طريق القسطرة القلبية العلاجية.

٨- في عدد قليل من هؤلاء المرضى، قد يكشف الجزء التشخيصي من إجراء القسطرة عن ميزات أخرى (على سبيل المثال، مجموعة متشابكة من الأوعية أو مرض الشريان التاجي الرئيسي الأيسر، وأمراض الصمامات المصاحبة الشديدة)، والتي توفر معلومات مهمة لاتخاذ قرار والتخطيط لجراحة القلب المفتوح في حالة الاحتياج لذلك (19: page 3-4).

موانع استخدام القسطرة القلبية:

لا توجد موانع مطلقة للقسطرة التاجية. تشمل موانع الاستعمال النسبية ما يلي:

١- حمى غير مبررة وعدوى غير معالجة.

٢- فقر الدم الشديد مع هيموكلوبين أقل من ٨ جم / ديسيلتر.

٣- مانع تخثر الدم: يجب أن تكون النسبة المعيارية الدولية (INR)أقل من ٢.

٤- نزيف حاد نشط.

٥- نزيف الجهاز الهضمي الحاد.

٦- اختلال شديد في توازن الشوارد (خاصة فرط بوتاسيوم الدم حيث يؤدي ذلك إلى عدم انتظام ضربات القلب).

٧- ارتفاع ضغط الدم غير المنضبط.

٨- سمية الديجيتال.

٩- سكتة دماغية حديثة (خلال شهر).

١٠- الحمل

١١- قصور كلوي حاد أو انقطاع البول، إلا إذا تم التخطيط لغسيل الكلى بعد العملية.

١٢- قصور القلب الاحتقاني غير المنضبط.

١٣- مرض شغاف القلب النشط أو أمراض جهازية أخرى تحتاج إلى الاستقرار(Vitae, 1981).

١٤- تهيج البطين غير المنضبط.

١٥- نقص بوتاسيوم الدم غير المصحح.

١٦- قصور كلوي موجود مسبقاً وخاصة عند مرضى السكري.

١٧- المرضى الذين يعانون من رد فعل تحسسي سابق لوسط التباين يحتاجون إلى علاج خاص قبل الإجراء.

١٨- رفض المريض الإجراءات العلاجية لتوجيهه بنتائج القسطرة.

١٩- مضاد تخثر الدم هو موانع نسبية. بشكل روتيني، يجب حجب مضادات التخثر الفموية لمدة ٤٨ إلى ٧٢ ساعة قبل القسطرة لتحقيق معدل دولي طبيعي أقل من ٢,٠. في المرضى الذين يجب أن يظلوا على مضادات التخثر ، مثل المرضى الذين يعانون من صمامات القلب الاصطناعية أو حالات فرط التخثر ، يتم استخدام علاج الانسداد مع الهيبارين بينما يتم عكس زمن البروثرومبين أو السماح له بالعودة إلى طبيعته(Susan L. Woods, PhD, RN, FAHA et al., 2010) .

- الجلسة الثانية: - الإدارة التمريضية لمرضى قسطرة القلب قبل العملية.

❖ **العناوين الرئيسية للجلسة: -**

١- الفحوصات التشخيصية والمختبرية قبل إجراء قسطرة القلب.

٢- الأدوية التي تحجب والتي تستخدم قبل وأثناء وبعد إجراء قسطرة القلب.

٣- التحضير البدني قبل إجراء قسطرة القلب.

❖ **الأهداف: -**

في نهاية الجلسة، يجب أن يكون المشارك (الممرض) قادرًا على:

١- شرح الفحوصات المختبرية والشعاعية في قسطرة القلب.

٢- معرفة الدواء للمرضى الذين يخضعون للقسطرة القلبية.

٣- مناقشة كيفية تحضير المريض لقسطرة القلب.

❖ **مكان الجلسة: - مركز كربلاء لأمراض وجراحة القلب.**

❖ **الوقت: - ٦٠ دقيقة.**

❖ **الأدوات التعليمية: - محاضرة باور بوينت، محاضرة ورقية، فيديو، سبورة بيضاء، كمبيوتر محمول.**

❖ **المقدمة: -** يحتاج المرضى الذين يخضعون لقسطرة القلب إلى تقييم دقيق قبل الإجراء ، بما في ذلك التاريخ الحديث والفحص البدني لمعرفة تاريخ حساسية وسائط التباين بالإضافة إلى مجموعة حديثة من الدراسات المختبرية ، بما في ذلك حساب الدم الكامل ، ووقت الثرومبوبلاستين

الجزئي ، والبروثرومبين ، والنسبة المعيارية الدولية ، ولوحة الكيمياء (مستويات البوتاسيوم والكرياتينين واليوريا في الدم) (Morton & Fontaine, 2018) .

قبل الوصول إلى مختبر القسطرة، يجب على طبيب القلب المسؤول عن الإجراء شرح الإجراء بشكل كامل، بما في ذلك المخاطر والفوائد، والإجابة على أسئلة المريض وعائلته. يشمل تقييم ما قبل القسطرة الحصول على تاريخ المريض وتخطيط القلب. تشمل المكونات الهامة للتاريخ المرضي التي يجب معالجته داء السكري (الأنسولين أو غير الذي يحتاج إلى الأنسولين)، وأمراض الكلى، وحالة منع تخثر الدم، وأمراض الشرايين الطرفية وكذلك وسائط التباين السابقة أو حساسية اللاتكس. معرفة كاملة بأي إجراءات سابقة، بما في ذلك قسطرة القلب، والتدخلات التاجية عن طريق الجلد، وتداخلات الشرايين الطرفية أو الجراحة.

يجب أن يكون المريض صائماً لمدة ٦ ساعات على الأقل، ويجب إنشاء خط وريدي. عادة ما يتم إعطاء التخدير عن طريق الفم أو الوريد (مثل البنزوديازيبين). يجب استخدام مقياس التأكسج النبضي لمراقبة حالة الجهاز التنفسي. بعض المختبرات تخصص المرضى الذين يعانون من مضادات الهيستامين مثل ديفينهيدرامين (٢٥ مجم دفع في الوريد) لخصائصه المضادة للحساسية وللمساعدة في التهدئة.

يجب إيقاف مضادات التخثر الفموية ويجب أن يكون INR أقل من ١,٨ لتجنب زيادة خطر النزيف. يستمر تناول الأسبرين أو مضادات الصفيحات الفموية الأخرى قبل الإجراء. المرضى الذين يعانون من مرض السكري الذين يتلقون الميتفورمين يجب أن يتوقفوا عن تناول الدواء في صباح يوم الإجراء ولا يعاد تناوله حتى تستقر وظائف الكلى بعد ٤٨ ساعة على الأقل من العملية(Davidson & Bonow, 2010).

الرعاية التمريضية وتحضير المريض قبل القسطرة القلبية:

المرضى المشتبه في إصابتهم بمتلازمة الشريان التاجي الحادة سيخضعون لقسطرة قلبية أثناء مكوثهم في المستشفى. عادة ما يتم قبول الحالات الاختيارية لقسطرة القلب في يوم الإجراء. يشرح الطبيب الذي يجري القسطرة الإجراء ويحصل على الموافقة المسبقة قبل إجراء العملية. عادة ما تتضمن أوامر ما قبل القسطرة ما يلي:

١. تخطيط القلب الكهرائي مكون من ١٢ موصل رصاص (ECG)

٢. الفحوصات المخبرية: حساب الدم الكامل بما في ذلك الصفائح الدموية والتفاضلية ، والشوارد ، والنتروجين واليوريا في الدم ((BUN، والكرياتينين).

٣. لا شيء عن طريق الفم بعد منتصف الليل (أو بعد وجبة فطور خفيفة إذا كانت القسطرة في فترة ما بعد الظهر).

٤. قد يتم إعطاء تخدير مع مهدئ خفيف. أثناء الإجراء ، ينبغي اتباع بروتوكول التخدير الإجرائي.

٥. المرضى الذين يعانون من القصور الكلوي يجب أن يتم ترطيبهم بشكل كاف قبل وبعد العملية ويجب استخدام الحد الأدنى من وسيط التباين الشعاعي منخفض الأسمولية. أظهر الجمع بين تسريب N-acetylcysteine وبيكربونات الصوديوم قبل وبعد حقن التباين أنه يقلل من خطر اعتلال الكلية الناجم عن التباين في المرضى الذين يعانون من القصور الكلوي.كمية الماء تعتمد على وظيفة البطين وحالة السائل الأساسي. ومع ذلك ، في حالة التحمل ، يوصى بإعطاء ما مجموعه ١ لتر من المحلول الملحي الطبيعي بين بدء الإجراء وإتمامه (Davidson & Bonow, 2010) .

٦. المرضى الذين لديهم تاريخ من الحساسية تجاه التباين السابق أو الربو أو الحساسية تجاه الأدوية أو الطعام مع مواد تحتوي على اليود يجب أن يتلقوا وسط تباي منخفض الأسمولية ومعالجة مسبقة بالستيرويدات ومضادات الهيستامين (ديفينهيدرامين) وحاصرات (H2سيميتيدين أو رانيتيدين) ( ) cimetidine or ranitidine تستخدم أيضًا في بعض الأحيان.

٧. يجب على المرضى الصائمين تناول جرعة مخفضة من الأنسولين أو تناول جرعة حسب توجيهات الطبيب. عادة ما يتم إجراء عوامل السكري عن طريق الفم في صباح يوم الإجراء. يتم حجب الميتفورمين في يوم الإجراء وبعد ٤٨ ساعة من القسطرة.

٨. مسألة منع تخثر الدم يوجهها الطبيب وعادة ما يتم إعطاء حمض أسيتيل الساليسيليك (ASA) والأدوية المضادة للصفيحات قبل القسطرة. يتم إيقاف الوارفارين بشكل عام قبل العملية بثلاثة إلى أربعة أيام (Susan L. Woods, PhD, RN, FAHA et al., 2010).

إذا كان المريض يتلقى علاج الهيبارين، فيمكن الاستمرار في استخدام الهيبارين أثناء القسطرة وإيقافه لإزالة الغمد.

٩. نصح المريض بالتبول قبل الذهاب إلى مختبر القسطرة.

١٠. لا توجد بيانات قائمة على الأدلة لدعم الاستخدام الوقائي للمضادات الحيوية.

١١. يجب إرسال المرضى الذين يرتدون أطقم الأسنان أو النظارات أو أجهزة السمع إلى المختبر وهم يرتدونها. يكون المريض أكثر قدرة على التواصل عندما تكون أطقم الأسنان والمعينات السمعية في مكانها. تسمح النظارات للمريض بمشاهدة صورة الأوعية الدموية على الشاشة وتساعد على إبقاء المريض موجهًا نحو البيئة المحيطة (Susan L. Woods, PhD, RN, FAHA et al., 2010).

١٢. أغلبهم يقوم بإحضار البطاقة الصحية وجميع الأدوية.

١٣. إجلب قائمة بالأسئلة الخاصة بك للتأكد من أن لديك كل المعلومات التي تحتاجها.

