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Review Paper

Omeprazole Delayed Release Tablets and Herbal Interventions (*Aloe barbadensis* Miller & *Zingiber officinale*): A Review on Safety Enhancement

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ABSTRACT

Ulcer may cause due excess secretion of HCl from parietal cell via hyperactivity of H^+/K^+ -ATPase enzyme, in which damage the mucosal cell cause bleeding.[1] This study was conducted to evaluate the preventable effect of aloe vera, zingiber and mixture of omeprazole. phyto-genic agent have traditionally been used by herbal ingredient for the prevention and treatment of peptic ulcer.[2] this type of combination drug reduce the side effect of PPIs (Omeprazole) among herbal drug, aloe vera and zingiber officinale have used extensively and their clinical effect documented.[1,2] An ulcer may result from excessive HCl production from the parietal cell due to hyperactivity of the H^+/K^+ -ATPase enzyme, which damages the mucosal cell and causes bleeding.[4] The purpose of this study was to assess the preventable effects of a combination of omeprazole, zingiber, and aloe vera.[6] Herbal ingredients have long been utilized as phyto-genic agents to prevent and treat peptic ulcers. Aloe vera and zingiber officinale are herbal remedies that have been widely utilized and their clinical effects recorded; this sort of combination medication lessens the negative effects of PPIs (omeprazole).[7] A number of plant ulcers are also used in ethnomedical systems. This article examines medicinal plants that have phytochemicals with antiulcer and gastroprotective properties.[9]

INTRODUCTION

The Old French word *ulcere*, which is derived from the Latin word *ulcus*, which means "ulcer," is where the word ulcer originally appeared around 1200 CE. Additionally, the word came from

French and crossed the English Channel.^[11] Ulcer means "painful spot, When the natural balance is upset by either increased aggression or decreased mucosal resistance, ulceration results. The pathophysiology of stomach ulcers is linked to multiple factors.

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Pain relief, ulcer healing, and ulcer recurrence prevention are the ideal goals of peptic ulcer disease treatment.^[12,13]

An imbalance between gastric offensive factors—such as acid, bile salts, pepsin secretion, *H. pylori*, ethanol, NSAIDs, nitric acid oxide, and lipid peroxidation—and protective factors—such as blood flow, prostaglandins, glycoproteins, mucosal cell shedding, mucin secretion, and antioxidant enzymes like superoxide dismutase—causes peptic ulcers.^[16,17]

2 Types

- Gastric peptic ulcer
- Duodenal peptic ulcer

2.1 Gastric peptic ulcer –

A gastric ulcer is a rupture in the stomach lining's mucosa that extends more than 5 mm in diameter and passes through the muscularis mucosa. Changes in the stomach's defensive mechanisms might lead to changes in the gastric mucosa, which can ultimately induce erosion and ulceration.^[19]

2.2 Duodenal peptic ulcer

When the surface of the duodenum's mucosa is disturbed, duodenal ulcers develop. The stomach and the first segment of the duodenum are affected

by peptic ulcer disease, which includes these ulcers. In this exercise, the assessment and management of duodenal ulcers are reviewed, and the function of the interprofessional team in enhancing patient care is explained.^[20]

3. cause

There are major cause of peptic ulcer –

- *H pyloric* bacteria
- Non stroidal Anti-inflammatory drug (NSAIDs)
- Other factor
 - Smoking
 - Caffeine
 - Alcohol
 - Stress

3.1 *H pyloric* bacteria

Most ulcers are now thought to be caused by *H. pylori* (Cover & Blaser, 1992). The stomach contains the *H. pylori* bacteria, which, when combined with acid production, can harm the stomach and duodenum's tissue, resulting in inflammation and ulcers. A bacterium called *Helicobacter pylori* inhabits the digestive system's mucous membranes. *H. pylori* has been identified as the cause of 70% of all gastric ulcers and 95% of all duodenal ulcers.^[22]

