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**(Effect of Vitamin C on patients with Iron deficiency  
anemia due to H.pylori gastritis)**

A project report submitted in partial fulfillment of the requirements for the degree of bachelor in pharmacy.

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

((اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ \* خَلَقَ الْإِنْسَانَ مِنْ عَلَقٍ \* اقْرَأْ وَرَبُّكَ الْأَكْرَمُ \* الَّذِي عَلَّمَ

بِالْقَلَمِ \* عَلَّمَ الْإِنْسَانَ مَا لَمْ يَعْلَمْ\*))

الى من يهدي دماه الزكيه بكفه القدسيه ليقدما لنا مدادا نكتب  
به علما ننتفع به وينتفع به غيرنا ..

الى الشهداء ..

شهداء الحشد الشعبي والمقاومة ...

-الله جل وعلى ،شاهدا انك سبحانك لا اله الا انت،ولا معطي ولا مجزل غيرك ...

- للوالده الكريمه والطيبه التي لا طالما ومازالت تدعو لي بدوام التوفيق والسداد ...

-السيد الوالد أدام الله بقاءه عسى ان يكون شكري له نقطة من رد بحر جوده وكرمه ...

-الدكتوراه الكريمه والمشرفه زمن ابراهيم الكعبي شاكرا نصائحها وإرشاداتها التي كانت لي  
صراطا أمضي عليه للوصول الى النجاح...

-ولكل من ابدى اليّ مساعده في رحلة دراستي المتعبه سائلا الله ان يجزيهم الجزاء الاوفى ...

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## 1-H. pylori gastritis:

### A) Definition:

*Helicobacter pylori* are a gram-negative, microaerophilic bacterium found usually in the stomach. It was identified in 1982 by Australian scientists Barry Marshall and Robin Warren, who found that it was present in a person with chronic gastritis and gastric ulcers, conditions not previously believed to have a microbial cause. It is also linked to the development of duodenal ulcers and stomach cancer. However, over 80% of individuals infected with the bacterium are asymptomatic, and it may play an important role in the natural stomach ecology. (1)(2)

### B) Causes:

- 1) An infection with the bacteria *Helicobacter pylori* (*H. pylori*).
- 2) Long-term use of non-steroidal anti-inflammatory drugs (NSAIDs), such as aspirin and ibuprofen.
- 3) Rarely, cancerous or noncancerous tumors in the stomach, duodenum, or pancreas.

### C) Signs and symptoms:

A dull or burning pain in the stomach is the most common symptom of peptic ulcer disease. A person can feel this pain anywhere between the navel and the breastbone. The pain usually occurs when a person's stomach is empty—such as between meals or during the night lessens briefly after eating food or taking antacids lasts for minutes to hours comes and goes for several days, weeks, or months.

-Iron-deficiency anemia: is anemia due to not enough iron. Anemia is defined as a decrease in the amount of red blood cells (RBCs) or hemoglobin in the blood. (3)(4)

Other, less common symptoms include:

