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A REVIEW ON" THE ANTIULCER ACTIVITY ON VARIOUS HERBAL PLANTS

Mansi Gehlod* and Namrata Gupta

Swami Vivekanand College of Pharmacy, Indore (M.P.), India.

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***Corresponding Author**
Mansi Gehlod
Swami Vivekanand College of Pharmacy, Indore (M.P.), India.

ABSTRACT

Ulcer are an open sore that develops lining of the stomach, oesophagus and small intestine. They have causes by imbalance between two major factor aggressive and defensive factor. Aggressive factor may include H.pylori, Hcl, pepsins, bile acids, alcohol and smoking. Defensive factor may include bicarbonate, mucus layer, mucosal blood flow and growth factor. Ulcer are generally two types like peptic ulcer or gastric ulcer and duodenal ulcer. Peptic ulcer is a break sore lining in the stomach and upper part of small intestine. Helicobacter pylori is the main etiology factor for peptic and duodenal ulcer. Herbal drugs are used traditionally in the treatment of ulcer healing. In this review various herbal plants are useful for healing ulcer.

KEYWORDS: Peptic ulcer, H. pylori, Nsaids, Herbal plants, Duodenal ulcer.

INTRODUCTION

Ulcers are an open sore of mucus membrane or skin characterized by sloughing of inflamed dead tissue. Ulcers are lesions on the surface of the skin or a mucous membrane characterized by a superficial loss of tissue. Ulcers are most commonest on the skin of the lower extremities and within the alimentary canal, although they will be encountered at almost any site. There are many sorts of ulcer like mouth ulcer, esophagus ulcer, peptic ulcer, and genital ulcer of these peptic ulcer is seen among many of us. Peptic ulcers are erosion of lining of stomach or the duodenum. The two most common types of peptic ulcer are called “gastric ulcer” and “duodenal ulcer.” The name refers to the location of ulceration. A person may have both gastric and duodenal ulcers at an equivalent time. Gastric ulcers are located in the stomach, characterized by pain; ulcers are common in older age bracket. Eating may increase pain rather than relieve pain. Some other symptoms may include nausea, vomiting, and

weight loss. Although patients with gastric ulcers have normal or diminished acid production, yet ulcers may occur even in complete absence of acid.[1]

Duodenal ulcers are found at the start of small intestine and are characterized by severe pain with burning sensation in upper abdomen that awakens patients from sleep. Generally, stomach is empty when pain occure and relieves after eating. A duodenal ulcer is more common in younger individuals and predominantly affects males. In the duodenum, ulcers may appear on both the anterior and posterior walls. In some cases, peptic ulcer are life threatening with symptoms like bloody stool, severe abdominal pain, and cramps along with vomiting blood. Recently, there has been a rapid progress within understanding of the pathogenesis of peptic ulceration. Most of the studies specialise in newer and better drug therapy. There are made possible largely by the supply of the proton pump inhibitors, histamine receptor blockers, drugs affecting the mucosal barrier and prostaglandin analog. However, the clinical evaluation of these drugs showed development of incidence and tolerance of relapses and side effects that make their efficacy arguable. This has been the rationale for the event of latest antiulcer drugs, which incorporates herbal drugs. Indian Medicinal plants and their derivatives have been an invaluable source of therapeutic agents to treat various disorders including PUD. Present study was conducted to review medicinal plants considered as gastroprotective and healing agents on ulcers in ayurvedic resources and beside that to gather evidence for their effectiveness and biological mechanisms in modern investigation.[1] Gastrointestinal bleeding and ulceration are the most recurrent and formidable problems linked with NSAID.[2]

Peptic ulcer

Peptic ulcer disease (PUD) is an illness that affects a considerable number of people worldwide. It develops when there is an imbalance between the ‘‘aggressive’’ and ‘‘protective’’ factors at the luminal surface of the epithelial cells. Aggressive factors include Helicobacter pylori, HCl, pepsins, nonsteroidal anti-inflammatory drugs (NSAIDs), bile acids, ischemia, hypoxia, smoking and alcohol. While defensive factors include bicarbonate, mucus layer, mucosal blood flow, PGs and growth factors.[3]

It is a chronic inflammatory condition involving a group of disorders characterized by ulceration in regions of upper gastrointestinal tract where parietal cells secret pepsin and hydrochloric acid 1. Recently, there has been a rapid progress in the understanding of the pathogenesis of peptic ulcer. Most of the studies focus on newer and better drug therapy.