١٤. اتخاذ الترتيبات اللازمة للانتقال إلى المنزل عند الخروج. لا يسمح للمريض بالقيادة. سيتم التفريغ بعد العملية بحوالي خمس إلى ست ساعات.

١٥. إذا كان المريض يعيش على مسافة بعيدة من مركز القلب، فاستشر الطبيب لمعرفة ما إذا كان يجب عليك البقاء بالقرب من المركز في ليلة الخروج منه.

١٦. سيقوم الممرض بإجراء تقييم وقياس ضغط الدم والعلامات الحيوية الأخرى.

١٧. يمكن إدخال محلول ملحي (في الوريد).

١٨. دراسة حالة المريض وعرضها على شريط فيديو ويكون متوفراً قبل اجراء عملية القسطرة القلبية.

١٩. ملاحظة إجراءات طبيب القلب.

٢٠. الحصول على الموافقة الرسمية.

٢١. منطقة صغيرة على جانبي الفخذ أو على الرسغ يتم تحضيرها(Baim, 2007).

٢٢. يجب أن يكون المريض صائماً لـ٦ ساعات على الأقل مع فتح خط وريدي.

٢٣. يجب إيقاف مضادات التخثر الفموية ويجب أن يكون INR أقل من ١,٨ لتجنب زيادة خطر النزيف.

٢٤- من أجل الاستعداد الكامل والحصول على موافقة المريض وتعاونه ، من الضروري تقييم فهم المريض ومواقفه تجاه الإجراء ومعالجة أي مفاهيم خاطئة ، بما في ذلك النتائج المحتملة والعلاج اللاحق.

٢٥. الوزن والطول.

مراقبة وتسجيل وجود أو عدم وجود نبضات محيطية (الكعبر ومسند القدم).

٢٦. يحتاج مرضى السكري إلى قياس نسبة السكر في الدم. وتأكد من توفر جميع نتائج الدم إذا لزم الأمر.

٢٧. كلوبيدوكريل والأسبرين - يجب أن يتلقى جميع المرضى الذين يخضعون لقسطرة قلبية (تصوير الأوعية الدموية ± قسطرة علاجية) جرعة ثابتة من عقار كلوبيدوكريل والأسبرين، ما لم يكن هناك بطلان أو كان المريض يخطط لإجراء جراحة قلب. من الضروري أن يصوم المريض، لأن وسيط التباين يمكن أن يسبب الغثيان والقيء، أو في حالة المرض الشديد، قد تكون هناك حاجة لعملية جراحية طارئة. يجب ألا يتلقى المرضى الطعام لمدة تصل إلى ٤ ساعات قبل الإجراء. قد يتم استهلاك السوائل الصافية حتى وقت الإجراء.

٢٨. لتقليل مخاطر الإصابة، يجب قص الشعر على ذراع المريض أو الفخذ، حسب موقع الوصول، في أقرب وقت ممكن من وقت الإجراء.

٢٩. ضمان الوصول الوريدي - يفضل استخدام الذراع اليسرى بسبب وضع المعدات والأفراد على الجانب الأيمن من المريض أثناء الإجراء.

٣٠. توثيق أي أطراف صناعية.

٣١. إذا كان المريض قد خضع لعملية تحويل مسار الشريان التاجي سابقًا، فتأكد من توفر ملاحظات العملية.

٣٢. تأكد من أن الوثائق / قائمة التحقق كاملة.

٣٣. إذا كانت أية ملاحظات / نتائج خارج المتغيرات الطبيعية، أبلغ الطبيب المختص (Collins, 2008).

الجلسة الثالثة: - الإدارة التمريضية أثناء إجراء قسطرة القلب.

❖ **العناوين الرئيسية للجلسة: -**

١- إدارة التمريض أثناء إجراء قسطرة القلب.

❖ **الأهداف: -**

في نهاية الجلسة، يجب أن يكون المشارك (الممرض) قادرًا على:

١- التعرف على دور الممرض في غرفة عمليات قسطرة القلب.

٢- يشرح كيفية مراقبة العلامات الحيوية للمريض والتفاعلات الدوائية أثناء إجراء قسطرة القلب.

٣- التنسيق الكامل بين الفريق الطبي في غرفة العمليات وممرض ردهة القسطرة القلبية.

❖ **مكان الجلسة: - مركز كربلاء لأمراض وجراحة القلب.**

❖ **الوقت: - ٦٠ دقيقة.**

❖ **الأدوات التعليمية: - محاضرة باور بوينت، محاضرة ورقية، فيديو، سبورة بيضاء، كمبيوتر محمول.**

المقدمة: -

أثناء القسطرة القلبية، يتم وضع خط وريدي للمريض لإعطاء المهدئات والسوائل والهيبارين والأدوية الأخرى. تعد المراقبة الدموية غير التوسيعية التي تتضمن ضغط الدم ويتبعه تخطيط القلب الكهربائي المتعدد ضروري للمراقبة المستمرة لاضطراب نظم القلب أو عدم استقرار الدورة الدموية. يمكن أن تصبح عضلة القلب إقفارية وتسبب خلل في ضربات القلب حيث يتم وضع القسطرة في الشرايين التاجية أو أثناء حقن عوامل التباين. يجب أن تكون أجهزة الإنعاش متاحة

بسهولة أثناء الإجراء. يجب أن يكون الموظفون على استعداد لتقديم تدابير دعم الحياة القلبية المتقدمة حسب الضرورة (Jacobson & Paul, 2016).

دور الممرض في مختبر القسطرة: -

١- بمجرد وصول المريض إلى مختبر القسطرة ، سيُطلب منه الاستلقاء على طاولة القسطرة.

٢- سيتم وضع ملصقات الأقطاب الكهربائية على جسم المريض حتى يتمكن جهاز تخطيط القلب من مراقبة معدل ضربات القلب والإيقاع خلال العملية.

٣- يمكن وضع مسبار على إصبع المريض لمراقبة تشبع الدم بالأكسجين ومراقبة ضغط الدم داخل الأوعية الدموية طوال العملية.

٤- ما لم يكن ذلك مخالفًا للمعتقدات الدينية للمريض ، يتأكد الممرضون من أن منطقة الوصول المقترحة قد تم حلقها بشكل صحيح ؛ ثم يتم تغطية المريض بستائر معقمة.

٥- قد يكون الوصول إلى الجهاز الشرياني عن طريق الشريان الفخذي أو العضدي أو الكعبري. ومع ذلك ، فإن أكثر مواقع الوصول إلى الأوعية الدموية شيوعًا هو الطريق الفخذي والكعبري.

٦- بمجرد أن يستلقي المريض على المنضدة ، سيتم تنظيف المناطق الإربية من الفخذين أو المنطقة الكعبرية بمحلول مطهر. بعد ذلك ، يتم تغطية المريض بقطعة قماش معقمة ، تاركًا الشريان الفخذي أو الكعبري مكشوفًا.

٧- بمجرد الانتهاء من الاستعدادات لتعقيم المريض ، سيتم حقن كمية وفيرة من التخدير الموضعي. يجب تحذير المريض من أنه قد يعاني من بعض الحرقة أثناء حقن المخدر. بمجرد تخدير المنطقة ، يتم إدخال غمد مُدخل في الشريان الفخذي أو الكعبري.

٨- قد يشعر المريض ببعض الشد والضغط في هذا الوقت. عادة ، يحدث تدفق قليل من الدم في البداية ، مما يدل على وجود الغمد في الشريان للطبيب. يحتوي غمد المُدخل على نظام صمام أحادي الاتجاه يسمح للطبيب بإدخال أسلاك التوجيه وقسطرة تصوير الأوعية الدموية. هذا يقلل من النزيف في موقع البزل ويتجنب طعن الشريان في كل مرة تحتاج إلى إدخال قسطرة.

٩- لذلك يعاني معظم المرضى من القليل من الانزعاج أو عدم الراحة أثناء العملية ، يجب نصح المرضى بإعلام الطاقم الطبي إذا بدأ التخدير الموضعي في التلاشي بحيث يمكن إعطاء المزيد.

١٠- يجب نصح المرضى أيضًا بإخبار الممرضين إذا كان المريض يعاني من أي ذبحة صدرية أو ألم في الصدر حتى يمكن إعطاء المسكن المناسب.

١١- بمجرد أن يضع الطبيب القسطرة في الموضع المناسب ، يتم حقن الصبغة المتباينة. يتم أخذ وجهات نظر متعددة لكل من الشرايين التاجية من زوايا مختلفة للتأكد من أن جميع الأجزاء القريبة من الشرايين يتم تصويرها بشكل كافٍ. لكل منظر ، يتم حقن ٥-١٠ مل من صبغة التباين باليد ويتم

الحصول على تسجيل لكل منظر. الزوايا التي يتم التقاط الصور عندها عادة ما تكون ٣٠ درجة ، والمعروفة باسم المنحرف الأيسر الأمامي ، و ٦٠ درجة ، والمعروفة باسم المناظر المائلة الأمامية اليمنى. إن النظر إلى الشريان التاجي من هذه الزوايا يوفر للطبيب أفضل المناظر لقياس وتقييم الضرر في الشرايين التاجية.

يشعر بعض الناس بالإحراج لأنهم يشعرون بأنهم قد بللوا أنفسهم ، لذلك يجب أن يطمئنوا أنهم لم يفعلوا ذلك. من أجل الحصول على رؤية أفضل ، قد يُطلب من المريض أن يسعل أو يتوقف عن التنفس ، دون الضغط ، لفترة قصيرة من الوقت أثناء العملية. ويتم حقن صبغة تباين من خلال هذه القسطرة لإبراز الشرايين التاجية. يعاني معظم المرضى من إحساس بدفء الجسم عند حقن الصبغة أو الرغبة في إفراغ المثانة (Baim, 2007).

١٢- لم تعد هناك حاجة للهيبارين لفترة أطول من الوقت عن طريق الوريد أثناء تصوير الأوعية التاجية الروتينية ، وعادة ما تتم إزالة غمد الفخذ في نهاية الإجراء(Vitae, 1981).

١٣- إعطاء أدوية تساعد على الاسترخاء ولكن يكون المريض مستيقظاً أثناء العملية.

١٤- كلذلك يمكن إعطاء أي تعليمات سواء من الطبيب أو / والممرضين.

١٥- يقوم الطبيب بتجميد منطقة الفخذ أو الرسغ.

١٦- إدخال قسطرة صغيرة عبر وعاء دموي حتى القلب.

١٧- يتم أخذ صور الأشعة طوال العملية. ستتحرك آلة الأشعة السينية فوق المريض بالقرب من الجسم.

١٨- أثناء العملية، قد يُطلب من المريض أن يأخذ نفسًا عميقًا ويحبسه لبضع ثوان، أو يسعل.

١٩- تستغرق العملية في المختبر عادة من ٣٠ إلى ٩٠ دقيقة. إذا كانت حالة المريض معقدة، فإن الإجراء سيكون أطول. بسبب ظروف غير متوقعة(Baim, 2007).

