

## Research Article

### Etiology, pathophysiology, diagnosis and management of Ulcer

Gayatri Kokane and Kundan Tiwari\*

SMBT Institute of Diploma Pharmacy, Nandi-Hills Dhamangaon, Nashik-422403, India.

#### ARTICLE INFO

#### ABSTRACT

Article history:  
Received: 18/02/2022;  
Revised: 21/01/2022;  
Accepted: 24/02/2022.

**Key Words:**  
NSAIDs, Peptic ulcer,  
PUD, stomach.

**Please cite this article as:**  
Tiwari, K.J. et al.  
Etiology,  
pathophysiology,  
diagnosis and  
management of Ulcer.  
4(1), 020- 023.

Peptic ulcer disease usually occurs in the stomach and proximal duodenum. The predominant causes in the United States are infection with *Helicobacter pylori* and use of nonsteroidal anti-inflammatory drugs. Symptoms of peptic ulcer disease include epigastric discomfort (specifically, pain relieved by food intake or antacids and pain that causes awakening at night or that occurs between meals), loss of appetite, and weight loss. A stomach ulcer, also known as a gastric ulcer, is a sore or lesion that develops in the lining of the stomach. It can occur in the upper part of the intestine. Ulcer can be treated by many ways of treatment. Peptic ulcer is a chronic disease affecting up to 10% of the world's population. The formation of peptic ulcers depends on the presence of gastric juice pH and the decrease in mucosal defenses. Non-steroidal anti-inflammatory drugs (NSAIDs). A stomach ulcer, also known as a gastric ulcer, is a sore or lesion that develops in the lining of the stomach. It can occur in the upper part of the intestine. Ulcer can be treated by many ways of treatment, but I want to switch over Home remedies by our daily using substances.

©2022 Published by International Journal of PharmaO<sub>2</sub>. This is an open access article.

\*Corresponding author: e- mail: [tiwarikundan236@gmail.com](mailto:tiwarikundan236@gmail.com)

## INTRODUCTION

India has immeasurable varieties of tropical plants. Native Indians possess a long tradition of Kabiraji medicine utilizing such medicinal plants. The Indian Medicine Central Council Act 1970 recognizes Ayurvedic medicine. The World Health Organization also sponsors and encourages research in Ayurvedic treatments. The use of herbal medicine can be traced back to China about 5000 years ago. Extracts of several plants have been used as therapeutic agents for many diseases by virtue of their antioxidant actions. Spices and herbs are recognized sources of natural antioxidants, many of which are phenols and aromatic amines. These can act at different levels by decreasing local oxygen concentrations, decreasing superoxide formation, preventing chain initiation, metal-induced free radical generation, and lipid peroxidation. However, despite the large varieties of such plants grown in India, a minimal number has been thoroughly studied for all aspects of their potential therapeutic value in medicine (Harish K

& Shamena Begam J, 2016). A growing body of evidence suggests that at least part of the therapeutic values may be contributed by their antioxidative property. These natural antioxidants may therefore contribute to protect the human body from several diseases including gastric ulcer. Clinical research has confirmed the efficacy of several medicinal plants for the treatment of gastric disorders, and basic scientific research has uncovered many of the mechanisms to explain their therapeutic effects. Gastric ulcer is a common disease, where the gastric mucosa gets damaged and perforations lead to bleeding. A report of the Indian Council of Medical Research on the epidemiology of gastric ulcer in India showed that the overall prevalence rate of the disease ranged from 1 to 6.5 per thousand in the age group of 15 years and above in a selected urban population. Mahadeva and Goh have extensively studied and reported the epidemiology of this disease (Peter Malfertheiner 2020a, Fahrur Nur Rosyid 2017b, Ananya Chatterjee 2014c).

Ulcers are caused by an infection of a bacterium known as *Helicobacter pylori* or *H. pylori*. Eradication of HP infection alters the natural history of peptic ulcer disease. Successful eradication reduces PUD recurrence rate from 90% to < 5% per year. PUD generally does not recur in the successfully treated patient unless nonsteroidal anti-inflammatory drug (NSAID) use is Present. (Lucija Kuna *et al* 2019a, Amanda Siu *et al* 2015b),

Peptic ulcer occurs in that of the gastrointestinal tract which is exposed to gastric acid and pepsin, i.e. the stomach and duodenum. The etiology of peptic ulcer is not clearly known. It results probably due to an imbalance between the aggressive (acid, pepsin, bile and *H. pylori*) and the defensive (gastric mucus and bicarbonate secretion, prostaglandins, nitric oxide, high mucosal blood flow, innate resistance of the mucosal cells) factors. A variety of psychosomatic, humoral and vascular derangements have been implicated and the causative role of *Helicobacter pyloro* infection in

**Signs and Symptoms** (Harish K & Shamena Begam J, 2016a, Michael Buenor Adinortey *et al* 2013b, Kalyanakrishnan Ramakrishnan, 2007c)

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. Other, less common symptoms include; bloating, burping, changes in appetite, nausea, vomiting and weight loss.