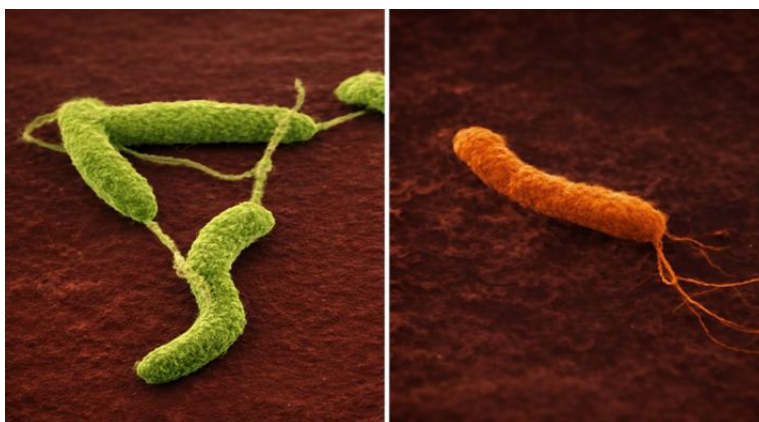


Figure 3.1 *Helicobacter pylori* bacteria

3.2 Nonsteroidal anti-inflammatory drug (NSAIDs)

Numerous medications can irritate the stomach lining and result in ulcers, including aspirin, other

NSAIDs, and corticosteroids. The majority of NSAID and corticosteroid users do not have peptic ulcers.^[25] However, some doctors advise against using an older class of NSAIDs in favor of coxibs

(COX-2 inhibitors), which are less likely to irritate the stomach, for those who are at high risk of developing peptic ulcers.^[25]

Table 3.1 Peptic ulcer risk by specific NSAIDs

Lowest Risk	Midium Risk	Highest Risk
- Nabumetone (Relafen) - Etodolac (Lodine) - Salsalate - Sulindac (Clinoril)	- Aspirin. Even low-dose aspirin (81 mg) used to protect the heart may pose some risk (although lower than standard doses). - Ibuprofen (Motrin, Advil, Nuprin, Rufen) - Naproxen (Aleve, Naprosyn, Naprelan, Anaprox) - Diclofenac (Voltaren) - Tolmetin (Tolectin)	- Flurbiprofen (Ansaid) - Piroxicam (Feldene) - Fenoprofen - Indomethacin (Indocin) - Meclofenamate (Meclomen) - Ketoprofen (Action, Orudis KT)

3.3 Other factor

May also increase a person risk for ulcer for example. Smokers are more likely to develop an ulcer and also more likely to die from the complication of an ulcer.^[27]

The stomach is protected from ulcers by gastric mucus, the stomach's surface cells, bicarbonate ions (which neutralize acid), and substances called prostaglandins. Stress ulcers can also be caused by ischemia, reduced mucosal blood flow, acid, free radicals, Prostaglandin, glucose, angiotensin II, nicotine, thyrotropin-releasing hormone (TRH), and salts of bile.^[28] A few more causes exist in addition to these, including:

- **Smoking** -Cigarette smoking has been linked to an increased risk of ulcers, according' p=;]= to studies. Additionally, smoking promotes ulcer recurrence and hinders the healing of pre-existing ulcers.^[28]
- **Caffeine** - Beverages and foods that contain caffeine can stimulate acid secretion in the stomach. This can aggravate an existing ulcer,

but the stimulation of stomach acid can't be attributed solely to caffeine.^[28]

- **Alcohol** - No direct correlation has been established between alcohol use and peptic ulcers; nonetheless, ulcers are more prevalent among individuals with cirrhosis of the liver, a condition frequently associated with excessive alcohol intake.^[28]
- **Stress** - Although it is no longer believed that emotional stress causes ulcers, those who are under emotional stress frequently claim that their pre-existing ulcers hurt worse. On the other hand, physical stress is distinct. It may make ulcers more likely to occur, particularly in the stomach. People with injuries like severe burns and those undergoing major surgery are two examples of physical stressors that can result in ulcers.^[28]

As shown below, ulcerogens have mostly targeted acid secretion and disruption of mucosal defense (Figure 1.4 & 1.5). Understanding the physiological control in stomach cells becomes



evident prior to comprehending their targeted involvement during ulcerogenesis. Since H^+ , K^+ -ATPase, and mucosal defense have been essential

for regulating.^[28]

The following is a detailed illustration of the stomach defense.

