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REVIEW OF ANEMIA: TYPES AND CAUSES

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Abstract:
One of the most prevalent public health issues, anemia can result in major health issues such stunted growth in children, slowed mental and psychomotor development, worse work performance, and increased susceptibility to parasite infections. Low socioeconomic position, dietary deficits, helminth infections and other infectious illnesses, illiteracy, and blood disorders are the causes of anemia. Iron deficiency, foliate deficiency, hookworm infection, and malaria are the main causes of anemia. About 50% of the two billion anemia cases worldwide are caused by iron deficiency. Treatment of the underlying causes, return of hemoglobin concentration to normal ranges, and prevention and treatment of consequences are among the cost-effective therapies against anemia.

Keywords: Anemia, Health Issues

INTRODUCTION:

Iron deficiency is believed to be the most common cause of anemia globally, but other nutritional deficiencies (including folate, vitamin B12, and magnesium) are also known to contribute to anemia. Anemia is a condition in which the number of red blood cells (and consequently their oxygen-carrying capacity) is insufficient to meet the body's physiologic needs. Specific physiologic needs vary with a person's age, gender, residential elevation above sea level (altitude), smoking behavior, and different. However, the concentration of haemoglobin should be measured, even though not all anemia is caused by iron deficiency(1). The prevalence of anemia is an important health indicator and when it is used with other measurements of iron status the haemoglobin concentration can provide information about the severity of iron deficiency (2). Anemia is highly prevalent in primary care consultations, pediatrics, and during pregnancy. Iron deficiency (ID) and iron deficiency anemia (IDA) are not the same. The latter is the most widespread cause of anemia in the world and is a serious health issue, particularly in developing nations. The IDA is so pervasive that it can impact up to 40% of elderly people who are cared for at home, as well as 5% of children and adolescents, 10% of premenopausal women, and 1% of males. Clinical recommendations on how to manage anemia generally and/or anemia during pregnancy are available from the majority of health services (3, 4).

Types of Anemia

Anemia may be broken down into several forms and categories. Anemia can be caused by a number of red cell defects, including those that affect red cell production (aplastic anemia), maturation (megaloblastic anemia), haemoglobin synthesis (iron deficiency anemia), genetic maturation defects (thalassaemia), or physical loss of red cells (haemolytic anemias) (5).

1. Iron-Deficiency Anemia

Iron is necessary for several bodily processes, including the formation of hemoglobin. Anemia caused by a lack of iron in the blood is known as iron deficiency anemia. Teenagers and women in the premenopausal stage of life are more likely to have this kind of anemia. This condition can be exacerbated by excessive blood donation, internal bleeding from the gastrointestinal tract, and significant menstrual bleeding. Anemia, which is caused by a low amount of iron, can have many different reasons. Pregnancy or childhood growth spurts are the main causes of anemia due to iron shortage, heavy menstrual cycles, inadequate iron absorption, gastrointestinal bleeding, dietary variables (iron deficiency or a limited diet), medicine (aspirin, ibuprofen, naproxen, and diclofenac), and other causes lack of some vitamins (such as vitamin B12 and folic acid), the kidney is bleeding, Bone marrow issues, red blood cell issues, and hookworm infection(6).

2. Pernicious anemia

The most typical cause of a vitamin B12 deficiency is pernicious anemia. The B12 vitamin is necessary for survival. The body needs it to create new cells, such as the many red blood cells that are created daily. Meat, fish, eggs, and milk are all good sources of vitamin B12. Anemia is brought on by a shortage of vitamin B12, and occasionally other issues as well. Anemia can be brought on by a B12 deficiency, which is a lack of the vitamin. Typically, pernicious anemia

appears after age 50. Men are less likely to be afflicted than women, and it usually runs in families. People with other autoimmune disorders are more likely to experience it. The absorption of vitamin B12 may also be affected by several medications. The most typical examples include anticonvulsants used to treat epilepsy, metformin, colchicine, and neomycin (7).

3. Haemolytic Anemia

In hemolytic anemia, red blood cells are taken from the circulation and destroyed before they reach the end of their usual life cycle. People of all ages, races, and sexes can develop hemolytic anemia. Fatigue, discomfort, arrhythmias, an enlarged heart and heart failure, hereditary spherocytosis, hereditary elliptocytosis, glucose-6-phosphate dehydrogenase (G6PD) deficiency, and pyruvate kinase insufficiency are just a few of the health issues that can result from hemolytic anemia. Immune hemolytic anemia, autoimmune hemolytic anemia, alloimmune hemolytic anemia, drug-induced hemolytic anemia, mechanical hemolytic anemias, paroxysmal nocturnal hemoglobinuria, and others are acquired hemolytic anemias. Haemolytic anemia can also be brought on by specific illnesses and drugs (8).