Abdominal pain in patient with PUD is classically described as gnawing or burning, non-radiating, epigastric pain, which occurs 2-3 hours after meals (when stomach is empty) or at night. The pain is relieved with food or antacids. However, less than 50% of patients with those symptoms are actually found to have peptic ulcer disease. The most discriminating symptom of pain awakening the patient from sleep between 12-3 a.m. affects 2/3 of duodenal ulcer patients and 1/3 of gastric ulcer patients. However, these same symptoms are also seen in 1/3 of patients with non-ulcer dyspepsia.

**Risk factors** (Sivapathasundharam B *et al* 2018a, Amanda Siu *et al* 2015b)

The following factors increase the risk for pressure ulcers areas,

- Bed or chair-bound
- Advanced age (>65 years)
- Unable to move body or parts of body without help
- Chronic conditions, such as diabetes or vascular disease, which affect perfusion (blood circulation)
- Mental disability from conditions such as dementia

majority of duodenal due to NASIDs) has realized (F.S.K. Barar 2008a, K.D. Tripathi 2015b)

The gastric ulcer, generally acid secretion is normal or low, while deficient mucosal defense (mostly impaired mucus and bicarbonate secretion) plays a greater role. In duodenal ulcer, acid secretion is high in about half of the patients but normal in the rest. Notwithstanding whether production of acid is normal or high, it does contribute to ulceration as an aggressive factor, reduction of which is the main approach to ulcer treatment. An understanding of the mechanism and control of gastric acid secretion will elucidate the targets of antisecretory drug action. (Prabhu V *et al* 2014a, Lucija Kuna *et al* 2019a, K.D. Tripathi 2015b)

**Causes** (Harish K & Shamena Begam J, 2016)

- Smoking, alcohol use, and using non steroidal anti-inflammatory drugs (NSAIDs) or aspirin can make peptic ulcer disease worse.
- You may be more likely to have peptic ulcers if family members have had a peptic ulcer.
- History of previous ulcer
- Urinary and/or fecal incontinence
- Inadequate/poor nutrition and/or dehydration
- Diastolic pressure

**Prevention** (Harish K & Shamena Begam J, 2016).

Certain lifestyle choices and habits can reduce your risk of developing peptic ulcers. These include,

- Not drinking more than two alcoholic beverages a day.
- Not mixing alcohol with medication.
- Washing your hands frequently to avoid infections
- Avoid aspirin, ibuprofen, naproxen, and other NSAIDs. Try acetaminophen instead. If you must take such medicines, talk to your provider first. Your provider may:
  - Test you for *H. pylori* before you take these medicines
  - Have you take proton pump inhibitors (PPIs) or an acid blocker
  - Have you take a drug called misoprostol
  - The following lifestyle changes may help prevent peptic ulcers: DO NOT smoke or chew tobacco.

**Possible Complications** (Harish K & Shamena Begam J, 2016a, Marco A. C. Frade1 2013b)

Complications may include:

- Severe blood loss
- Scarring from an ulcer may make it harder for the stomach to empty
- Perforation or hole of the stomach and intestines
- Vomit blood or have blood in your stool (especially if it is maroon or dark, tarry black)

**Home Remedies** (Harish K & Shamena Begam J, 2016).

The peptic ulcer is cure by some of the natural remedies they are:

1. A diet centered on fruits, vegetables, and a whole grain is just good for your overall health. According to Mayo Clinic, a vitamin rich diet can help your body heals your ulcer. Foods containing polyphenols, an antioxidant, can protect you from ulcers and help ulcers heal. Polyphenol-rich foods and seasonings include; dried rosemary, mexican oregano, blueberries and dark chocolate.

2. Fenugreek is known for its powerful healing properties and health benefits. You can use it to treat stomach ulcer also. Being rich in a mucilaginous compound, fenugreek protects the stomach's lining by coating it like mucus, thereby facilitating the process of healing. Boil one teaspoon of fenugreek seeds in two cups of water. Strain and drink it after adding a little honey to it.