These have been made possible largely by the availability of the proton pump inhibitors, histamine receptor blockers, drugs affecting the mucosal barrier and prostaglandin analog.[4]

However, the clinical evaluation of these drugs showed development of tolerance and incidence of relapses and side effects that make their efficacy arguable. This has been the rationale for the development of new antiulcer drugs, which includes herbal drugs. Indian Medicinal plants and their derivatives have been an invaluable source of therapeutic agents to treat various disorder including PUD.[5]

The goals of treating peptic ulcer disease are to relieve pain, heal the ulcer and prevent ulcer recurrence. Currently, there is no cost-effective treatment that meets all these goals. Hence, efforts are on to find a suitable treatment from natural product sources. A large number of spices and herbs have been evaluated by various researchers for their anti-ulcer effects to achieve a favorable outcome.[6]

Various reports indicates that old age group patients are more prone to gastric ulcer. Younger individuals have higher risk of duodenal ulcers .A number of drugs including proton pump inhibitors and H2 receptor antagonists are available for the treatment of peptic ulcer, but clinical evaluation of these drugs has shown incidence of relapses, side effects, and drug interactions. But therapeutic uses of plant are safe, economical &effective as their ease of availability.[7]

Signs and symptoms

Here in peptic ulcer diseases patients can be asymptomatic or experience anorexia, nausea, vomiting, bleaching and blotting and heart burn or epigastric pain.

Epidemiology

The life time prevalence of peptic ulcer diseases is 5 to 10% in the general population. There are approx 3.9 million patients with peptic ulcer diseases in United States with 200,000 to 400,000 new cases reported each year. The peak incidence is between 50 to 70 years of age.

Etiology of chronic ulceration

Heredity

Patients with peptic ulcer often have a family history of the diseases. This is particularly the case with duodenal ulcers which develop below the age of 20 years. The gastric ulcer patients

have 3 times the expected number of gastric ulcer but duodenal ulcer occurs with the same frequency amongst relatives as in the general population.

Acid-pepsin Vs mucosal resistance

The immediate cause of peptic ulceration is digestion of the mucosa by acid and pepsin of the gastric juice. But the sequence of events leading to this is unknown. Digestion by acid and pepsin cannot be the only factor involved, since the normal stomach is obviously capable of resisting digestion by its own secretion. The concept of ulcer etiology may be written as "acid plus pepsin Vs mucosal resistance".

Gastric hyper secretion

Ulcer occurs only in the presence of acid and pepsin. They are never found in achlorhydric patients such as those with pernicious anemia. Acid secretion is more important in the astiology of duodenal than gastric ulcer. Peptic ulcer is the most common gastrointestinal disorder in clinical practice.[4]

Pathophysiological processes in peptic ulcer

Peptic ulcer results from a pathological condition in which the biological balance between defensive and offensive factors in the gastrointestinal tract is disturbed. The exact pathogenesis of peptic ulcers is not clear, but diverse factors, including consumption of non-steroidal anti-inflammatory drugs (NSAIDs) and corticosteroids, stressful lifestyle, alcohol consumption, Helicobacter pylori (H. pylori) infection, smoking, and family history are considered as risk factors in the pathogenesis of peptic ulcer.

Oxidative damage:- The pivotal role of antioxidants in the prevention and healing of peptic ulcer has been widely studied in numerous investigations. Tissue damage is always associated with intense generation of free radicals such as reactive oxygen species (ROS) that cause oxidative stress and subsequent mucosal injury.

Gastric mucus:- Gastric mucosal layers act as a barrier which restricts the exposure of the gastric cells to various injurious agents of both exogenous and endogenous origin. Enhancement of mucus production could be assumed as a central factor in ulcer healing by protecting the damaged tissue against various aggressors like harmful drugs and oxidants.

Nsaids:- NSAID-induced peptic ulcer is the most serious complication of any synthetic drug therapy. It is now well-recognized that ulceration induced by NSAIDs is mediated by

suppression of the cyclooxygenase (COX)-dependent pathway and subsequently blocking synthesis of PG.

