REVIEW ARTICLE ON ANTI-ULCER AGENTS

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Abstract:

Antiulcer agents are pharmacological compounds designed to prevent or treat ulcers in the gastrointestinal tract, particularly in the stomach and duodenum. These agents function through various mechanisms, including reducing gastric acid secretion, enhancing mucosal defence, and promoting healing of the gastric lining. Common classes of antiulcer medications include proton pump inhibitors (PPIs), H2-receptor antagonists, antacids, and mucosal protectants. Recent research has also explored the role of herbal and natural products in antiulcer therapy, highlighting their potential efficacy and safety profiles. Understanding the mechanisms of action, indications, and side effects of these agents is crucial for effective management of peptic ulcer disease and improving patient outcomes.

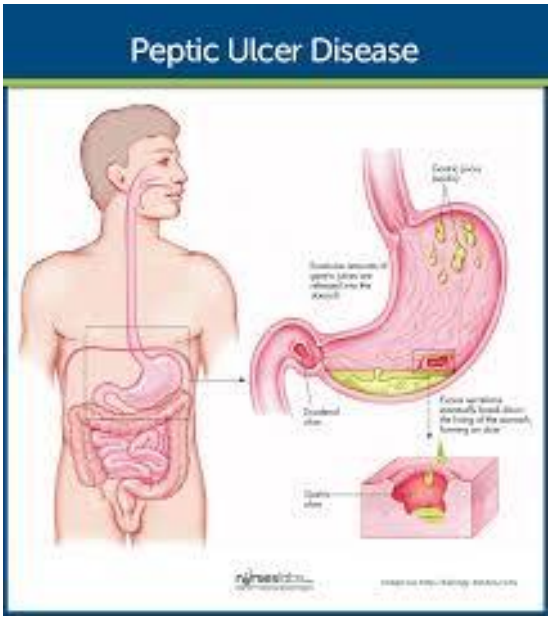
INTRODUCTION:

Antiulcer medications are classified into several categories based on their mechanisms of action. Proton pump inhibitors (PPIs), such as omeprazole and pantoprazole, effectively reduce gastric acid production, providing relief and promoting healing.

H2-receptor Antagonists like ranitidine and famotidine, also decrease acid secretion but through different pathways. Antacids provide symptomatic relief by neutralizing stomach acid, while mucosal protectants, such as sucralfate, form a protective barrier over the ulcerated area.

Peptic ulcer is the most common gastrointestinal disorder in clinical practice. Considering the several side effects (arrhythmias, impotence, gynaecomastia and haematopoietic changes) of modern medicine, indigenous drugs possessing fewer side effects should be looked for as a better alternative for the treatment of peptic ulcer

Anti-ulcer is used in the treatment of gastric and duodenal (peptic) ulcers, reflux esophagitis, Zollinger-Ellison syndrome, and other gastrointestinal conditions where gastric acid reduction is beneficial. Peptic ulcers are open sores on the inner lining of the stomach and the upper part of the small intestine.



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Causes:

The most common causes of peptic ulcer are infection with the germ helicobacter pylori (h. pylori) and long–term use of nonstroidal anti- Inflammatory drugs (NSAIDS). These include ibuprofen (Advil, Motrin IB, other) and naproxen sodium (Aleve). Stress and spicy food do not cause peptic ulcer .but they can make symptoms worse

Ulcer happen when acid in the organ that food travels through, called the digestive tractates Peptic away at the inner surface of the stomach or small intestine. The acid can create a painful open sore that may bleed.

Your digestive tract is coated with a mucous layer that most often protect against acid but if the amount of acid increases or the amount of mucus decreases, you could develop an ulcer.

Helicobacter pylori: this germ lives in the mucous layer that covers and protects tissues that line the stomach and small intestine. The h.pyori germ intestine.