3. Bananas contain antibacterial substance that helps slow down the growth of ulcer in the stomach. Hence eat a banana every day after your breakfast.

4. Coconut oil has been used widely as a natural ingredient for treating various disturbances in stomach. It has anti-bacterial property that kills bacteria that cause ulcers.

5. *Solanum nigrum* is considered to be antioxidant, antipyretic and anti-inflammatory. The leaf of *solanum nigrum* is a natural home remedy to treat digestive problems. The juice of leaves good for peptic ulcer.

**Need to implement antibiotic treatment of peptic ulcer disease.** A federally-funded survey of over 1,000 gastroenterologists and primary care physicians revealed considerable uncertainty regarding the under diagnosis and treatment of HP infection in selected patient populations. Claims data show a pattern of under treatment of patients with PUD. (Michael Buenor Adinortey *et al* 2013a, Amanda Siu *et al* 2015b)

**Overuse of chronic anti-secretory medications.** Prospective studies reveal that non-NSAID induced PUD can be effectively "cured" when HP infection is successfully eradicated. Therefore, individuals receiving chronic maintenance H<sub>2</sub>-blocker therapy for ulcer disease may no longer require these medications given that the likelihood of ulcer recurrence is nearly eliminated. (Amanda Siu *et al* 2015)

### Drugs Promoting Ulcer Healing

The antacids and the conventional anticholinergic drugs have no significant effect on ulcer healing. The following drugs promote ulcer healing;

**1. Cimetidine (Tagamet):** Cimetidine was the first histamine H<sub>2</sub> receptor antagonist available for clinical use and contains an imidazole ring. It reduces fasting and stimulated acid and pepsin secretion by competitively antagonizing the action of histamine on

H<sub>2</sub> receptors. It is very effective in promoting healing of gastric and peptic ulcers. The possibility of periodic recurrence of duodenal ulcers remains.

Cimetidine given in tablet form (200 mg three times daily and 400 mg each evening) for 4 weeks heals duodenal ulcers in about 60 percent of patients, and after 8 weeks therapy the healing occurs in more than 80 percent of patients. When healing has occurred therapy is continued for up to one year in a reduced dose (400mg twice daily). Side effects include drowsiness, itchy skin rashes, gynaecomastia, interstitial nephritis, acute pancreatitis, cardiac arrhythmias, and importance. The half life of Cimetidine is 90 minutes. Renal failure increases the half life and dialysis shortens it, as the drug is excreted through the kidneys. (F.S.K. Barar 2008)

**2. Ranitidine:** It has a thiazole ring. The elimination half life is 2.5 to 3.0 hrs. Like Cimetidine, it has a low incidence of toxicity. Side effect includes confusion, anicteric hepatitis, and cardiac arrhythmias on IV dosing. Ranitidine is available in the form of tablets (150 mg, 300 mg) and as injectable formulations. (F.S.K. Barar 2008a, K.D. Tripathi 2015b)

**3. Famotidine:** It contains a furan ring structure. On oral administration the onset of effect is within one hour, and inhibition of gastric secretion is up to 10-12 hours. Side effects are similar to those as with other H<sub>2</sub> receptor antagonists. Gynaecomastia has not been reported. The usual oral dose is 20 mg bid or 40 mg at bedtime. The IV dose is 20 mg every 12 hours. Dose should be reduced by 50 percent if the Creatinine clearance is less than 10 ml/min. (F.S.K. Barar 2008)

**4. Nizatidine (Axiid):** It is the newest H<sub>2</sub> receptor antagonists. It has thiazole ring and a side chain identical to ranitidine. The elimination half-life is 1-2 hours. Side effects are as with other H<sub>2</sub> receptor antagonists. Gynaecomastia may occur rarely. The usual dose for gastric and duodenal ulceration is 300 mg at night, or 150 mg bid for 4-8 weeks; maintenance, 150 mg at night upto 1 year. For gastro-esophageal reflux disease, the dose is 150-300 mg bid for upto 12 weeks. (F.S.K. Barar 2008)

**5. Roxatidine (Altat):** It is a new H<sub>2</sub> receptor antagonist, 4 times more potent than Cimetidine. The usual dose is 150 mg twice daily, or 300mg at bedtime; maintenance 150 mg at bedtime (F.S.K. Barar 2008)

**6. Anticholinergics:** Anticholinergics are used in the management of peptic ulcer as they reduce intestinal spasm. They inhibit acid and pepsin secretion and relieve pain. As Anticholinergics cause dryness of mouth, blurring of vision, retention of urine, they should not be given continuously to ulcer patients. Atropine (0.3 to 04 mg), Tinture belladonna (1mg), and propantheline (15mg) (S.R. Kale & R. R. Kale 2015a, K.D. Tripathi 2015b).