Helicobacter pylori:- Chronic infection of gastric mucosa with H. pylori is generally associated with gastric lesions. H. pylori is a prevalent human pathogen with an incidence of 90% in some developing countries. H. pylori undergoes asymptomatic gastric colonization in approximately 70% of the population, with a 10%-20% susceptibility of developing into peptic ulcer. The pathogenesis and pattern of H. pylori-induced gastritis is intensely associated with the morbidity of mucosal atrophy and duodenal/gastric ulcers. Eradication of H. pylori from the gastric mucosa of infected patients is considered to be the best therapeutic approach for complete remission of H. pylori associated gastritis and its consequent ulcers. [8]

Pathophysiology of h. pylori

H.pylori, a gram-negative, helical, rod-shaped bacterium, colonizes the gastric mucosa of approximately one-half of the world population2 and an estimated 30% to 40% of the U.S. population.3 H. pylori is present in 95% of patients with duodenal ulcers and in 70% of those with gastric ulcers.4 It is typically transmitted via the fecal-oral route during early childhood and persists for decades. The bacterium is a known cause of gastric and duodenal ulcers5 and is a risk factor for mucosa-associated lymphoid tissue (MALT) lymphoma and gastric adenocarcinoma.[9]

Different factors related to acid secretion

General factors: Vagal hormonal effect, histamine and epinephrine, insufficient circulation, shock and general ischemia increase the secretion.

- Constitutional and environmental factors i.e. sex, age, temperature, family history, social class, geographical differences; occupation may also influence the acid release.
- Local factors in stomach.

Aggressive factors: HCl, pepsin, refluxed bile, NSAIDs, alcohol, pancreatic proteolytic enzymes, ingested irritants, bacterial toxins, physiochemical trauma; all of these factors increase the acid secretion.

Digestive factors: Mucus, bicarbonates, blood flow, resolution of epithelium, the current status of therapy.[4]

Physiology of gastric acid secretion

- Gastric acid secretion is a complex, continuous process in which multiple central and peripheral factors contribute to a common endpoint: the secretion of H+ by parietal cells.
- Neuronal (acetylcholine (Ach)), paracrine (histamine), and endocrine (gastrin) factors all regulate acid secretion.
- Their specific receptors (M3, H2 and CCK2 receptors respectively) are on the basolateral membrane of parietal cells in the body and fundus of the stomach.
- The H2 receptor is a GPCR that activates the G – adenyl cyclase - cyclic AMP-PKA pathway.
- ACh and gastrin signal through GPCRs that couple to the G protein-coupled - inositol 1,4s,5-trisphosphate - Ca2+ pathway in parietal cells.
- In parietal cells, the cyclic AMP and the Ca2+ - dependent pathways activate H+, K+ - ATPase (the proton pump), which exchanges hydrogen and potassium ions across the parietal cell membrane.[10]

The natural herbs used in natural treatment of ulcers

Demulcent herbs: Help to coat and soothe the irritated mucous membranes. These can provide symptomatic relief quite quickly.

Astringent herbs: Help to frighten and tone the mucous membrane to help the wound they can also limit any infection.

Antimicrobial herbs: Can address infection of the wound. In the case of a peptic ulcer we want to helicobacter herbs that awe specific to H. pylori such as goldenseal or garlic.

Valnerary herb: Help to heal wounds. Bitter herbs: Help to stimulate digestive secretions (often a lack of digestive secretion is the underlining cause of the ulcer.[11]

Table 1: Some potential plants with antiulcer activity.

Botanical name and family	Common name	Parts used	Active constituents	Ref.
Aloe Vera Fam: Liliaceae	Gritkumari	Leaves	Barbaloin, isobarbaloin, saponins	[12]
Curcuma longa Fam: Zingiberaceae	Haldi	Rhizome	phenolic,tannins, flavonoids	[12]
Terminalia Chebula Fam:Combretaceae	Harida	Seed	Tannins, gallic acid, chebulinic acid, sorbitol.	[12]