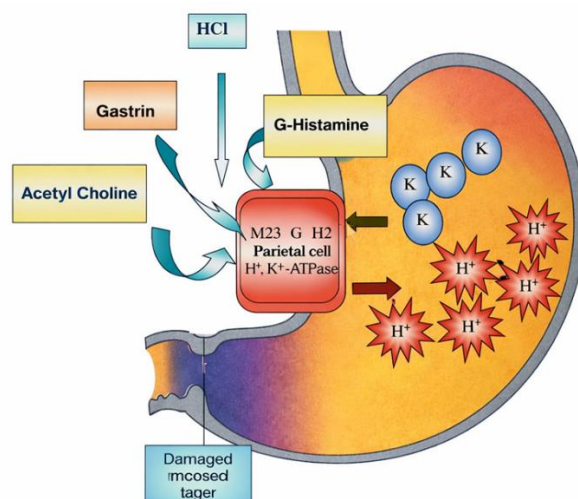


Figure 3.1 Dysregulation of parital cellular activity result in acidity

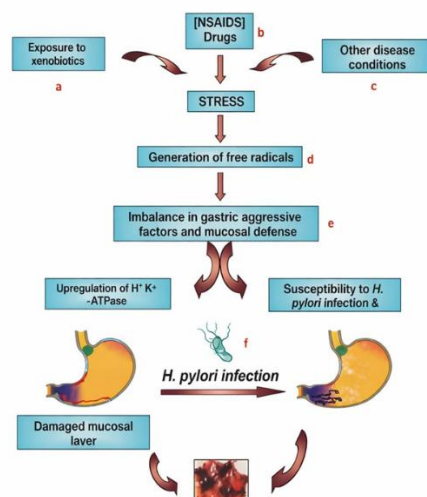


Figure 3.2 -scheme of induction of ulcerogenicity

4. Diagnosis of Ulcer

Diagnosis can be made by series of tests including physical examination and different diagnosis.^[30]

Physical examination - Epigastric tenderness is the most frequent finding in patients with gastric or duodenal ulcer. Physical examination is critically important for discovering evidence of ulcer complications. Tachycardia and orthostasis suggest dehydration secondary to vomiting or active gastrointestinal blood loss. A severely

tender, board like abdomen suggests a perforation.^[29]

Endoscopy offers the most accurate and focused method for assessing the upper gastrointestinal tract (Figure 1.10). Endoscopy facilitates tissue sampling and photographic documentation of a mucosal defect in addition to allowing direct sight of the mucosa.^[29]

exclude *H. pylori* or cancer. When evaluating unusual radiographic abnormalities, detecting lesions too small to be detected by radiographic examination, or determining whether an ulcer is

the cause of blood loss, endoscopic examination is especially.^[29]

useful. A urease test in the biopsy samples is part of the diagnostic process for *H. pylori*, but it has a

sensitivity and specificity of >90 to 95%. Several noninvasive techniques for identifying *H. pylori* have been developed in an effort to diagnose this infection without the need for endoscopy.^[29]