٢٠- هناك أدوار أساسية أخرى للممرضين في مختبر القسطرة أثناء العملية وهي جهاز التنظيف والمسجل والدوران. في بعض المختبرات، يقوم الممرضين بتنظيف العملية والمساعدة فيها؛ في حالات أخرى، يكونون مسؤولون عن مراقبة الضغط وإيقاع القلب، والمساعدة في دراسات الدورة الدموية مثل تحديد ثاني أكسيد الكربون ، وإدارة التخدير الإجرائي الرابع.

٢١- يجوز للممرض زيارة المريض قبل الإجراء لإعطاء بعض النصائح والتوضيحات في تحضير المريض أو بعد الإجراء لتقييم استقرار منطقة الوخز. من الناحية المثالية، يجب أن يكون الممرض لديه خلفية في الرعاية المركزة أو التاجية ومعرفة شاملة بأدوية القلب والأوعية الدموية، وعدم انتظام ضربات القلب، ومبادئ التخدير الإجرائي الرابع، وتقنية التعقيم، وتشريح وفسيولوجيا القلب، وأجهزة تنظيم ضربات القلب، ومفاهيم إدارة القسطرة لتصوير الأوعية التاجية والتداخل.

٢٢- التغييرات في الحالة العاطفية للمريض، واليقظة، والاستجابات الصوتية، وتعبيرات الوجه هي مؤشرات مهمة لتحمل المريض للإجراء. قد يساعد تنبيه الممرض لهذه القرائن والتدخل المبكر مع الطمأنينة أو العلاج المناسب في منع الأحداث الأكثر خطورة.

٢٣- التدريب على دعم الحياة القلبي المتقدم هو مطلب لممرضي مختبرات القسطرة والممرضين الذين يعتنون بالمرضى بعد العملية.

٢٤- توثيق الملاحظات وإجراءات التمريض من بداية عملية القسطرة القلبية وحتى نهايتها مهم جداً (Susan L. Woods, PhD, RN, FAHA et al., 2010).

<u>الأسبوع الثاني :</u> -

الجلسة الأولى: الإجراءات التمريضية بعد إجراء قسطرة القلب..

- **العناوين الرئيسية للجلسة: -**

١ الإجراءات التمريضية بعد إجراء قسطرة القلب.

- **الأهداف: -**

في نهاية الجلسة، يجب أن يكون المشارك (الممرض) قادرًا على:

١- التعرف على دور الممرض في ردهة القسطرة القلبية.

٢- التعرف على الرعاية التمريضية للمريض بعد القسطرة القلبية.

٣- التواصل المستمر مع الطبيب المختص حول حدوث أي تغيرات في حالة المريض.

- **مكان الجلسة: - مركز كربلاء لأمراض وجراحة القلب.**
- **الوقت: - ٦٠ دقيقة.**
- **الأدوات التعليمية: - محاضرة باور بوينت، محاضرة ورقية، فيديو، سبورة بيضاء، كمبيوتر محمول.**

المقدمة: -

بمجرد الانتهاء من إجراء قسطرة القلب ، يتم إعادة المريض إلى الردهة. في حالة الطوارئ ، يتم توصيل المريض بجهاز مراقبة القلب وكفة ضغط الدم حتى يتمكن الممرض من الحصول على العلامات الحيوية للمريض ويقوم الممرض ايضاً بفحص مكان الوخز لملاحظة أي نزيف ، والتحقق من نبض مسند القدم ولون الجلد المحيطي ودرجة حرارة الطرف تحت مكان الوخز.

أثناء الراحة في الفراش، يجب على الممرض مراقبة مكان المسلك كل نصف ساعة بحثًا عن علامات النزيف أو التورم أو تكون ورم دموي. يجب نصح المرضى بالحفاظ على ساقهم مستقيمة، والضغط على موقع البزل قبل السعال أو العطس. يجب عليهم إبلاغ طاقم التمريض إذا شعروا بأي

دم أو بلل أو لزوجة. نظرًا لأن عدم انتظام دقات القلب وانخفاض ضغط الدم يمكن أن يشير إلى أن المريض يفقد الدم ، والذي قد لا يكون مرئيًا إذا كان نزيفًا خلف التجويف البريتوني ، فيجب تسجيل معدل ضربات القلب وضغط الدم كل نصف ساعة. غالبًا ما يكون المريض الذي يشكو من آلام أسفل الظهر هو أول أعراض النزيف خلف التجويف البريتوني.

يجب السماح للمريض بتناول الطعام والشراب مباشرة بعد العملية. يجب تشجيع المرضى على شرب الكثير من السوائل بعد العملية للتعويض عن التأثير المدر للبول لصبغة التباين، وكذلك لطرد الأدوية المثبطة لعضلة القلب والأوعية الدموية في أجهزة الجسم، ومنع انخفاض ضغط الدم. إذا كان المريض غير قادر على الشرب، يجب إعطاء سوائل في الوريد (Vitae, 1981).

الغرض من المراقبة المتكررة للمريض بعد القسطرة القلبية هو الكشف عن المضاعفات المرتبطة بالثقب الشرياني أو الوريدي ، والأحداث المتعلقة بالمرض وأجهزة الجسم، وتشمل الرعاية بعد الإجراء ما يلي:

١- بعد وقف النزف الدموي ، إذا تم إجراء قسطرة قلبية في منطقة الفخذ ، يمكن للمريض الاستلقاء عند ٤٥ درجة لمدة ساعة واحدة. إذا لم يتم ملاحظة أي مضاعفات أو علامات نزيف ، فيمكنهم الجلوس في وضع مستقيم في السرير. يوصى بالراحة في السرير لمدة ٣ ساعات قبل التحرك.

٢- يجب تحرير جهاز الضغط الشرياني الكعبري ببطء. يجب أن يستريح المريض على السرير / الكرسي لمدة ساعة إلى ساعتين وتجنب تحريك الذراع المصابة بعد إجراء القسطرة في العضد ، ويجب إزالة الخيوط الجراحية بعد ٧ أيام ، أو بعد ١٠ أيام لمرضى السكري (Collins, 2008)

٣- قياس مجموعة كاملة من الملاحظات – ضغط الدم، نبض القلب ، درجة الحرارة ، نسبة الاوكسجين في الدم ، ومعدل التنفس وسكر الدم إذا كان المريض مصابًا بداء السكري.

٤- يجب ملاحظة اللون والدفء والإحساس للطرف المصاب.

٥- ملاحظة وجود أو عدم وجود نبضات مسند القدم / الكعبر (ذات صلة بموقع الوصول الشرياني).

٦- مكان الجرح - ملاحظة وجود نزيف أو ورم دموي وعلامات العدوى. إذا كان المريض غير مستقر أو يشكو من ألم في الصدر:

٧- ربط المريض بجهاز مراقبة القلب.

٨- قم بإجراء تخطيط القلب الكهربائي المكون من ١٢ خطًا وقارن بنتائج تخطيط القلب الكهربائي قبل الإجراء لتقييم أي تغييرات او مضاعفات ضارة.

٩- إعادة مجموعة كاملة من الملاحظات المطلوبة.

١٠- تقديم تقرير من قبل الطبيب المسؤول او الممرض المسؤول في جناح القسطرة.

١١- إذا لزم الأمر، يعطى العلاج المناسب (مثل O 2 والنترات والمسكنات). يجب تحديد تواتر الملاحظات حسب حالة المريض؛ ومع ذلك، يمكن استخدام ما يلي كدليل للمرضى المستقرين أو الروتينيين:

أ- مراقبة وتسجيل النبض وضغط الدم: -

١- كل ٣٠ دقيقة لمدة ساعتين.

٢- كل ساعة حتى اكتمال الراحة في الفراش.

ب- لذلك قم بقياس معدل التنفس و SpO 2 إذا لزم الأمر.

ج- مراقبة وتسجيل حالة الطرف المصاب، والنبض مسند القدم / الكعبر وفحص مكان الجرح:-

١- كل ٣٠ دقيقة إلى ساعة واحدة حتى تكتمل الراحة في الفراش.

٢- ساعة بعد التحريك.

٣- في صباح اليوم التالي للعملية و / أو قبل الخروج.

٤- أيضاً مراجعة فرع إزالة الغمد (Collins, 2008) .

١٢- توعية المريض لإبلاغ الطاقم عن أي ألم في الصدر / ضيق في التنفس أو نزيف / عدم راحة في مكان الدخول.

١٣- شرح كيفية الضغط على منطقة الفخذ إذا لزم الأمر (للسعال أو العطس أو إذا شعر المريض بأي دفء أو رطوبة في المنطقة).

١٤- يجب إعطاء المرضى حمية خفيفة فقط إلى ما بعد إزالة الغمد، لأن ذلك قد يؤدي إلى التقيؤ.

١٥- مراقبة خروج البول. إذا فشل المريض في إفراغ البول خلال ٦ ساعات من الإجراء، أو إذا كان المريض يعاني من عدم الراحة / يعاني من صعوبة في التبول، فقد تكون هناك حاجة إلى قسطرة بولية.

١٦- التأكيد على أهمية الراحة في الفراش، لأن التحرك أو الجلوس مباشرة بعد العملية يمكن أن يؤدي إلى حدوث نزيف أو ورم دموي(Collins, 2008).

العناية بمكان الإدخال:

الضماد:

١- يجوز إزالة الضمادة أو الضمادة الشفافة في اليوم التالي للعملية أو في نفس اليوم واستبدالها بضمادة جديدة.

٢- كمية قليلة من الدم المجفف على الضمادة القديمة ومكان الإدخال أمر طبيعي.

٣- السماح للمريض بالاستحمام في اليوم التالي لإجراء القسطرة، لكن لا تسمح للضمادة أن تبقى مبللة.

٤- لا تأخذ حمام البانيو خلال ٤٨ ساعة من الاختبار.

٥- يمكن إعادة وضع الضمادة الجافة لبضعة أيام أخرى من أجل الحفاظ على الجلد نظيفًا وتقليل خطر الإصابة بالصدمات أو العدوى. يمكن إزالة الضمادة بعد ٧٢ ساعة من العملية.

٦- حاول تجنب ارتداء الملابس الضيقة أو المقيدة فوق مكان الإدخال.

فحص مكان الإدخال:

فحص مكان الإدخال كل يوم وأخبر الطبيب إذا تطور أي مما يلي:

١- تكتل متوسع أو منطقة مستمرة من الاحمرار والدفء.

٢- إفرازات صفراء من مكان الإدخال.

٣- زيادة التنميل في الساق أو اليد أو الرسغ أو الذراع.

٤- انزعاج شديد في مكان الإدخال.

الحمية الغذائية:

١- يجب أن يحاول المريض شرب المزيد من السوائل أكثر من المعتاد في غضون ٤٨ ساعة بعد العملية. سيساعد هذا الكلى على التخلص من الصبغة عن طريق التبول.

٢- قد يستأنف المريض نظامه الغذائي المعتاد بعد الخروج من المستشفى.