The bacterium named helicobacter pylori (h .pylori) campylobacter pylori (c. pylori)

Decrease mucous secretion and bicarbonate secretion

Increase protein diet

Over intake of aspirin and non-steroidal anti-inflammatory drugs (nsaids)

Steroidal (preferable taken with antacid and with food to reduce the chances of ulcer)

Skipping of diet

Over intake of emotional stress,

Smoking

Radiation therapy

TYPES OF ANTI ULCER:

Peptic ulcer

Oesophageal ulcer

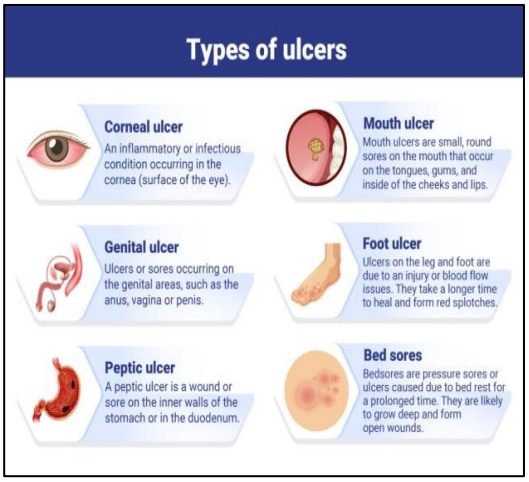
Mouth ulcer

Arterial ulcer

Diabetic foot ulcer

Venous ulcer

Genital ulcer



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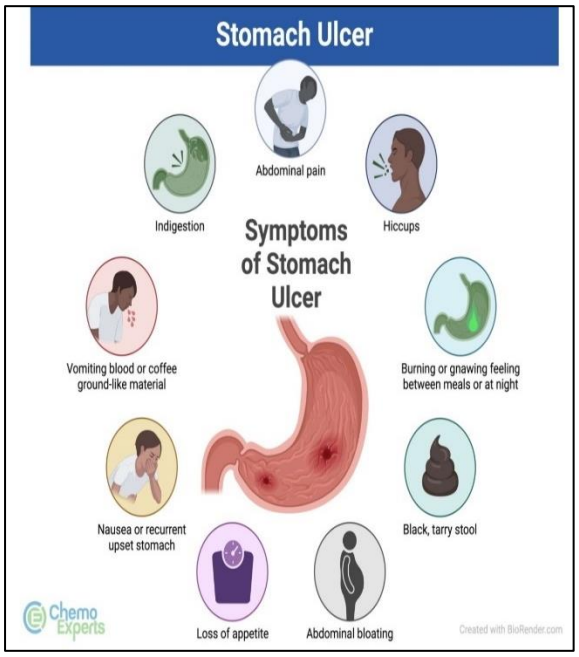
SYMPTOMS:



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Many people with peptic ulcer don't have symptoms .if there are symptoms.

Dull or burning stomach pain. For some people, pain may be worse between meals and at night. For other, if may be worse after eating.

Feeling of fullness or bloating.

Belching.

Heartburn.

Nausea.

Peptic ulcer can cause bleeding from the ulcer. Then symptoms might include.

Vomiting blood, which may appear red or black.

Having dark blood in stool, or stools that are black or tarry.

Feeling dizzy or fainting.

Risk factor of peptic ulcer:

1. Smoking cigarettes

2. Drinking a lot of alcohol

3. being very ill, such as being on a breathing macine

4. Radiation treatment

5. Having a first –degree relative with a peptic ulcer

6. Old age: this include people older than 60

7. Taking high doses of nsaids

8. Having untreated stress.

9. Eating spicy foods.

Natural drugs used in anti-ulcer:

Several natural remedies have been traditionally used to help manage ulcers. Here are some of them:

1. Liquorice root: known for its soothing properties, liquorice may help protect the stomach lining and promote healing.
2. Aloe Vera: aloe Vera juice can help reduce inflammation and soothe the digestive tract.
3. Cabbage juice: fresh cabbage juice has been used historically for its potential to promote healing of stomach ulcers.
4. Honey: manuka honey, in particular, has antibacterial properties and may help in ulcer healing.
5. Slippery elm: this herb may coat the stomach and protect against irritation.

6. Chamomile: known for its calming effects, chamomile tea may help soothe the digestive system.
7. Turmeric: the active compound cur cumin has anti-inflammatory properties and may aid in ulcer healing.
8. Probiotics: foods rich in probiotics, like yogurt and fermented foods, can help maintain gut health.

Drugs used in anti-ulcer:

Anti-ulcer medications are primarily used to treat peptic ulcers and conditions like gastroesophageal reflux disease (GERD). Here are the main types of drugs used:

1. Proton Pump Inhibitors (PPIs):

   Examples: Omeprazole, Esomeprazole, Pantoprazole, Pantoprazole.

   Function: Reduce stomach acid production.

2. H2-Receptor Antagonists:

   Examples: Ranitidine (note: withdrawn in some markets), Famotidine, Cimetidine.