### CONFLICT OF INTEREST

The author declares no conflict of interest.

## CONCLUSION

Ulcer treatment recovers the causes of ulceration acid therapy in peptic ulcer. It has global impact a health and life time of persons. The peptic ulcer particularly affects large part of the population. It can also put an end to diminish the symptoms including diet therapy. In this work we prefer drug therapy for cure of peptic ulcer.

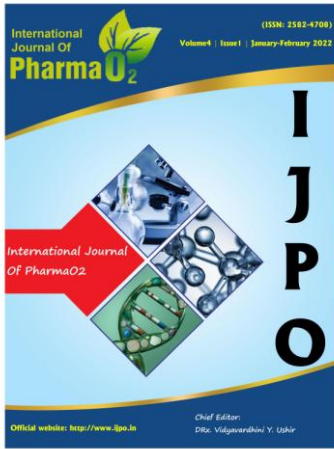
## REFERENCES

1. Harish K, Shamena Begam J (2016), Treatment of Peptic Ulcer by Home Remedies, International Journal of Advances in Science Engineering and Technology, 4(3): 94-97.
2. Peter Malfertheiner, Christian Schulz (2020), Peptic Ulcer: Chapter Closed?, Digestive Diseases, 1(1): 1-5.
3. Fahrur Nur Rosyid (2017), Etiology, pathophysiology, diagnosis and management of diabetics' foot ulcer, International Journal of Research in Medical Sciences, 5(10): 4206-4213.
4. Ananya Chatterjee and Sandip K. Bandyopadhyay (2014), Herbal Remedy: An Alternate Therapy of Nonsteroidal Anti-Inflammatory Drug Induced Gastric Ulcer Healing, Hindawi Publishing Corporation, 1(1): 1-13.
5. Michael Buenor Adinortey, Charles Ansah, Isaac Galyuon, and Alexander Nyarko (2013), In Vivo Models Used for Evaluation of Potential Antigastroduodenal Ulcer Agents, Hindawi Publishing Corporation, 1(1): 1-12.
6. Marco A. C. Frade1 and Pranab K. Das (2013), Chronic Ulcers: Updating Epidemiology, Physiopathology, and Therapies, Hindawi Publishing Corporation, 1(1): 1-2.
7. Kalyanakrishnan Ramakrishnan, Robert C. Salinas (2007), Peptic Ulcer Disease, American Family Physician, 76(7): 1005-1012.
8. Prabhu V, Shivani A (2014), An Overview of History, Pathogenesis and Treatment of Perforated Peptic Ulcer Disease with Evaluation of Prognostic Scoring in Adults, Annals of Medical and Health Sciences Research, 4(1): 22-29.
9. Lucija Kuna, Jelena Jakab, Robert Smolic, Nikola Raguz-Lucic, Aleksandar Vcev and Martina Smolic (2019), Peptic Ulcer Disease: A Brief Review of Conventional Therapy and Herbal Treatment Options, Journal of Clinical Medicine, 8(1): 1-19.
10. Sivapathasundharam B, Sundararaman P and Kannan K (2018), Oral Ulcers - A Review, Journal of Dentistry & Oral Disorders, 4(4): 1-9.
11. Amanda Siu, Katina Landon, and Daniel M Ramos (2015), Differential diagnosis and management of oral ulcers, Frontline Medical Communications, 34(1): 171-177.

12. S.R. Kale, R. R. Kale (2015), Pharmacology and Toxicology, Nirali Prakashan, Seventeenth edition, 11.5-11.6.

13. F.S.K. Barar (2008), Essentials of Pharmacotherapeutics, S. Chand and Company Ltd, Fifth edition 530-542.

14. K.D. Tripathi (2015), Essentials of Medical Pharmacology, Jaypee Brothers Medical Publishers, Seventh Edition, 672-687.



**IJPO** is

- Peer reviewed
- Bi-monthly
- Rapid publication
- Submit your next manuscript at [journalpharma02@gmail.com](mailto:journalpharma02@gmail.com)