إزالة الغمد (Sheath):

ضغط يدوي:

عادة ما يتم إجراء إزالة الغمد مباشرة بعد تصوير الأوعية الدموية التشخيصي، ما لم يتم إعطاء الهيبارين (على سبيل المثال أثناء تصوير الأوعية الدموية لفترات طويلة أو معقدة) أو إذا تلقى المريض علاج التخثر أو العلاج بالبروتين السكري. إذا كانت هذه هي الحالة، أو إذا تم إجراء تداخلي ، فإن إزالة الغمد تحدث بشكل عام بعد فترة من ٣ إلى ٦ ساعات.

لا تخلو إزالة الغمد من الشريان من المخاطر ، وتشمل المضاعفات المحتملة ما يلي:

١- نزيف في الموضع أو نزيف خلف التجويف البريتوني.

٢- تمدد الأوعية الدموية الكاذب.

٣- الناسور الشرياني الوريدي.

٤- نقص التروية أو النخر.

٥- تكوين ورم دموي.

٦- انسداد الشرايين.

٧- الاستجابة الوعائية المبهمة: انخفاض ضغط الدم وبطء القلب.

في محاولة للحد من حدوث المضاعفات، من المهم جمع المعلومات التالية قبل الإجراء:

٨- هل تم تناول الهيبارين؟ إذا كان الأمر كذلك، فمن المهم تحديد وقت التجلط النشط (ACT)يجب أن يكون هذا عادةً أقل من ١٥٠–١٦٥ ثانية.

٩- ما هو ضغط الدم لدى المريض؟ إذا كان المريض يعاني من ارتفاع ضغط الدم (ضغط الدم الانقباضي> ١٥٠ مم زئبق)، فسيكون من الضروري الضغط لفترة طويلة لتحقيق إيقاف النزف الدموي. قد تكون هناك حاجة إلى الأدوية الخافضة للضغط قبل إزالة الغمد. إذا كان المريض يعاني من انخفاض ضغط الدم ، فيجب معالجة السبب.

١٠- وجود ورم دموي؟ يمكن أن يسبب هذا إزعاجًا كبيرًا للمريض وبالتالي يتسبب في ضغط الدم. ضع في اعتبارك المسكن المناسب قبل إزالة الغمد.

١١- ما هي وظيفة البطين الايسر للمريض؟ يمكن الحصول على هذه المعلومات من الملاحظات الطبية للمريض. إذا كان المريض يعاني من انخفاض في وظيفة البطين الايسر ، فيجب توخي مزيد من الحذر / المراقبة المتكررة في حالة إعطاء بديل للبلازما بعد تفاعل وعائي مبهم (Collins, 2008).

المعدات المطلوبة لإزالة غمد الفخذ:

١- عربة ضماد / صينية

٢- عبوة ضمادة معقمة

٣- مسحات شاش معقمة

٤- القفازات المعقمة

٥- الضماد العضوي

٦- كيس محلول ملحي معقم (للتنظيف)

٧- نظارات واقية

٨- وزرة واقية

٩- مياه مالحة للتنظيف

١٠- معدات Femostop ®

١١- أتروبين ٦٠٠ ميكروجرام

١٢- تعويض البلازما ٥٠٠ مل وجماعة التبرع بالدم.

الإجراء:

١- اغسل اليدين وجففهما.

٢- ارتداء الملابس / المعدات الواقية.

٣- قم بإزالة الضمادة العضوية وتنظيف المنطقة باستخدام تقنية التعقيم.

٤- تحديد موقع نبض الفخذ عن طريق ملامسة الفخذ (١ - ٢ سم فوق مكان الوخز). ضع إصبع السبابة والوسطى على النبض واضغط أثناء إزالة الغمد باليد الأخرى. إذا تم إدخال غمد وريدي أيضًا، فمن المستحسن إزالة غمد الشرايين أولاً وإزالة الغمد الوريدي بعد ١٠ دقائق. الغمد الوريدي هو الأعمق.

٥- راقب المريض بحثًا عن علامات المضاعفات - يمكن أن تؤدي الاستجابة الوعائية المبهمة إلى بطء القلب وانخفاض ضغط الدم والغثيان والقيء والتثاؤب والتعرق والشحوب و / أو الانفعالات.

٦- إذا لزم الأمر ، يجب استدعاء الممرض الثاني لإعطاء الأتروبين و / أو بدائل البلازما حسب الحاجة.

٧- تطبيق ضغط مستمر لمدة لا تقل عن ١٠ دقائق (تشخيصي) أو ١٥-٢٠ دقيقة (تداخلي). حرر الضغط ببطء واستمر في الضغط برفق، حسب الاقتضاء.

٨- أثناء الضغط بإحدى يديك، قم بجس المنطقة المحيطة باليد الأخرى لاكتشاف تكون الورم الدموي. يجب أن يكون الجلد ناعمًا ومرنًا.

٩- في حالة استمرار النزيف أو تضخم الورم الدموي، قم بمزيد من الضغط وقيم ما إذا كان جهاز الضغط مطلوبًا (تحقيق وقف النزف الدموي: أجهزة الإغلاق).

١٠- عند حدوث الزف الدموي، قم بتنظيف المنطقة باستخدام محلول ملحي معقم ووضع ضماد حيوي.

١١- توثيق وقت النزف الدموي وأية إجراءات تمريضية.(Collins, 2008) .

نصائح الخروج:

من أجل حماية مكان الوخز من النزيف، يجب نصح المرضى بما يلي:

١. تحسس مكان الوخز بحثًا عن علامات نمو كتلة خلال اليومين أو الثلاثة أيام القادمة.

٢. قد يصاب المريض بكدمة حول مكان الوخز، وعادة ما يزداد هذا حجمًا حيث تسحبه الجاذبية إلى أسفل الساق. ما لم يكن ذلك مؤلمًا، فلا داعي للقلق بشأن هذا.

٣. قد يكون هناك القليل من بقع الدم على ملابسهم الداخلية. إذا كان الدم أحمر فاتحًا ومتدفقًا، فعليهم إرسال سيارة إسعاف. أثناء انتظار سيارة الإسعاف، يجب عليهم الاستلقاء على سطح ثابت والضغط بقوة فوق موقع البزل.

٤. على الرغم من أنه من النادر جدًا حدوث مثل هذه المشكلات، إلا أنه من أجل تقليلها، يجب:

أ- يفضل الاستحمام بعد مرور ٢-٣ أيام.

ب- عدم فرك مكان الوخز بقوة.

ج- تجنب رفع الأشياء الثقيلة وسحبها لمدة ٢-٣ أيام قادمة.

د- الامتناع عن القيادة لمدة أسبوع(Vitae, 1981) .

٥. قم بإبلاغ الطبيب عن الأعراض التالية في حالة حدوثها:

أ- نزيف جديد أو انتفاخ في موضع القسطرة. (في حالة حدوث نزيف ملحوظ، اضغط بقوة على منطقة النزيف.

ب- زيادة اللين أو الاحمرار أو التصريف أو الألم في موضع القسطرة.

ج- الحمى.

د- تغير في اللون (الشحوب) أو درجة الحرارة (البرودة) أو الإحساس (التنميل) في الرجل أو الذراع المستخدمة في القسطرة.

٦. يمكن تناول الأسيتامينوفين أو المسكنات الأخرى التي لا تحتوي على الأسبرين كل ٤ ساعات حسب الحاجة للألم ما لم يتم منعه.

٧. في حالة وجود غرز، يتم ارتداء ضمادة لاصقة ويتم إزالتها حسب توجيهات الطبيب. خلاف ذلك ، يتم تغطية المكان بضمادة لاصقة لمدة ٢٤ ساعة.

٨. مراجعة المريض للطبيب لتحديد موعد للمتابعة.

٩. استمر في تناول الأدوية الموصوفة كما في السابق ما لم يحدد الطبيب غير ذلك.

١٠. تجنب النشاط الشاق لمدة ٤٨ ساعة ولا ترفع أي شيء أثقل من ٥ أرطال خلال الـ ٤٨ ساعة القادمة.

١١. الحد من صعود الدرج المفرط.

١٢. يجب أن يتم نقل المريض إلى المنزل وأن يكون برفقة شخص بالغ مسؤول حتى صباح اليوم التالي.

١٣. إذا حدث ألم أو ضغط في الصدر أو الذراعين أو الكتفين أو الرقبة أو الفك:

أ- تناول النتروجليسرين إذا وصف للمريض.

ب- إخطار طبيب القلب بألم الصدر إذا تم تخفيفه بالنيتروجليسرين إذا لم يتم تخفيف ألم الصدر.

١٤. اتباع نظام غذائي كما هو موصوف من قبل طبيب القلب، وعادة ما يكون نظام غذائي قليل الملح وقليل الدهون(Susan L. Woods, PhD, RN, FAHA et al., 2010) .

الجلسة الثانية: أكثر عوامل الخطر والمضاعفات شيوعًا في إجراء قسطرة القلب.

- **العناوين الرئيسية للجلسة: -**

١ـ معرفة المضاعفات أثناء وبعد إجراء قسطرة القلب.

٢ـ الرعاية التمريضية وتجنب المضاعفات أثناء وبعد القسطرة القلبية.

❖ **الأهداف: ـ**

في نهاية الجلسة، يجب أن يكون المشارك (الممرض) قادرًا على:

١ـ يشرح المضاعفات التي قد تحدث أثناء وبعد القسطرة القلبية.

٢ـ مناقشة كيفية إدارة التمريض للمضاعفات أثناء وبعد قسطرة القلب.

٣ـ معرفة تجنب المضاعفات التي قد تحدث أثناء وبعد القسطرة القلبية.

مكان الجلسة: ـ مركز كربلاء لأمراض وجراحة القلب.

❖ **الوقت: ـ ٦٠ دقيقة.**

❖ **الأدوات التعليمية: ـ محاضرة باور بوينت، محاضرة ورقية، فيديو، سبورة بيضاء، كمبيوتر محمول.**

المقدمة: ـ

هناك انخفاض كبير في الوفيات والمراضة المرتبطة بالقسطرة القلبية. أشار تحليل المضاعفات في أكثر من ٢٠٠٠٠٠ مريض إلى أن خطر الوفاة كان أقل من ٠,١٪، واحتشاء عضلة القلب أقل من ٠,٠٥٪، والسكتة الدماغية أقل من ٠,٠٧٪، وعدم انتظام ضربات القلب البطيني الخطير أقل من ٠,٥٪، ومضاعفات الأوعية الدموية الرئيسية (تجلط الدم، والنزيف الذي يتطلب نقل الدم، تمدد الأوعية الدموية الكاذب) أقل من ١٪ (Vitae, 1981).

تعتمد الاختلافات الأخرى في المخاطر على نوع الإجراء الذي يتم إجراؤه (القسطرة التشخيصية ، والتداخل الشرياني التاجي ، وما إلى ذلك) وإلى حد ما على خبرة الطبيب المختص وإلمامه بهذا الإجراء المعين(19; page 77).

١ـ معرفة المضاعفات أثناء وبعد إجراء قسطرة القلب.