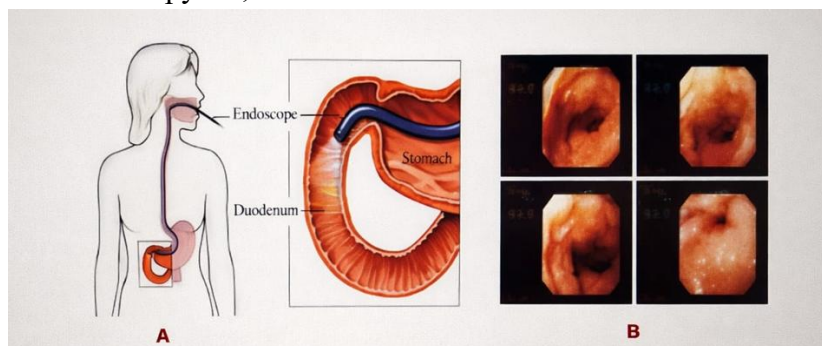


Figure 4.1 picture depicting endoscopy

5. Effects of different PPIs on the parietal cell

Omeprazole, a benzimidazole derivative, was the first PPI to be used in clinical settings. Rabeprazole, pantoprazole, and lansoprazole are further benzimidazole PPIs that were later introduced. Each of these substances is made up of two heterocyclic components connected by a methyl sulfinyl group: a pyridine and a benzimidazole moiety.^[1]

Omeprazole transforms into a sulfenamide analogue when acid is present, and this analogue inhibits the ATPase irreversibly by creating a covalent disulfide link with an essential sulfhydryl group in the active site. Esomeprazole, the enantiomerically pure S-isomer, is sold separately under the brand name Nexium.^[1]

Mode Of Action

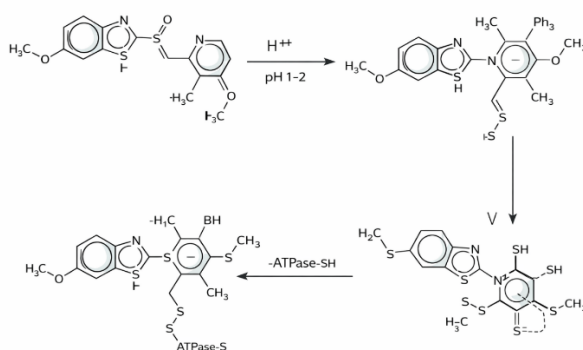


Figure 1.13. Action of omeprazole

6. Plant Profile

• Aleo vera

Family name: *Liliaceae*
Common name: Aloe vera
Origin: It is perennial plant native to mediterranean and

african countries. it is cultivated in cyprus, india, malta and sicily

Parts used: Leaf
Active constituent: Saponin, barbaloin, isobarbaloin
Traditional uses: Its gel is used in preparation of

beverages, lotions and cosmetics such as shampoos, razors, moisturizers, soaps, sunscreens and makeup
 Roles in human body: Detoxification, laxative, wound healing, skin burns care, antiulcer, cytoprotective, anti-fungal, hepatoprotective, immunostimulator, mucus secreting and anti-diabetic.^[30]

• **Zingiber officinale**

Common name: Ginger
 Family name: *Zingiberaceae* (Ginger family)
 Parts used: Rhizome
 Active constituents: Gingerols (especially 6-gingerol), Shogaols, Zingerone
 Traditional use: Relief of nausea and vomiting (motion sickness, pregnancy-related nausea), Treatment of colds and cough, Digestive aid (indigestion, bloating, flatulence), Anti-inflammatory remedy for joint pain.
 Roles in the human body: Stimulates digestive enzymes and improves gut motility, Acts as an anti-inflammatory by inhibiting prostaglandins and leukotrienes, Antioxidant activity (reduces oxidative stress).^[30]

CONCLUSION

Peptic ulcers are gastrointestinal disorders caused by an imbalance between defensive forces such as prostaglandins, bicarbonate production, gastric mucus, and intrinsic resistance of the mucosal cell actors and aggressive factors like acid, pepsin, and *Helicobacter pylori*.^[35] This article discusses medications made from plants, such as tannins and flavonoids, to treat peptic ulcers. It is clear that plant extracts have strong antiulcer effects in animal models. A survey of medicinal plants that may have anti-ulcer properties is presented in this

article. Around the world, *Allophylus serratus*, *Zingiber officinalis*, *Aloe vera*, and other medicinal plants are widely used to cure ulcers.^[35]

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