   Function: Decrease acid production by blocking histamine receptors.

3. Antacids:

   Examples: Aluminium hydroxide, Magnesium hydroxide, Calcium carbonate.

   Function: Neutralize existing stomach acid for quick relief.

4. Mucosal Protective Agents:

   Examples: Sucralfate, Misoprostol.

   Function: Coat the stomach lining and protect it from acid.

5. Antibiotics (if H. pylori infection is present):

Examples: Amoxicillin, Clarithromycin, Metronidazole.

Function: Eradicate Helicobacter pylori bacteria.

Treatment of anti-ulcer:

The treatment of ulcers, particularly peptic ulcers, typically involves a combination of medication, lifestyle changes, and sometimes surgery. Here are some common approache

Medications:

1. And misoprostol Proton pump inhibitors (ppis): reduce stomach acid production. Examples include omeprazole, pantoprazole, and esomeprazole.

2. H2-receptor antagonists: decrease acid production. Examples include ranitidine and famotidine.
3. Antacids: neutralize stomach acid for quick relief. Examples include aluminium hydroxide and magnesium hydroxide.
4. Antibiotics: if the ulcer is caused by h. pylori infection, antibiotics like amoxicillin, clarithromycin, and metronidazole may be prescribed.
5. Cytoprotective agents: help protect the stomach lining. Sucralfate are examples.

Lifestyle Changes

Diet: Avoid spicy foods, caffeine, alcohol, and tobacco. Eating smaller, more frequent meals can help.

Stress Management: Techniques such as yoga, meditation, and exercise may be beneficial.

Avoid NSAIDs: No steroidal anti-inflammatory drugs can irritate the stomach lining.

Surgery:

In severe cases, such as complications from ulcers, surgery may be necessary to remove the ulcer or to close a perforation.

The potential medicinal plants used in ulcer:

The well-known medicinal plants used in Indian traditional medicine to treat several diseases, studies related to the pharmacological properties of some medicinal plants are very scare. We studied the antiulcer activity and acute toxicity of some medicinal plants. Our investigation showed that these inquire into medicinal plants could prevent ulcer in rats in a dose-dependent manner. Histological studies disclose that these medicinal plants did not show any single- dose toxicity. Introducing photochemical screening of this medicinal plant identified the presence of important secondary metabolites like flavonoids and common tannic acid.

A variety of botanical products have been described to possess antiulcer activity but the documented written work has cantered primarily on pharmacological action in experimental animals. Except for a few phytogenic compounds (i.e. aloe, liquorice and chilly), limited clinical data are available to support the use of herbs as gastro-protective agents and thus, the data on efficacy and safety are limited. Despite this, there are several botanical products with potential therapeutic applications because of their high efficacy and low toxicity. Finally, it should be noted that substances such as flavonoids, aescin, aloe gel and many others, that possess antiulcer activity are of particular therapeutic importance as most of the anti-inflammatory drugs used in modern medicine are ulcer genic

Medication of anti- ulcer:

Anti-ulcer medications offer several advantages in the management of peptic ulcers and related conditions. Here are some key benefits:

1. Symptom relief

These medications help alleviate symptoms such as pain, nausea, and discomfort associated with ulcers.

2. Healing of ulcers

They promote the healing of existing ulcers, reducing the risk of complications like bleeding or perforation.

3. Prevention of recurrence

Many anti-ulcer drugs, especially ppis and h2-receptor antagonists, can help prevent the recurrence of ulcers, particularly in individuals with a history of peptic ulcer disease.

4. Reduction of stomach acid

By lowering stomach acid production, these medications help create a less hostile environment for ulcer healing and reduce irritation.

5. Treatment of h. pylori infection

When used in combination with antibiotics, anti-ulcer medications can effectively treat ulcers caused by h. pylori, addressing the root cause of the problem.

6. improved quality of life

By managing symptoms and promoting healing, these medications can significantly improve the overall quality of life for those affected by ulcers.

7. Cytoprotection

Some anti-ulcer agents, like sucralfate, provide a protective barrier over the ulcer, shielding it from stomach acid and promoting healing.

8. Versatile use

Many of these medications can be used for various gastrointestinal conditions beyond ulcers, such as gastroesophageal reflux disease (gerd) and gastritis.

9. Non-invasive

Anti-ulcer medications provide a non-surgical option for managing ulcer-related issues, which can be preferable for many patients.