الوقاية والكشف عن المضاعفات هي الأهداف الرئيسية للرعاية التمريضية، أثناء وبعد القسطرة القلبية (تصوير الأوعية الدموية أو إصلاح الأوعية). على الرغم من ندرة المضاعفات، إلا أنها تحدث ويمكن أن تهدد الحياة، إلا أن الاكتشاف والتدخل المبكر ضروريان. من المهم التعرف على المضاعفات. ترتبط المضاعفات التي نوقشت هنا بكل من تصوير الأوعية الدموية وإصلاح الأوعية الدموية (PCI)، ويمكننا فصل هذه المضاعفات على النحو التالي:(Collins, 2008) .

١ـ الوفاة:

أ- الوفاة: كمضاعفات القسطرة التشخيصية، انخفض معدل الوفاة تدريجياً خلال الثلاثين عاماً الماضية.

ب- المرض الرئيسي الأيسر: على الرغم من حدوث انخفاض تدريجي في معدل الوفيات الإجمالي للقسطرة القلبية التشخيصية على مدار الخمسة وعشرين عامًا الماضية، يظل المرضى الذين يعانون من مرض الشريان التاجي الأيسر الرئيسي في خطر متزايد.

ج- ضعف البطين الأيسر: المرضى المصابون بصدمة قلبية في حالة احتشاء عضلة القلب الحاد أو الخلل الوظيفي البطيني الأيسر المزمن لديهم مخاطر مضاعفة للإصابة بالأمراض والوفيات الإجرائية.

د- أمراض القلب الصمامية: على الرغم من شيوع مرض الشريان التاجي كمؤشر لتشخيص قسطرة القلب ، فإن المرضى الذين يعانون من أمراض القلب الصمامية الشديدة معرضون أيضًا لخطر الموت أثناء القسطرة القلبية.

هـ- الموت أثناء إجراء تداخلي: لأنها تشمل على استخدام قساطير أكثر شده، وإدخال (Cannulation) على الشرايين التاجية المريضة، والانقطاع القصير للتدفق التاجي أو حتى الجهازي، تميل الإجراءات التداخلية إلى تحمل معدلات وفيات أعلى. من القسطرة التشخيصية البحتة.

و- جراحة التطعيم لتجاوز الشريان التاجي السابق: المرضى الذين خضعوا سابقًا لجراحة المجازة التاجية يشكلون مجموعة فرعية متنامية من القسطرة التشخيصية والتداخلية. هم عادة أكبر من ٥ سنوات، ولديهم المزيد من الشريان التاجي المنتشر وتصلب الشرايين المعمم، ووظيفة البطين الأيسر أسوأ، ويتطلبون إجراءً أطول وأكثر تعقيدًا لتصوير الشرايين التاجية الأصلية وجميع الطعوم.

٢- احتشاء عضلة القلب: على الرغم من أن نقص تروية عضلة القلب العابر شائع نسبيًا أثناء القسطرة التشخيصية ويحدث بشكل روتيني أثناء التداخل التاجي ، إلا أن احتشاء عضلة القلب يعد من المضاعفات غير الشائعة ولكن المهمة للقسطرة القلبية التشخيصية.

أ- الإجراءات التداخلية: قد تؤدي التداخلات التاجية إلى احتشاء عضلة القلب من خلال مجموعة متنوعة من الآليات التي تشمل التشريح ، الإغلاق المفاجئ للأوعية ، انسداد الفروع الجانبية "بالثلج" ، تشنج الأوعية النخابية أو الشرايين (بدون إعادة تدفق) ، تجلط الدم ، أو الانصمام البعيدة.

٣- المضاعفات الوعائية الدماغية: الحوادث الوعائية الدماغية (السكتات الدماغية) غير شائعة ولكنها قد تكون مضاعفات مدمرة للقسطرة القلبية التشخيصية.

٤- المضاعفات الوعائية الموضعية: تعتبر المضاعفات الموضعية في موقع إدخال القسطرة من أكثر المشكلات شيوعًا التي تظهر بعد إجراءات قسطرة القلب ، وربما تكون أكبر مصدر منفرد للمراضة المرتبطة بالإجراء. تشمل المشاكل المحددة تجلط الأوعية الدموية ، والانصمام القاصي ، والتسلخ ، والنزيف الذي يتم التحكم فيه بشكل سيئ في مكان الوخز ، وتطور تمدد الأوعية الدموية الكاذب ، والناسور الشرياني الوريدي ، والورم الدموي خلف التجويف البريتوني، وتطور اعتلال الأعصاب الفخذي.

أ- تجلط الشريان الفخذي: يمكن أن يحدث تجلط الشريان الفخذي في المرضى الذين يعانون من تجويف الشريان الفخذي الصغير الشائع (مرض الأوعية الدموية المحيطية ، السكري ، الجنس الأنثوي) ، الذين تم استخدام قسطار أو غمد بقطر كبير (على سبيل المثال ، مضخة بالون داخل الشريان الأبهر) يتم وضعها ، خاصةً عندما يكون وقت تثبيت القسطرة طويلاً أو عند تطبيق ضغط مطول بعد الإجراء.

ب- تخثر الوريد الفخذي: الخثار الوريدي الفخذي والانسداد الرئوي من المضاعفات النادرة للقسطرة الفخذية التشخيصية. عدد صغير من الحالات السريرية سجلت ، لا سيما في حالة الانضغاط الوريدي عن طريق ورم دموي شرياني كبير ، أو ضغط ميكانيكي مستمر ، أو إجراءات مطولة مع خطوط وريدية متعددة (على سبيل المثال ، دراسات الفيزيولوجيا الكهربية).

ج- المضاعفات النزفية: على الرغم من حدوث مضاعفات التخثر ، إلا أن النزيف السيئ السيطرة من مكان الوخز الشرياني هو مشكلة أكثر شيوعًا بعد قسطرة القلب عن طريق النهج الفخذي ، والنزيف المطلق الذي لا يمكن السيطرة عليه حول الغمد يشير إلى تمزق في الشريان الفخذي.

د- النزيف خلف التجويف البريتوني: يعتبر النزف خلف التجويف البريتوني أو الورم الدموي من المضاعفات النادرة نسبيًا التي ترتبط بارتفاع معدلات الاعتلال والوفيات.

ه- الاعتلال العصبي الفخذي: الاعتلال العصبي الفخذي هو أحد المضاعفات النادرة الأخرى عند الوصول إلى الشريان الفخذي. يمكن أن يحدث من صدمة مباشرة إلى العصب الفخذي، او من ضغط من ورم دموي، أو من ضغط مباشر طويل الأمد أثناء تحقيق النزف الدموي.

و- تمدد الأوعية الدموية الكاذب والناسور الشرياني الوريدي: قد يتطور تمدد الأوعية الدموية الكاذب إذا ظل ورم دموي مستمر مع تجويف الشرايين (أي بعد انحلال الجلطة التي تسد مكان الوخز الشرياني).

٥- عدم انتظام ضربات القلب أو اضطرابات التوصيل: قد يحدث عدم انتظام ضربات القلب المختلفة (تسارع القلب أو بطء القلب) أو اضطراب التوصيل أثناء قسطرة القلب التشخيصية أو العلاجية.

أ- الرجفان البطيني: التنظير البطيني (Ventricular ectopy) أو حتى فترات قصيرة (من ثلاث إلى خمس ضربات) من تسارع القلب البطيني ليس من غير المألوف أثناء مرور القسطرة إلى البطين الأيمن أو الأيسر.

ب- عدم انتظام ضربات القلب الأذيني: الانقباضات الأذينية الخارجية شائعة أثناء تقدم القسطرة من الأذين الأيمن إلى الوريد الأجوف العلوي، أو أثناء لف القسطرة في الأذين الأيمن لتسهيل المرور في المريض الذي لديه تضخم في غرف القلب اليمنى. عادة ما تهدأ هذه الانقباضات الخارجية بمجرد إعادة وضع القسطرة، على الرغم من أنها قد تتطور إلى الرفرفة الأذينية أو الرجفان عند المرضى الحساسين. يميل كلا الإيقاعين إلى العودة تلقائيًا خلال فترة من دقائق إلى ساعات، ولكن قد يتطلبان علاجًا إضافيًا إذا تسببوا في نقص التروية أو عدم استقرار الدورة الدموية.

ج- عدم انتظام ضربات القلب البطيء: بطء عابر لمعدل ضربات القلب يحدث بشكل شائع أثناء تصوير الأوعية التاجية، خاصة في نهاية حقنة الشريان التاجي الأيمن التي يتم إجراؤها باستخدام عامل تباين أيوني عالي الأسمولية.

٦- انثقاب القلب أو الأوعية الدموية الكبرى: لحسن الحظ فإن ثقب غرف القلب أو الشرايين التاجية أو الأوعية الكبيرة داخل الصدر هو حدث نادر في القسطرة التشخيصية.

٧- الالتهابات والتفاعلات البيروجينية: لأن القسطرة القلبية هي إجراء معقم بطبيعتها، فإن العدوى غير عادية للغاية. تتضمن التقنية الموصى بها حلق وتنظيف موقع إدخال القسطرة باستخدام غلوكونات الكلورهيكسيدين، واستخدام ستارة غير مسامية، وملابس الفريق الطبي المناسبة (بما في ذلك بدلة نظيفة، وثوب، وقفازات معقمة).

٨- تفاعلات الحساسية والتحسس المفرط: قد تؤدي القسطرة القلبية إلى تفاعلات حساسية تجاه ثلاث مواد: (أ) مخدر موضعي. (ب) عامل التباين المعالج باليود؛ أو (ج) كبريتات البروتامين. تحدث الحساسية الحقيقية للتخدير الموضعي، ولكنها أكثر شيوعًا مع عوامل ملح الإستر الأقدم (على سبيل المثال، بروكايين) مقارنة بعوامل الأميد الأحدث (ليدوكائين، بوبيفاكين).

٩- اعتلال الكلية الناجم عن التباين / إصابة الكلى الحادة: الخلل الكلوي المؤقت أو الدائم من المضاعفات الخطيرة المحتملة لتصوير الأوعية القلبية. تشمل الآليات المحتملة لاعتلال الكلية الناجم عن التباين (CIN) عدم استقرار حركي وعائي، وزيادة نفاذية الكبيبات للبروتين، وإصابة أنبوبية مباشرة، أو انسداد أنبوبي.

١٠- مضاعفات أخرى:

أ- انخفاض ضغط الدم: يعتبر انخفاض ضغط الدم الشرياني من أكثر المشاكل شيوعاً أثناء القسطرة. يمثل هذا التخفيض المظهر النهائي المشترك لمجموعة متنوعة من الحالات بما في ذلك

ما يلي: (أ) نقص حجم الدم، بسبب عدم كفاية الجفاف، أو فقدان الدم، أو إدرار البول الناتج عن التباين المفرط؛ (ب) انخفاض النتاج القلبي بسبب نقص التروية أو الدكاك أو عدم انتظام ضربات القلب أو ارتجاع الصمامات؛ أو (ج) توسع الأوعية الشرياني الجهازي غير المناسب، بسبب وعائي مبهمي، أو إعطاء النترات المفرط، أو استجابة موسع للأوعية للأدوية المتباينة أو المختلطة لتقلص التقلص العضلي مثل الدوبامين أو الدوبوتامين. ومع ذلك، فإن القليل من الأماكن مجهزة جيدًا مثل معمل قسطرة القلب للتعرف على انخفاض ضغط الدم وتشخيصه وعلاجه.

