A COMPREHENSIVE: REVIEW ON ANTI ULCER ACTIVITY OF HERBAL MEDICINAL PLANT

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Abstract:

Ulcer is a common gastrointestinal disorder which is seen among many people in that bacterium Helicobacter pylori is regarded as the most common cause of infection. Long-term use of NSAIDs such as Paracetamol, Aspirin, Diclofenac, etc. Various herbal medicines have been used traditionally for the remedy of peptic ulcer disease (PUD), however scientific information with regards to their anti-peptic ulcer both in-vivo and in-vitro as well as clinical studies supporting their use is still inadequate. Preliminary phytochemical screening of these herbs has shown the presence of important secondary metabolites like flavonoids, alkaloids, terpenoids, tannins which are responsible for the anti-ulcer activity. The purpose of this study is to treat of peptic ulcer disease are to relieve pain, heal the ulcer, and delay ulcer recurrence using herbal medicinal plants.

Keywords: Helicobacter Pyroli, Peptic ulcer disease, Natural Pain Killer, Medicinal Plants, Abdominal Pain

Introduction

Peptic ulcer disease (PUD) comprises of esophageal, duodenal and gastric ulcers. The most frequently occurring symptom of PUD is epigastric pain. This pain may occur with dyspepsia, bloating, nausea and/or early satiety. The causes of PUD are mainly two, the first being chronic infection with Helicobacter pylori and the second involves abuse of Non-Steroidal Anti-Inflammatory Drugs popularly known as NSAIDs. Therapy is normally focused on the elimination of H. pylori from the gut of an infected patient. A standard orthodox triple therapy is normally indicated as first-line therapy which involves combination of Proton Pump Inhibitor, Amoxicillin and Clarithromycin; Omeprazole, Clarithromycin and Amoxicillin; Pantoprazole, Clarithromycin
and Amoxicillin among others. Increasing antibiotic resistance of certain Ulcers are most common on the skin of the lower extremities and in the gastrointestinal tract, although they may be encountered at almost any site.\(^3\) There are many types of ulcer such as mouth ulcer, esophagus ulcer, peptic ulcer, and genital ulcer these peptic ulcer is seen among many people. The peptic ulcers are erosion of lining of stomach or the duodenum.\(^4\) The two most common types of peptic ulcer are called “gastric ulcer” and “duodenal ulcer.” The name refers to the site of ulceration. A person may have both gastric and duodenal ulcers at the same time. Gastric ulcers are located in the stomach, characterized by pain; ulcers are common in older age group. Eating may increase pain rather than relieve pain.\(^5\) 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. Duodenal ulcers are found at the beginning of small intestine and are characterized by severe pain with burning sensation in upper abdomen that awakens patients from sleep.\(^6\) Generally, pain occurs when the stomach is empty and relieves after eating. A duodenal ulcer is more common in younger individuals and predominantly affects males.\(^7\) In the duodenum, ulcers may appear on both the anterior and posterior walls. In some cases, peptic ulcer can be life threatening with symptoms like bloody stool, severe abdominal pain, and cramps along with vomiting blood. Peptic ulcer is one of the world’s major gastrointestinal disorders and affecting 10\% of the world population. About 19 out of 20 peptic ulcers are duodenal. An estimated 15000 deaths occur each year as a consequence of peptic ulcer. Annual incidence estimates of peptic ulcer hemorrhage and perforation were 19.4–57 and 3.8–14 per 100,000 individuals, respectively.\(^5\) The average 7-day recurrence of hemorrhage was 13.9\% and the average long-term recurrence of perforation was 12.2\% . In the Indian pharmaceutical industry, antacids and antiulcer drugs share 6.2 billion rupees and occupy 4.3\% of the market.\(^9\) In order to achieve this aim, Indian ayurvedic book Meteria Medica and electronic databases including science direct, pubmed, scopus, and google scholar were explored for each of the medicinal plants for peptic ulcers and all retrieved articles were evaluated to achieve any in vitro, in vivo, or clinical evidence for their efficacy and possible mechanisms.\(^10\) The retrieved studies either demonstrate obviously effectiveness of these herbs or indirectly their efficacy on the involved mechanisms in the treatment of peptic ulcers. Meteria Medica provides lots of information about ethno medicinal herbs, which are valuable as antiulcer agents and their use experimentally was evaluated and proved by many researchers for its antiulcer activity. Following compiled data suggested that medicinal plant those are evidently reported for its antiulcer activity.\(^11\)
Herbal medicinal plants and its anti-ulcer activity

*Aegle marmelos*. *Aegle marmelos* which is commonly known as a “bael tree” belonging to the family *Rutaceae* is the plant that chiefly grows on throughout India. It is locally called as “vilvam.” Chemical constituents in this plant are flavonoids, tannins, and saponins.  