Terminalia Billerica Fam:Combretaceae	Bahada	Seed, Bark	Tannins,gallic acid, ellagic acid	[12]
Vetiveria Ziziinoides Fam: Graminae	Benachar	Root	Phenolic compounds, pods contain saponin protein, flavonoids	[12]
Alstonia scholrs (Apocyanacea)	sapstaparni	Bark	Alkaloids, coumarins, flavonoids, phlobatannin, reducing sugars, simple phenolic, steroids, tannins and saponins	[13]
Anacardium accidentate **(**Anacardiaceae)	cashew	Leaves	Catechins	[13]
Aegle marmelous	Bael tree	fruit	flavonoids, tannins, and saponins	[1]
Carica papaya (Caricaceae)	papaya	Unripe fruit	Papain ,chymopapain, pectin, carposide, carpaine, carotenoids	[1]
Asparagus racemosus (Asparagaceae)	satawari	root	Shatavarin,flavonoids	[13]
Ginseng Fam: Araliaceae	Gurmar	Root, leaf, stem	Polysaccharides, triterpenoids, flavonoids, fatty acids, peptides, amino acids.	[12]
Azadirachta indica (Meliaceae)	neem	leaves	Flavonoids, tannins, carbohydrates, and proteins	[13]
Nerium indicum Mill Fam: Apocynaceae	Kaner	Leaves roots	Phenolic compounds, flavonoids	[12]
Euphorbia neriifolia (Eurphorbiaceae)	common milk hedge.	Bark tender leaves, pods	Euphorbon, resin, gum, caoutchouc, malate	[1]
Hydrocotyle asiatica (Umbelliferae)	Indian penny-wort	Leaves	Vellarin, resins and some fatty aromatic body, gum, sugar, tannin, albuminous	[1]
Indigofera tinctoria (Papilionaceae)	true indigo	Leaves	Indican (a glucoside)	[1]
Glycyrrhiza glabra Fam:Leguminosae	Liquorice	Root and rhizome	Glycyrrhizinic acid, a triterpenoids saponin	[12]

CONCLUSION

Now a days ulcer are most common disease. It is caused by H.pylori bacteria, alcohol consumption, smoking, excessive use of NSAIDS. In this review find the various medicinal

plants that used in treatment of ulcer. Various herbal medicine and chemical constituents which related to herbal plants are more effective and useful for the treatment of ulcer.

REFERENCES

1. Vimala G, Gricilda Shoba F. A Review on Antiulcer Activity of Few Indian Medicinal Plants,Int J Microbiol, 2014; 1-4.
2. Mostofa R., Evaluation of anti-inflammatory and gastric anti-ulcer activity of Phyllanthus niruri L. (Euphorbiaceae) leaves in experimental rats, BMC Complementary and Alternative Medicine, 2017; 17: 267.
3. Rao s, Indu Amrit, antiulcer activity of natural compounds: A review,Research Journal of Pharmacognosy and Phytochemistry, 2015; 7(2): 124-130.
4. Jain K, Singh M, Pharmacological screning of antiulceragents: areview, IJPSR, 2010; 1(9): 29-37.
5. Dharmani P, Palit G. Exploring Indian medicinal plants for antiulcer activity, February, 2021; 111(118): 241-146.
6. Shenoy A, Shastry C.S, Anti ulcer activity of Naravelia zeylanica leaves extract Journal of Pharmacy Research, 2009; 2(7): 1218-1220.
7. Priyanka, Some of The Medicinal Plants With Anti-Ulcer Activity- A Review, J. Pharm. Sci. & Res, 2015; 7(9): 772-775.
8. Farzaei M, Role of dietary polyphenols in the management of peptic ulcer, World J Gastroenterol, 2015; 7, 21(21): 6499-6517.
9. Fashner J, Diagnosis and Treatment of Peptic Ulcer Disease and H. pylori Infection, American Family Physician, 2015; 91(4): 15, 236-242.
10. Arige SD, Rao L, A review on pharmacological screening of antiulcer agents, Int J Med Lab Res, 2017; 2(3): 44-54.
11. Ranjan K, Herbal drugs in treatment of peptic ulcer, J.Bio.Innov, 2017; 6(3): 499-508.
12. Gadekar R, Singour P. K, A potential of some medicinal plants as an antiulcer agents, July-December, 2010; 4: 8.
13. Majee C, medicinal plants with anti-ulcer and hepatoprotective activity: a review, IJPSR, 2019; 10(1): 1-11.