ب- زيادة حجم السوائل: المرضى في مختبر قسطرة القلب معرضون للحجم الزائد بسبب إعطاء عوامل التباين مفرطة التوتر ، أو انخفاض عضلة القلب أو نقص التروية الناجم عن التباين ، وضعف وظيفة البطين الأيسر الأساسي ، بالإضافة إلى وضع الاستلقاء ومحاولات تحميل حجم السوائل للمرضى المعرضين لخطر الاختلال الكلوي الناجم عن التباين.

ج- القلق / الألم: يجب تحمل إجراءات القسطرة القلبية بشكل جيد مع المعالجة المسبقة بمسكنات الفم (الميدازولان ١ إلى ٢ مجم ، والفنتانيل ٢٥ إلى ٥٠ بيكوغرام) والاستخدام الحر للتخدير الموضعي في موقع إدخال القسطرة.

د- القصور التنفسي: مشاكل التهوية أو الأوكسجين غير شائعة في مختبر قسطرة القلب. قد تنجم عن الوذمة الرئوية، أو مرض الرئة الأساسي، أو رد الفعل التحسسي، أو توقف التنفس أثناء النوم ، أو الإفراط في تناول الطعام. تتم مراقبة المرضى طوال الإجراء باستخدام مقياس التأكسج النبضي للإصبع لاكتشاف التشبع التدريجي.

هـ- المعدات المحتجزة أو المتروكة: على الرغم من أن القسطرة القلبية التشخيصية والعلاجية تتمتع بدرجة عالية من الموثوقية، إلا أن الأعطال يمكن أن تحدث وتحدث بالفعل حيث تتعقد الأجهزة أو تنحصر أو تترك شظايا في الدورة الدموية(19; page 77-101) .

مخاطر القسطرة القلبية (تصوير الأوعية الدموية والقسطرة العلاجية):

يُعد تصوير الأوعية الدموية وإصلاحها (مع أو بدون زرع الدعامة) من الإجراءات الشائعة. الطبيب ينظر بعناية في الحالة السريرية ويعتقد أن فوائد الإجراء تفوق المخاطر. ومع ذلك ، نظرًا لأن هذه الإجراءات توسيعية ، فهناك مخاطر مرتبطة بها (Baim, 2007):

وتشمل المخاطر الشائعة ما يلي:

نزيف في موضع إدخال القسطرة أو أعضاء أخرى بسبب أدوية ترقق الدم (مضادات التخثر).

تشمل المخاطر الأقل شيوعًا ولكن الأكثر خطورة ما يلي:

١- النوبة القلبية.

٢-السكتة الدماغية.

٣- حساسية غير معروفة للصبغة.

٤- مشاكل الكلى بما في ذلك الفشل الكلوي الذي يتطلب غسيل الكلى.

٥- جراحة القلب الطارئة.

٦- الموت.

٧- مضاعفات أخرى نادرة وغير متوقعة.

١٪ إلى ٢٪ من حالات إصلاح الاوعية الدموية، ينهار الشريان أو يتضرر بسبب السلك أو البالون. غالبًا ما يمكن للدعامة إصلاح هذا، لكن في بعض الأحيان يحتاج المرضى إلى جراحة طارئة لتجاوز الشريان التاجي.

القسطرة ليست علاجًا لمرض الشريان التاجي. يحتاج مرض الشريان التاجي إلى إدارة مدى الحياة. يمكنه التحكم في الحالة بأسلوب حياتي صحي:

أ- ممارسة الرياضة بشكل كافٍ

ب- المحافظة على وزن صحي وتقليل حجم الخصر

ج- الإقلاع عن التدخين

يمكن السيطرة على عوامل الخطر عن طريق تناول الأدوية التي يصفها الطبيب. قد يصف الطبيب دواءً من أجل:

أ- ارتفاع ضغط الدم.

ب- ارتفاع نسبة الكوليسترول.

ج- ارتفاع نسبة السكر في الدم(Collins, 2008) .

٢- الرعاية التمريضية وتجنب المضاعفات أثناء وبعد القسطرة القلبية.

إن الرعاية التمريضية للمرضى أثناء وبعد القسطرة القلبية موجهة نحو الوقاية والكشف عن المضاعفات. خطر حدوث مضاعفات كبيرة (احتشاء عضلة القلب أو الوفاة أو الانصمام الكبير) أثناء القسطرة القلبية التشخيصية أقل من ١٪.

يُعد مرض الأوعية الدموية المحيطية الشديد أحد عوامل الخطر للمضاعفات الرئيسية في جميع الإجراءات. (SCAI) جمعية تصوير الأوعية الدموية للقلب والأوعية الدموية والتدخلات) تسجيل حدوث مضاعفات أثناء قسطرة القلب وتصوير الأوعية التاجية: مضاعفات الأوعية الدموية، ٠,٤٣٪؛ تفاعلات التباين، ٠,٣٧٪؛ احتشاء عضلة القلب ٠,٠٥٪؛ حادث وعائي دماغي، ٠,٠٧٪؛ والوفيات ٠,١١٪.

على الرغم من ندرة المضاعفات، إلا أنها تحدث وقد تكون مهددة للحياة. الاكتشاف المبكر والتداخل ضروريان في الوقاية. تعد مشاكل الأوعية الدموية الموضعية في مكان دخول القسطرة هي

المضاعفات الأكثر شيوعًا بعد إجراءات القسطرة القلبية. تشمل هذه المشاكل نَضحاً طفيفًا أو كبيرًا، أو كدمات، أو ورم دموي، أو نزيفًا ضعيف التحكم في مكان الوخز.

المضاعفات الوعائية الأخرى الأقل شيوعًا هي تجلط الأوعية الدموية، والانصمام القاصي، أو التسلخ، وتمدد الأوعية الدموية الكاذب، والناسور الشرياني الوريدي. يحدث عدم انتظام ضربات القلب البطيني استجابةً للتلاعب بالقسطرة أو حقن وسيط التباين ويميل إلى عدم التكرار بعد إزالة المنبه المهيأ.

بطء القلب شائع استجابة لحقن الشرايين التاجية بالتباين أو أثناء إدخال الغمد أو إزالته. يجب أن يكون ممرض مختبر القسطرة على دراية بإعداد(IABP) (مضخة بالون داخل الأبهر) وإدارتها، لأن (IABP) غالبًا ما يستخدم عندما يصبح المرضى غير مستقرين من الناحية الديناميكية الدموية أثناء إجراء القسطرة. يجب أن يكون الممرض أيضًا على دراية بالمعدات الأخرى المستخدمة في المختبر(IVUS) (الموجات فوق الصوتية داخل الأوعية).

أسلاك الدوبلر والضغط والقسطرة والدعامات البالونية وأجهزة استئصال الخثرة ومعدات استئصال التصلب العصيدي للأوعية الدموية. تشمل المهارات الإضافية إدارة مكان الدخول، بما في ذلك إزالة الغمد، والضغط اليدوي من أجل وقف النزف الدموي ، واستخدام أجهزة الإغلاق أو FemoStop لوقف النزف الدموي ، ومعرفة شاملة بالأدوية المستخدمة بشكل شائع أثناء إجراء ما ، مثل الهيبارين ، و bivalirudin ، والهيبارين منخفض الوزن الجزيئي ، مثبطات مستقبلات البروتين السكري IIb / IIIa ، مضادات اضطراب النظمية ، الأدوية الفعالة في الأوعية ، والأدوية المستخدمة للتخدير الإجرائي (Susan L. Woods, PhD, RN, FAHA et al., 2010).

هناك العديد من الإجراءات التمريضية أثناء وبعد القسطرة القلبية مهمة جدًا لتقليل المضاعفات.

١- التقييم المستمر للعلامات الحيوية للمريض، الأكسجين، ومستوى الوعي، وإيقاع القلب لكل بروتوكول مؤسسي.

٢- ابلاغ الطبيب المعالج للتغيرات الهامة في العلامات الحيوية والأكسجين ووجود خلل في نظم القلب الضار (مثل تقلصات البطين المبكرة (PVCs)، تسارع دقات القلب البطيني ، الرجفان البطيني (VF).

٣- يجب أن يكون هنالك استعداد دائم لبدء إنعاش القلب باستخدام معدات وأدوية الطوارئ.

٤- إرشاد المريض لإبلاغ الطبيب والفريق بأي ألم في الصدر يعاني منه.

٥- ذكر المريض بالاستلقاء.

٦- طمأنة المريض وتخفيف القلق.

٧- تشجيع والإجابة على أسئلة المريض.

هناك العديد من الإجراءات التمريضية بعد نقل المريض إلى غرفة الإنعاش.

١- التأكد من استقرار العلامات الحيوية للمريض قبل النقل.

٢- فحص ضماد مكان القسطرة بحثًا عن النزيف وسلامته.

٣- فحص النبض البعيد أسفل مكان القسطرة. إذا تم استخدام موقع الفخذ ، تحقق من النبض البعيد ولون الأطراف وإعادة تعبئة الشعيرات الدموية والحالة العصبية الحسية.

٤- إذا كانت العملية عن طريق الفخذ، يجب إبقاء الأطراف مستقيمة وإرشاد المريض إلى عدم ثني الساق أو الذراع.

٥- إذا كانت العملية عن طريق الشريان الكعبري، فتأكد من وضع شريط وقف النزف الدموي بشكل صحيح وتضخيمه. اتبع تعليمات الشركة المصنعة بخصوص الانكماش / الإزالة.

٦- الحفاظ على التسريب الوريدي حسب طلب الطبيب أو البروتوكول المؤسسي.

٧- الحفاظ على دعم الأوكسجين التكميلي كما هو مطلوب أو محدد.

٨- تشجيع تناول السوائل عن طريق الفم حسب الطلب.

٩ تحقق من حالة تخثر المريض لكل بروتوكول مؤسسي قبل إزالة الغمد.

١٠-عند إزالة قسطرة الشريان الفخذي:

أ- تطبيق ضغط مباشر على مكان الوخز لمدة ٢٠ إلى ٣٠ دقيقة لمنع النزيف أو استخدام جهاز ضغط تجاري لوقف النزف الدموي حسب بروتوكول مؤسسي.

ب- فحص الأطراف البعيدة عن النبض واللون وامتلاء الشعيرات الدموية والاحساس او التحسس.

ج- تذكير المريض بالاستلقاء لمدة ٤ إلى ٦ ساعات لكل بروتوكول مؤسسي.

د- فحص ضمادة مكان الوخز كل ٤ إلى ٦ ساعات للتأكد من النزيف وسلامتها.