Figure no.1: Bel Plant

**Antiulcer Activity**

*In Folk Medicine*. The fruit of *A. marmelos* is traditionally used for the treatment of ulcer among the kani tribes in Kanyakumari district, Tamil Nadu, India. *In Recent Studies*. Ulcers are induced by aspirin plus pylorus ligated gastric ulceration in rats and aqueous extract of leaves is to be administered orally for 21 days, daily dose of 1gm/kg. The result indicated a significant reduction in the ulcer lesion count compared to control.

*Active Constituents*. Luvangetin, a pyranocoumarin isolated from the seeds, is considered.

**Azadirachta indica.** *Azadirachta indica* (family *Meliaceae*) is indigenous to and cultivated nearly all over India and in Bengal. It is commonly known as “neem” and locally called “vembu.” Chemical constituents reported in this plant are nimbidin, phenolic compounds, saponin, and flavonoids. It contains a bitter alkaloid named Margosine. Seeds contain about 10–31% of a yellow bitter fixed oil. The oil contains free and volatile fatty acids. The volatile fatty acids probably consist of a mixture of stearic and oleic acids with a small amount of lauric acid.

Figure no. 2: Neem Plant
Antiulcer Activity

In Ayurvedic. A poultice of leaves mixed with sesame seeds is very useful in unhealthy ulcerations. In Recent Studies. Azadirachta indica leaf extract protected against pylorus ligation and cold restraint stress induced gastric ulcer in rats. Active Constituents. Stearic and palmitic acid isolated from the nimbidin fraction of neem seeds oil is considered.

Aloe vera. Aloe vera belonging to the family Liliaceae is commonly known as “aloe gel.” It is locally called “kattalai” which is found all over India. Chemical constituents in this plant are aloin, isobarbaloin, and emodin.

Antiulcer Activity

In Ayurvedic. Leaves are being used successfully in America in the local treatment of chronic ulcers. First the pain diminishes and after a few weeks the ulcers heal. In Recent Studies. Aloe vera powder was mixed with gum acacia; the solution was administered orally in rats at dose of 200mg/kg against indomethacin induced gastric ulcer. The extract showed significant antiulcer activity comparable to control. Active Constituents. Barbalin, isobarbolin, and saponins are considered.

Annona squamosa. (Annonaceae) is commonly known as “custard apple.” It is cultivated in gardens all over India which is locally called as “sitapalam.” Chemical constituents in this plant are alkaloids, flavonoids, saponins, and tannins. Seeds yield oil and resin; seeds, leaves, and immature fruit contain an acrid principle.

Antiulcer Activity

In Ayurvedic. Leaves made into a paste without adding water are applied to unhealthy ulcers. In Recent Studies. The aqueous leaf extract protected against pylorus ligation and ethanol induced gastric ulcer in rats. Active Constituents. Tannic acid is considered.

Carica papaya. (Caricaceae) is commonly known as “papaya.” It is locally called “papali-pazham.” It grows in all tropical countries and many subtropical regions of the world. Chemical constituents in this plant are Papain, chymopapain, pectin, carposide, carpaine, carotenoids, and antheraxanthin.
**Antiulcer Activity**

*In Folk Medicine.* It is largely used in tropical folk medicines. The ripe fruit is edible and unripe can be eaten cooked for indolent ulcer. The unripe fruit can be cooked as parts of salads, jellies, and stews while the ripe fruits are usually eaten raw without the skin or seed. Intake of the unripe fruit of the plant has been linked with an antiulcer effect. *In Recent Studies.* The aqueous seed extract of *C. papaya* was administered at the doses of 50 and 100 mg/kg orally, in rats against ethanol induced gastric ulcer. The extract protected the gastric mucosa against ethanol effect. *C. papaya* extract significantly reduced the gastric juice volume and gastric acidity. *Active Constituents.* Chymopapain and papain are widely known as being useful for digestive disorders and disturbances of the gastrointestinal tract.