4. Sickle cell anemia

Sickle Cell anemia is a kind of anemia where the body produces sickle-shaped ("C") red blood cells. It contains aberrant hemoglobin that has a sickle shape and makes it difficult for the blood to flow through blood vessels. Sickle cell clusters obstruct blood flow to the limbs and organs. Organ damage, severe infections, and discomfort are all results of blocked blood arteries. Sickle cells typically expire after 10 to 20 days, and because the body cannot make enough red blood cells to replace the ones that are dying, anemia results.

5. Thalassaemia

An genetic blood illness called thalassaemia results in the body producing fewer healthy red blood cells and less hemoglobin. Alpha- and beta-thalassaemia are the two main forms of thalassaemia. The most severe type of beta thalassaemia is known as Cooley's anemia, while the most severe form of alpha thalassaemia is known as alpha thalassaemia major or hydrops fetalis. Both men and women can have thalassemias, which are most prevalent in persons of Italian, Greek, Middle Eastern, Asian, and African origin. Alpha and beta globin are the two different types of protein chains that make up hemoglobin in red blood cells. Red blood cells can't develop properly and can't carry enough oxygen if your body doesn't produce enough of these protein chains. The body's production of haemoglobin protein chains is governed by genes. Thalassaemias develop when these genes are absent or changed. Thalassemias are inherited genetically from parents to their offspring (9).

6. Aplastic Anemia

Aplastic anemia is a blood condition when the bone marrow of the body fails to produce enough new blood cells. Numerous health issues, including as arrhythmias, an enlarged heart, heart failure, infections, and bleeding, might be brought on by this. Aplastic anemia is brought on by damage to the stem cells in the bone marrow (10). Aplastic anemia can be brought on by a variety of acquired illnesses, disorders, and circumstances, including toxins like benzene, arsenic, and pesticides. chemotherapy and radiotherapy, Infectious disorders include hepatitis, Epstein-Barr virus, CMV, parvovirus B19, and HIV, medications like chloramphenicol, such as lupus and rheumatoid arthritis, are autoimmune diseases. Aplastic anemia can also be brought on by inherited disorders such Fanconi anemia, Shwachman-Diamond syndrome, dyskeratosis, and Diamond-Blackfan anemia. Aplastic anemia's most typical symptoms are fatigue, shortness of breath, dizziness, headache, cold hands or feet, pale skin, gums, and nail beds, and chest pains. Blood transfusions, bone marrow stem cell transplants, and medicines are all used to treat aplastic anemia. These therapies can lessen symptoms, reduce problems, and enhance quality of life. Transplants of blood and marrow stem cells might treat the condition (11).

Cancer-Related Anemia

Cancer invasion (anemia consequent to cancer, or ASC), cancer treatment (radiation- or chemotherapy-induced anemia, or CIA), or chronic kidney disease (CKD) can all be primary causes of cancer-related anemia (CRA). The invasion of normal tissues by the malignancy, which results in blood loss, marrow infiltration, which prevents the formation of red blood cells, or inflammation, which causes functional iron shortage, are the direct causes of ASC. Myelosuppressive chemotherapy, often known as CIA, can cause anemia whether given alone or in conjunction with radiation therapy. Most older cancer patients will have CKD, which can be caused by chemotherapy, age-related deterioration, or renal impairment from tumor invasion.

Although patients may have multiple of the aforementioned contributing reasons for anemia, the formation, degradation, or loss of red blood cells (RBCs) is always the root cause of CRA (12,13).

Reduced erythropoiesis caused by a variety of causes is the main cause of ASC, CIA, and CKD. Reduced erythropoietin (Epo) production as a result of acute kidney injury or CKD (14, 15), iron, folate, and vitamin B12 nutritional deficiencies, or damage to the bone marrow as a result of bone metastases, myelodysplasia, or myelosuppressive chemotherapy (16, 17) are a few examples.Patients with thymoma, leukemia, or lymphomas may experience pure red cell aplasia as a result of tumor-associated cytokines or, less frequently, as a result of the development of anti-Epo antibodies following the administration of exogenous Epo (18).

Additionally, anemia is a common presenting symptom in individuals with malignancies derived from hematopoietic progenitors or precursors (i.e., acute and chronic leukemias). This may be partially caused by bone marrow blast cell hyperproliferation, which "crowds out" the non-malignant cell population and prevents normal erythroid blast-forming units and islands from interacting with stem cell factor and bone marrow stromal cells, which is thought to be necessary to maintain their differentiation, growth, and division (19,20). Additionally, by inhibiting c-kit-dependent phosphorylation

and the intracellular interaction between c-kit and the tyrosine kinase domain of the erythropoietin receptor, mutations in or therapy-related inhibition of the intracellular domain of c-kit (CD117) may also contribute to reduced erythropoiesis (21,22).

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