A Questionnaire to assess cardiac catheterization on nurse's knowledge at Karbala center for cardiothoracic diseases and surgery

Dears Nurses:

Questionnaire subject full strict to confidential and therefore can make you think frankly with appreciation ...

Part I: Demographic Data

Please mark (✓) in front of the appropriate answer

1. **Age:** ☐ **Years**
2. **Gender:** Male ☐ Female ☐
3. **Educational Attainment**

   School of nursing ☐
   Diploma Nursing ☐
   Bachelor's Nursing ☐
   Master and above ☐

4. **Years of Experience in Nursing:** ☐
5. **Years of experience in Cardiac Catheterization:** ☐
6. **Workplace** ☐
7. **Participation in training sessions about Cardiac Catheterization:**

   Yes ☐ No ☐
   If yes, How are number? ☐

8. **Do you develop your knowledge in the field of specialization on your own?**

   1. The Internet: social networking sites ☐
   2. The Internet: scientific sites ☐
   3. Consultation with fellow nurses ☐
   4. Consult a specialist doctor ☐
   5. Hospital Library ☐
   6. Other ☐

Part II: Nurses' knowledge about cardiac catheterization

List	Nurses' knowledge of the concept of cardiac catheterization and the indications for performing it	Yes	No
1	Cardiac catheterization through the femoral or humeral artery is the most common method.		
2	Cardiac catheterization provides important information about the nature of the work of the right and left atrium of the heart.		
3	The purpose of cardiac catheterization is to assess the function of the right ventricle of the heart.		
4	Cardiac catheterization is performed to evaluate and treat the functioning of the heart valves		
5	The limb through which the therapeutic cardiac catheterization was performed remains fixed for 6-8 hours		
6	Cardiac arrhythmias are evaluated and treated in some cases by performing cardiac catheterization		
7	Chest pain can go away immediately after a cardiac catheterization procedure		
8	Therapeutic cardiac catheterization is to determine the damaged site of the heart muscle		
9	Coronary angiography is a medical term that means the medical procedures for performing a therapeutic cardiac catheterization.		
10	The Fowler's position is appropriate for the patient on the bed after the cardiac catheterization procedure		
11	Therapeutic cardiac catheterization is performed to evaluate congenital heart disease		
12	Therapeutic cardiac catheterization is a term that describes a group of procedures aimed at restoring the work of the heart for future periods of time		
13	Vascular vasovagal reactions are fairly common and can occur during cardiac catheterization resulting in only a slow heartbeat.		
14	Any type of allergy that the patient suffers from must be documented before performing the cardiac catheterization procedure and inform the medical team in the operating room		
15	Pulmonary edema after cardiac catheterization may lead to failure of the left atrium of the heart		
16	Diagnostic and therapeutic cardiac catheterization cannot be performed together as it negatively affects the work of the left ventricle		
List	**Nurses' knowledge about medications and diagnostic tests for patients before, during and after cardiac catheterization**	**Yes**	**No**
17	Clopidogrel 75 mg reduces the incidence of heart attacks and stroke		
18	One week after the cardiac catheterization procedure, a serum creatinine test can be performed		
19	Anticoagulants act directly and indirectly on fibrin to dissolve clots (converting plasminogen to plasmin, an enzyme that digests fibrin clot)		
20	Anticoagulants only reduce the risk of myocardial infarction		
21	Conducting the required laboratory and radiological tests about abnormal		

	changes in the work of the heart that make the specialist doctor prefer the catheter intervention option		
22	The INR (International normalized ratio) test evaluates the risk of sudden cardiac arrest during cardiac catheterization		
23	A blood urea test is very necessary during cardiac catheterization		
24	The drug (clopidogrel 75 mg) should be stopped 24 hours before the cardiac catheterization procedure and 48 hours after it for the patient suffering from chest pain and diabetes.		
25	Troponin test should be performed only before cardiac catheterization		
26	The patient should not stop taking metformin before and after cardiac catheterization		
27	Thrombolytic drugs work to remove damage to the tissues of the heart muscle		
28	One of the medicines and medical supplies that the nurse brings when removing the catheter or sheath is atropine 600mcg.		
29	If the patient is unstable after the cardiac catheterization procedure, the electrocardiogram should be done and compared with the previous one		
30	If the patient is unstable after the cardiac catheterization procedure and complains of chest pain, the doctor should be informed of this to give him the appropriate treatment such as O2, painkillers and others		
List	**Nurses' knowledge of nursing care provided to patients before, during and after cardiac catheterization and possible complications**	**Yes**	**No**
31	The patient's vital signs should be monitored before and after cardiac catheterization		
32	When bleeding occurs at the catheter entry site, the nurse must advise the patient to press on the place for half an hour		
33	The nurse must measure the vital signs of the unstable patient after the diagnostic cardiac catheterization procedure every 20 minutes for two hours		
34	When the catheter or sheath is removed, continuous pressure is applied to the catheter entry site for a period of no less than 10 minutes if the catheterization process is curative, and 15-20 minutes if the catheterization process is diagnostic.		
35	Measuring blood pressure and pulse of a diabetic patient before and after cardiac catheterization		
36	Encouraging the patient to do deep breathing after performing a cardiac catheterization, and this process will increase the heart’s need for oxygen and reduce chest pain.		
37	Various arrhythmias (tachycardia or bradycardia) may occur during diagnostic or therapeutic cardiac catheterization.		
38	The patient who underwent cardiac catheterization should be advised to adhere to a high-sodium diet in order to improve the contraction and diastole process of the heart muscle.		
39	To prevent the risk of hypoglycemic episodes or elevations during cardiac catheterization of a diabetic patient, the nurse should monitor the intramuscularly prescribed insulin and inform the physician if abnormal changes occur.		
40	An uncommon complication of cardiac catheterization is pulmonary..		
41	The goal of providing nursing care before, during and after a cardiac catheterization procedure is to relieve chest pain		

42	Complications that may occur after the late removal of the catheter or sheath is rapid breathing		
43	Vital signs should be monitored before giving the patient the prescribed medications after the cardiac catheterization procedure		
44	An uncommon complication of cardiac catheterization is myocardial infarction		
45	Nursing care for the patient before, during and after cardiac catheterization should include psychological support to reduce the level of anxiety, which in turn increases myocardial oxygen consumption.		
46	It is very common after cardiac catheterization to have a stroke		
47	All interventions, nursing notes, and prosthetics located anywhere on the body must be documented in the patient's file		
48	The patient should be educated about the upcoming lifestyle changes after cardiac catheterization to reduce risks and complications		

عزيزتي الممرضة... عزيزي الممرض

بين يديك أستبانة خاصة بالبحث الموسوم

(تأثير البرنامج التعليمي ألتداخلي للقسطرة القلبية على معارف الممرضين في مركز كربلاء لأمراض وجراحة القلب والصدر)

اولا: المعلومات الديموغرافية

١. **العمر :** ☐ **سنة**

٢. **الجنس:**

١. ذكر ☐

٢. أنثى ☐

٣. **التحصيل الدراسي**

١. **خريج اعدادية تمريض** ☐

٢. **خريج معهد تمريض** ☐

٣. **خريج كلية تمريض/ بكالوريوس** ☐

٤. **دراسات عليا / ماجستير** ☐ **دكتوراه** ☐

٤. **عدد سنوات العمل في مجال التمريض .....**

٥. **عدد سنوات الخدمة في مجال القسطرة القلبية .....**

٦. **مكان العمل .....**

٧. **هل سبق لك المشاركة في دورات تدريبية حول إجراءات السلامة الخاصة بالقسطرة القلبية ؟**

نعم ☐ **لا** ☐

اذا كانت اجابتك بنعم فاذكر عدد الدورات .....

٨. **هل تتولى تطوير معارفك في حقل الاختصاص اعتمادا على ذاتك ؟ نعم** ☐ **كلا** ☐

في حال إجابتك بنعم فحدد مصادر تعلمك الذاتي:

١.الانترنت: مواقع التواصل الاجتماعي

٢.الانترنت: مواقع علمية رصينة

٣.استشارة الزملاء الممرضون

٤.استشارة الطبيب الاختصاص

٥.مكتبة المستشفى

٦. أخرى تذكر

ثانيا: معارف الممرضين للقسطرة القلبية في مركز كربلاء للقلب

ملاحظة: يرجى الاجابة بوضع علامة (✓) في المربع الذي يمثل اختيارك للإجابة الصحيحة.

الجزء ١: معارف الممرضين تجاه مفهوم القسطرة القلبية ودواعي إجراؤها	نعم	لا
عملية القسطرة القلبية عن طريق الشريان الفخذي أو العضدي هي الطريقة الاكثر شيوعاً		
القسطرة القلبية تعطي معلومات مهمه عن طبيعة عمل الاذين الايمن والايسر للقلب.		
من دواعي اجراء عملية القسطرة القلبية هو لتقييم وظيفة البطين الايمن للقلب.		
القسطرة القلبية يتم اجراؤها لتقييم وعلاج عمل صمامات القلب .		
يبقى الطرف الذي تم من خلاله اجراء القسطرة القلبية العلاجية ثابتاً لمدة ٦-٨ ساعات.		
عدم انتظام ضربات القلب يتم تقييمه وعلاجه في بعض الحالات عن طريق اجراء القسطرة القلبية .		
يمكن ان يزول الم الصدر مباشرةً بعد اجراء عملية القسطرة القلبية العلاجية .		
القسطرة القلبية العلاجية يتم من خلالها تحديد المكان المتضرر من عضلة القلب .		
تصوير الاوعية الدموية (الشرايين التاجية) (Angiogram) هو مصطلح طبي معناه الإجراءات الطبية لإجراء عملية القسطرة القلبية العلاجية.		
وضع فاولر(Fowler's position) هو المناسب للمريض على السرير بعد اجراء عملية القسطرة القلبية.		
القسطرة القلبية العلاجية يتم اجراؤها لتقييم امراض القلب الولادية.		
قسطرة القلب العلاجية هي مصطلح يصف مجموعة من الاجراءات التي تهدف الى استعادة عمل القلب للفترات الزمنية المقبلة.		
التفاعلات الوعائية المبهمة شائعة إلى حد ما ويمكن أن تحدث أثناء قسطرة القلب مما يؤدي إلى بطء في نبضات القلب فقط .		
يجب توثيق اي نوع من انواع الحساسية التي يعاني منها المريض قبل اجراء عملية القسطرة القلبية وابلاغ الفريق الطبي المتواجد في غرفة العمليات.		
الاصابة بالوذمة الرئوية بعد إجراء عملية القسطرة القلبية ربما تؤدي الى فشل عمل الاذين الايسر للقلب.		
لا يمكن اجراء عملية القسطرة القلبية التشخيصية والعلاجية معاً كونها تؤثر سلباً على عمل البطين الايسر.		
الجزء ٢ : معارف الممرضين حول الادوية والفحوصات التشخيصية للمرضى قبل وأثناء وبعد اجراء القسطرة القلبية .	**نعم**	**لا**
دواء كلوبيدوكريل 75 mg (clopidogrel) يقلل من الاصابة بالنوبات القلبية والجلطة الدماغية.		
يمكن بعد اسبوع واحد من اجراء عملية القسطرة القلبية اجراء فحص الكرياتينين في الدم		
مضادات التخثر تعمل بشكل مباشر وغير مباشر على مادة الفبرين لإذابة الجلطات (تحويل البلازمينوجين الى البلازمين وهو انزيم يهضم جلطة الفبرين).		
مضادات التخثر تعمل على تقليل مخاطر الاصابة بإحتشاء عضلة القلب فقط .		
اجراء الفحوصات المختبرية والشعاعية المطلوبة حول التغيرات الغير طبيعية في عمل القلب تجعل الطبيب المختص يفضل خيار التداخل القسطاري .		
فحص INR (International normalized ratio) يتم من خلاله تقييم خطورة توقف القلب المفاجئ أثناء عملية القسطرة القلبية .		
فحص اليوريا في الدم (blood urea) ضروري جداً أثناء اجراء عملية القسطرة القلبية .		
يجب إيقاف دواء (clopidogrel 75 mg) قبل اجراء عملية القسطرة القلبية بـ (٢٤) ساعة وبعدها بـ (٤٨) ساعة للمريض الذي يعاني من ألم الصدر وداء السكري.		