    bloating

    burping

    changes in appetite

    weight loss

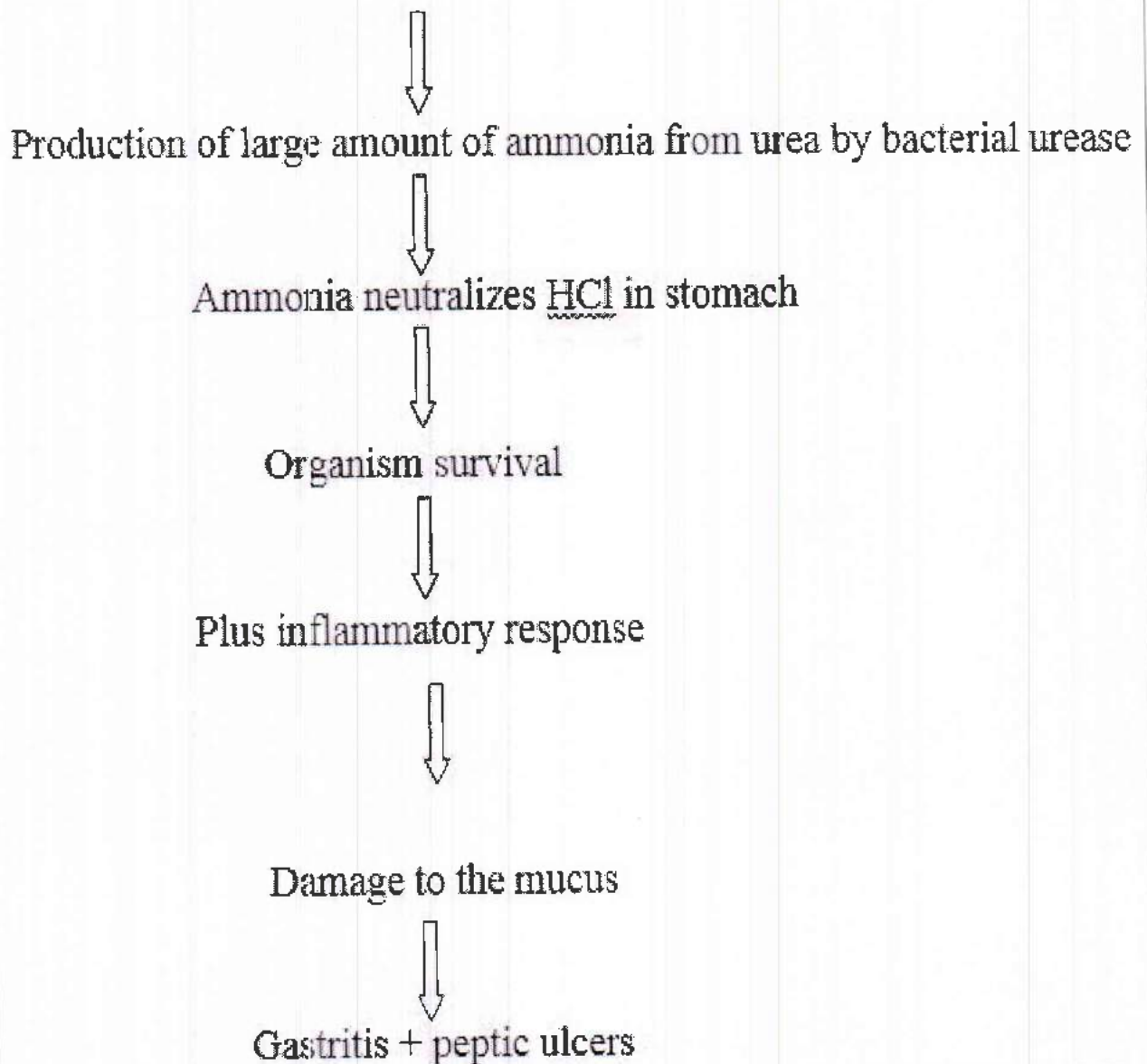
    nausea

    Vomiting.

## D) Pathogenesis:

- protease → Breakdown mucous → expose epithelium for digestion + urea.
- urease → Breakdown urea → ammonia → neutralize acid → reflex → hyperacidity.
- Chronic inflammation → Gastric metaplasia → Ulceration.
- Complications: Bleeding, perforation, stenosis, carcinoma.

Organism attached to the mucus – secreting cells of gastric mucosa



## E) Treatment and prevention:

The standard first-line therapy is a one-week "**triple therapy**" consisting of proton pump inhibitors such as **omeprazole** and the antibiotics **clarithromycin** and **amoxicillin**.(5)

Or replacing amoxicillin with **metronidazole** for people who are allergic to penicillin.(6)

An increasing number of infected individuals are found to harbor antibiotic-resistant bacteria. This results in initial treatment failure and requires additional rounds of antibiotic therapy or alternative strategies, such as a **quadruple therapy**, which adds a bismuth colloid, such as **bismuth subsalicylate**.(7)(8)(9) For the treatment of clarithromycin-resistant strains of *H. pylori*, the use of levofloxacin as part of the therapy has been suggested.(10) (11)

No one knows for sure how *H. pylori* infection spreads, so prevention is difficult. However, to reduce the chances of infection, health care providers generally advise people to:

- 1) Wash their hands with soap and water after using the bathroom and before eating.
- 2) make sure that they or those who prepare the food they eat have washed and cooked it properly.
- 3) Drink water from a clean, safe source.



\*\*There is no complete recovery from H.pylori because:

-Miss diagnosis.

-H.Pylori embedded in the gastric mucosa.

-patient incomppliance and treatment is discontinued.

## **2-Vitamin C:**

Vitamin C is a water-soluble vitamin that is necessary for normal growth and development. It is an antioxidant that helps maintain the connective tissue protein collagen, protects against infection, and helps iron absorption. (12)

Vitamin C (ascorbic acid), which is necessary in the body to form collagen in bones, cartilage, muscle, and blood vessels and aids in the absorption of iron. Dietary sources of vitamin C include fruits and vegetables, particularly citrus fruits such as oranges. (13)(14) Vitamin C should be consumed every day because it is not fat-soluble, therefore, cannot be stored for later use.