*Ficus religiosa.* (*Urticaceae*) is commonly known as “sacred fig.” It is locally called “arasha-maram.” This sacred peepul is a large tree round wild and cultivated all over India by the Hindus. Chemical constituents in this plant are bark containing tannin, caoutchouc (cochtone), and wax.

**Antiulcer Activity**

*In Ayurvedic.* Bark is useful in ulcers in infusion or decoction (simple kashayam) with a little honey. *In Recent Studies.* The hydro alcoholic extract leaves of *F. religiosa* were studied at two dose levels (250 and 500 mg/kg, oral) in rats against absolute ethanol, aspirin, and pylorussligation induced gastric ulcer. The extract significantly decreases the ulcer index value when compared to control. *Active Constituents.* Bioactive compounds like flavonoids, saponins, and tannins are considered.

*Moringa oleifera.* (*Moringaceae*) is commonly known as “drum-stick, horse radish tree.” It is locally called “murungai.” It is native to the Western and sub-Himalayan region, India, Pakistan, Asia minor, Africa, and Arabia. Chemical constituents in this plant are alkaloids, flavonoids, saponin, tannins, zeatin, quercetin, kaempferom, and terpenoids.

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Figure no. 5: peepul Plant

Figure no. 6: murunga Plant
Antiulcer Activity

In Folk Medicine. The medicinal value of the different parts of the plant has long been recognized in folklore medicine. The leaf tea treats gastric ulcers by Kani tribals of Pechiparai Hills, Tamil Nadu, India. Flower buds of *M. oleifera* are widely consumed in Pakistan and have been reported to possess antiulcer activity. The alcoholic leaves extract of *M. oleifera* was administered in the doses of 125, 250, and 500mg/kg orally, in rats against pylorus ligation, ethanol, cold restraint stress, and aspirin induced gastric ulcer. The extract showed decreases in ulcer and acid pepsin secretion. Active Constituents. Quercetin, beta sitosterol, and beta carotene are considered.34

*Tamarindus indica.* (*Caesalpiniaceae*) is commonly known as “tamarind tree.” It is locally called “puli; puliyam-pazham.” This evergreen tree which is indigenous to South India is cultivated throughout India and Burma. Chemical constituents in this plant are pulp that contains tartaric acid 5%, citric acid 4%, malic and acetic acids, tartaric of potassium 8%, invert sugar 25–40%, gum, and pectin.

Seeds contain albuminoids, fat, carbohydrates 63.22%, fiber, and ash containing phosphorus and nitrogen. Fruit contains traces of oxalic acid.35

Antiulcer Activity

In Ayurvedic. Decoction of the leaves is used as a wash for indolent ulcers and promotes healthy action. The methanolic extract of the seed coat of *T. indica* at doses of 100 and 200mg/kg significantly reduces the total volume of gastric juice and free and total acidity of gastric secretion in pylorus ligation induced ulcer model as compared to control. Active Constituents. Tannins are considered.

Conclusion

According to pervious hypothesis, acid secretion is a major sole cause of ulcer formation and reduction in acid secretion was thought to be the major approach towards therapy. Now a day’s treatment of ulcer mainly targets the potentiation of the defensive system along with lowering of acid secretion. Ayurveda, the oldest medicinal system in the world, provides leads to find therapeutically useful compounds from plants. Therefore, Ayurveda knowledge supported by modern science is necessary to isolate, characterize, and standardize the active constituents from herbal sources for antiulcer activity. The combination of traditional and modern knowledge can produce better drugs for the treatment of peptic ulcer with fewer side effects. It is apparent that experimental evaluation of herbal drugs for the treatment of gastric ulcer is rather impressive but very few have reached clinical trials and still few have been marketed. This shows that the benefits of research are not
reaching the people to whom medical research is directed and hence the time, manpower, and resources are not efficiently utilized. Hence, pharmacologists need to take more active interest in evaluation of herbal drugs for potential antiulcer activity and standardization of such herbal drugs to be clinically effective and globally competitive.

Reference