يجب اجراء فحص الـ(Troponin) فقط قبل اجراء عملية القسطرة القلبية.		
يجب على المريض عدم التوقف عن تناول علاج الـ(Metformin) قبل وبعد اجراء عملية القسطرة القلبية.		
الادوية المذيبة للتخثر (Thrombolytic) تعمل على ازالة التلف في انسجة عضلة القلب.		
من الادوية والمستلزمات الطبية التي يحضرها الممرض عند إزالة القسطار أو الغمد (Sheath) هو دواء الاتروبين (Atropine) 600mcg.		
اذا كان المريض غير مستقر صحياً بعد اجراء عملية القسطرة القلبية يجب عمل تخطيط القلب الكهربائي ومقارنته بالتخطيط السابق.		
اذا كان المريض غير مستقر صحياً بعد اجراء عملية القسطرة القلبية ويشكو من آلام في الصدر يجب اخبار الطبيب بذلك لإعطائه العلاج المناسب مثل O2 والمسكنات وغيرها.		
الجزء ٣ : معارف الممرضين المتعلقة بالعناية التمريضية المقدمة للمرضى قبل وأثناء وبعد اجراء القسطرة القلبية والمضاعفات المحتملة.	**نعم**	**لا**
يجب مراقبة العلامات الحيوية للمريض قبل وبعد اجراء عملية القسطرة القلبية.		
عند حدوث نزيف في مكان دخول القسطار على الممرض ان ينصح المريض بالضغط على المكان لمدة نصف ساعه .		
يجب على الممرض قياس العلامات الحيوية للمريض الغير مستقر بعد اجراء عملية القسطرة القلبية التشخيصية كل ٢٠ دقيقة لمدة ساعتين.		
عند إزالة القسطار أو الغمد (sheath) يتم اجراء ضغط مستمر على مكان دخول القسطار لمدة لا تقل عن ١٠ دقائق اذا كانت عملية القسطرة علاجية و١٥-٢٠ دقيقة اذا كانت عملية القسطرة تشخيصية.		
قياس ضغط الدم والنبض للمريض المصاب بداء السكري قبل وبعد اجراء عملية القسطرة القلبية.		
تشجيع المريض على القيام بالتنفس العميق بعد اجراء القسطرة القلبية، وهذه العملية سوف تزيد من حاجة القلب الى الاوكسجين ويقلل من ألم الصدر.		
قد يحدث عدم انتظام ضربات القلب المختلفة (عدم انتظام دقات القلب أو بطء القلب) أثناء قسطرة القلب التشخيصية أو العلاجية.		
يجب نصح المريض الذي أجرى عملية القسطرة القلبية التقيد بإستخدام حمية غذائية عالية الصوديوم لغرض تحسين عملية التقلص والانبساط في عضلة القلب.		
لمنع خطر حدوث نوبات في سكر الدم أو ارتفاع فيه خلال اجراء القسطرة القلبية للمريض المصاب بداء السكري على الممرض مراقبة الانسولين الموصوف عضلياً وابلاغ الطبيب في حالة حدوث تغيرات غير طبيعية.		
من المضاعفات الغير شائعه عند اجراء القسطرة القلبية هي حدوث الوذمه الرئويه .		
ان الهدف من تقديم العناية التمريضية قبل وأثناء وبعد اجراء عملية القسطرة القلبية هو لإزالة الم الصدر.		
المضاعفات التي ربما تحدث بعد ازالة القسطار أو الغمد (sheath) المتأخر هي حدوث سرعه في التنفس.		
يجب مراقبة العلامات الحيوية قبل اعطاء المريض الادوية الموصوفة بعد اجراء عملية القسطرة القلبية.		
من المضاعفات الغير شائعه عند اجراء القسطرة القلبية هي حدوث إحتشاء العضلة القلبية .		
يجب ان تشمل العناية التمريضية بالمريض قبل واثناء وبعد اجراء القسطرة القلبية الدعم النفسي لتقليل مستوى القلق والذي بدوره يزيد من استهلاك عضلة القلب للأوكسجين.		

من الشائع جدا بعد اجراء القسطرة القلبية الإصابة بالسكتة الدماغية.		
يجب توثيق كل التداخلات والملاحظات التمريضية والاطراف الصناعية الموجودة في أي مكان من الجسم في ملف المريض.		
يجب تثقيف المريض حول التغيير في نمط الحياة المقبلة بعد اجراء القسطرة القلبية لتقليل المخاطر والمضاعفات.		

خبراء تحكيم استمارة الاستبانة

ت	اسم الخبير	اللقب العلمي	الاختصاص	مكان العمل	سنوات الخبرة
١	د. سمير رزاق عليوي	أستاذ مساعد	تمريض صحة البالغين	كلية الصفوة الجامعة/ قسم التمريض	٤٦
٢	د. فخرية جبر محيبس	أستاذ	تمريض صحة البالغين	جامعة بابل/كلية التمريض	٤٠
٣	د.راجحة عبد الحسن حمزة	أستاذ	تمريض صحة البالغين	جامعة الكوفة/كلية التمريض	٣٨
٤	د.هدى باقر حسن	أستاذ	تمريض صحة البالغين	جامعة بغداد/كلية التمريض	٣٣
٥	د.فاطمة مكي محمود	أستاذ مساعد	تمريض صحة البالغين	جامعة كربلاء/كلية التمريض	٢٧
٦	د.سحر ادهم علي	أستاذ مساعد	تمريض صحة البالغين	جامعة بابل/كلية التمريض	٢٥
٧	د.عامر محمد غبيش	أستاذ مساعد	تمريض صحة البالغين	كلية الصفوة الجامعة / قسم التمريض	٢٤
٨	د.شذى سعدي محمد	أستاذ مساعد	تمريض صحة البالغين	جامعة بابل/كلية التمريض	٢٣
٩	د.حسن عبد الله عذبي	أستاذ مساعد	تمريض صحة البالغين	جامعة كربلاء/كلية التمريض	١٧
١٠	د.ضياء كريم عبد علي	أستاذ مساعد	تمريض صحة البالغين	دامعة العميد/كلية التمريض	١٤
١١	د.جهاد جواد كاظم	أستاذ مساعد	تمريض صحة البالغين	جامعة الكوفة/كلية التمريض	١٣
١٢	د.صادق عبد الحسين حسن	أستاذ مساعد	تمريض صحة البالغين	جامعة بغداد/كلية التمريض	١٠
١٣	د. حيدر إبراهيم علي	أستاذ مساعد	تمريض صحة البالغين	معهد الصحة العالي / دائرة صحة النجف	١١

الخلاصة

أي اجراء علاجي للقلب يرتبط بعدد من المخاطر الصحية. لكن بشكلٍ عام، لا ترتبط قسطرة القلب بأي مخاطر كبيرة. عوامل الخطر المرتبطة بالقسطرة القلبية نادرة، ويزداد خطر الاصابة بأمراض القلب التي تحتاج الى تداخل قسطاري لدى مرضى السكري أو أمراض الكلى أو الذين تزيد أعمارهم عن ٧٠ عاماً.

أجريت دراسة شبه تجريبية من الفترة ما بين ٢٧ أيلول ٢٠٢٠ الى ٢٠ تموز ٢٠٢١ لتقويم أثر البرنامج التعليمي التداخلي للقسطرة القلبية على معارف الممرضين في مركز كربلاء لأمراض وجراحة القلب والصدر. صمم الباحث البرنامج والادوات للوصول الى اهداف الدراسة وأختيرت مجموعه مكونه من ٥٠ ممرضاً بشكلٍ عشوائي للمشاركة في الدراسة الذين تم تقسيمهم الى مجموعة التداخل (٢٥) ممرضاً والذين تعرضوا للبرنامج التعليمي، والمجموعة الضابطة (٢٥) ممرضاً والذين لم يتعرضوا للبرنامج التعليمي.

تم تقييم أثر البرنامج التعليمي التداخلي للقسطرة القلبية من خلال استمارة استبيانيه تتضمن (٤٨) فقرة تتعلق بالقسطرة القلبية وتم تحديد صدق الاستبانة من لجنة من الخبراء وأيضاً تحديد الثباتية من خلال دراسة تجريبية . حللت البيانات بإستخدام الاحصاء الوصفي (التكرار، النسب المئوية، المتوسط الحسابي، الانحراف المعياري) والاحصاء الاستنتاجي لإبراز الفروقات العلمية بين مجموعتي التداخل والضابطة (اختبارt).

كشفت نتائج الدراسة أن البرنامج التعليمي يهدف الى تحسين معارف الممرضين بالقسطرة القلبية ويوضح ان هنالك اختلافات كبيرة ذات دلالة احصائية في معارف الممرضين المرتبطة عموماً بمجموعة الدراسة للقسطرة القلبية بين الاختبارات قبل وبعد البرنامج وهو أمر جيد.

وفقاً للنتائج فإن الممرضين لديهم الحد الادنى من المعرفة عن القسطرة القلبية ويحتاجون الى برامج وجلسات تعليمية.

أوصت الدراسة بوضع وتنفيذ برنامج تعليمي للممرضين عن القسطرة القلبية، مع التركيز على العناية التمريضية بقسطرة القلب وتشجيع الممرضين على المشاركة في البرامج التعليمية لتلبية احتياجاتهم من حيث العيوب والقيود في ممارستهم.

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة بابل
كلية التمريض

تأثير البرنامج التعليمي ألتداخلي للقسطرة القلبية على معارف الممرضين في مركز كربلاء لأمراض وجراحة القلب والصدر

رسالة مقدمة الى

مجلـــــس كلية التمريض جامعة بابل

كجزء من متطلبات نيل درجة الماجستير علوم في التمريض

من قبل

جواد بدر ياسين

بإشراف

أ.م.د. حسام عباس داود

تموز /2020 ميلادية ذو الحجة/ 1443 هجرية