It is a critical component of both disease prevention and of basic body building processes. The benefits of Vitamin C include:

- Allergy and asthma relief.
- Cancer prevention.
- Diabetes control.
- Immune system booster.
- Neurotransmitter and hormone building.
- protect against infections such as Mycobacterium

*Tuberculosis* is highly susceptible to killing by vitamin C.

### **3- Relationship between Iron deficiency and H.pylori gastritis:**

Several mechanisms have been hypothesized to explain the possible effect of H. pylori infection on iron stores. A more likely mechanism is decreased iron absorption from hypo- or achlorhydria resulting from chronic gastritis. Gastric hydrochloric acid facilitates iron absorption by reducing non-heme iron from the ferric to ferrous form. (15)

Persons with H. pylori infection and IDA appear more likely to have corpus gastritis, Corpus gastritis results in decreased gastric acid secretion and increase in intragastric pH that may impair iron absorption. (16)

Another important effect of H. pylori gastritis that may cause reduced iron absorption is a decrease in gastric juice ascorbic acid concentration.

Ascorbic acid facilitates iron absorption by reducing iron to the ferrous form. (17)

Another mechanism hypothesized to explain decreased iron absorption associated with *H. pylori* infection is increased hepcidin production from hepatocytes in response to IL-6 production associated with *H. pylori* gastritis. (18) These physiological effects may be clinically relevant; *H. pylori* infected persons have been shown to have decreased oral iron absorption as compared to uninfected persons.

Another hypothesized mechanism to explain an association between *H. pylori* infection and iron deficiency is uptake of iron by the *H. pylori* organism. Like many bacteria, *H. pylori* require iron as a growth factor, and it possesses a 19-kDa iron-binding protein resembling ferritin (Pfr), that may play a role in storage of excessive iron by the bacteria. (19)

The last possible mechanism by which *H. pylori* could result in decreased availability of iron is sequestration of iron in lactoferrin in the gastric mucosa. *H. pylori* take up iron from human lactoferrin through a receptor-mediated method (20) (21). And lactoferrin secretion in the gastric mucosa appears to be influenced by the *H. pylori* organism. (22)(23) Lactoferrin may play a role in IDA, since gastric mucosa lactoferrin levels have been shown to be significantly higher in *H. pylori*-positive IDA persons compared to persons who are non-anemic *H. pylori*-

negative, no anemic *H. pylori*-positive, and *H. pylori*-negative with IDA.(22)

#### **4-Relationship between Vit.C and Iron deficiency gastritis:**

Gastritis, whether associated with autoimmune process, chemical injury or infection with *H. pylori* underlies the development of peptic ulcer disease and gastric cancer. Ascorbic acid plays a key role in healing and protection of the gastric mucosa from injurious insults. Vitamin C deficiency has repeatedly been linked with peptic ulcer disease and its complications. Its role in scavenging free radicals and reducing the inflammatory cascade, particularly in *H. pylori* induced gastritis, play a major preventive role in reducing the consequences of gastric inflammation including in reducing the deleterious effects of reactive oxygen species and NOC.

Ascorbic acid supplementation has been associated with a decreased incidence of bleeding from peptic ulcer disease and with a reduction in NSAID-associated gastric mucosal damage. Pharmacologic doses of ascorbic acid also may improve the effectiveness of *H. pylori* eradication therapy.

#### **5- Summary:**

This study is an attempt to find a relationship Effect of Vitamin C on patients with Iron deficiency anemia due to *H.pylori* gastritis. And there

are a lot of studies that are still studying these effects as well as other factors.

*Helicobacter pylori* may cause iron deficiency anemia (IDA) by defined mechanisms previously mentioned during research, Gastric acidity and ascorbic acid (AA) promote iron absorption. AA is lowered in the presence of *H. pylori* infection. Patients with IDA and *H. pylori* gastritis were characterized by concomitant increased intragastric pH (median value 7) and decreased intragastric Ascorbic acid (median value 4.4  $\mu\text{g/ml}$ ) compared with controls with a healthy stomach (median pH 2; median intragastric Ascorbic acid 17.5  $\mu\text{g/ml}$ ). The concomitant occurrence of these two alterations may plausibly account for impaired iron absorption and consequent IDA in patients.

From the above one of the important relation between Iron deficiency , *H. pylori* gastritis and ascorbic acid we can propose inclusion vitamin C in appropriate doses with in treatment using in *H. pylori* eradication and to increase the absorption of iron which effected by gastritis and peptic ulcer.

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