It's important to use these medications under the guidance of a healthcare professional to ensure safe and effective treatment

Mechanism of anti-ulcer:

The mechanism of action of anti-ulcer medications varies depending on the class of drugs. Here are some common types and their mechanisms:

Proton Pump Inhibitors (PPIs): Drugs like omeprazole and pantoprazole inhibit the proton pump in the stomach lining, reducing gastric acid secretion and promoting healing of ulcers

Proton pump inhibitors (PPIs) are a class of medications that reduce stomach acid production. Here's how they work:

Mechanism of Action:

1. Targeting the Proton Pump: PPIs specifically inhibit the H+/K+

ATPase enzyme, also known as the proton pump, located in the parietal cells of the gastric mucosa. This enzyme is responsible for the final step of gastric acid secretion.

2. Acid Secretion Inhibition: By blocking this enzyme, PPIs effectively reduce the secretion of hydrogen ions (H+) into the stomach, leading to decreased gastric acid production.
3. Activation in Acidic Environment: PPIs are prodrugs that become activated in the acidic environment of the stomach. Once they reach the parietal cells, they bind covalently to the proton pump, leading to prolonged inhibition.
4. Duration of Effect: The effects of PPIs can last for 24 hours or longer, even after the drug has been cleared from the bloodstream. This is due to the irreversible binding to the proton pump, requiring new pump synthesis for acid secretion to resume.

Clinical Effects:

Symptom Relief: By lowering gastric acidity, PPIs help alleviate symptoms associated with conditions like gastroesophageal reflux disease (GERD), peptic ulcers, and Zollinger-Ellison syndrome.

Healing: Reduced acid secretion promotes healing of the esophagus and stomach lining by decreasing acid exposure.

Overall, PPIs are highly effective in managing acid-related disorders due to their specific and long-lasting action on gastric acid secretion

H2-Receptor Antagonists: Medications such as ranitidine and famotidine block histamine H2 receptors on parietal cells, decreasing acid production and providing relief from ulcer symptoms.

H2-receptor antagonists (H2RAs) are a class of medications that reduce stomach acid production. Here's how they work:

Mechanism of Action:

1. Targeting H2 Receptors: H2RAs specifically block histamine H2 receptors located on the surface of gastric parietal cells in the stomach lining.
2. Inhibition of Gastric Acid Secretion: Normally, histamine binds to these H2 receptors, stimulating the parietal cells to produce and secrete gastric acid. By blocking this receptor, H2RAs prevent histamine from exerting its stimulatory effect, leading to a decrease in acid production.
3. Reversible Action: Unlike proton pump inhibitors, which irreversibly bind to the proton pump, H2RAs competitively inhibit the H2 receptors. This means their effects can be reversed, and normal acid secretion can resume once the medication is cleared from the system.

Pathophysiology:

Peptic ulcer is one of the world's major gastro-intestinal disorders, embracing both gastric and duodenal ulcers, and affecting 10% of the world population. The patho-physiology of peptic disease is attributed to the imbalance between aggressive factors like acid, pepsin, and helicobacter infection, and the local mucosa defences like bicarbonate secretion, mucus and prostaglandins. Helicobacter pylori infection, use of non-steroidal anti-inflammatory drugs-nsaids, emotional stress, alcohol abuse, and smoking are the principal etiological factors associated with peptic ulcer. In helicobacter pylori infections a gram negative bacterium colonizes the human stomach, and is a risk factor for the development of peptic ulcer and gastric adenocarcinoma. Tissue damage to the gastrointestinal mucosa (or haemorrhagic injury) is produced by exogenous compounds as well, mainly nsaids and ethanol. Naiads damage the stomach by suppressing synthesis of gastric prostaglandins. Gastric acid exacerbates nsaid effects by deepening superficial lesions, interfering with platelet aggregation, and impairing the ulcer relieves process.

The crushing of stomach acid secretions is a key therapeutic select for ulcers, and includes the use of antacids, specific muscarinic m1 receptor antagonists, targeting gastrin receptors and histamine h2 receptors, and the use of proton pump inhibitors. The exposure of gastric mucosa to aggressive factors such as absolute ethanol, stress, and ischemia followed by reperfusion, and the use of nsaids produce pathological changes and the growth of inflammation, haemorrhagic erosions, and ulcers with the acute involvement of free radicals, or reactive oxygen species (ros) . these radicals are normally neutralized by the action of the antioxidant system consisting of organic substance carry thiol groups such as glutathione, vitamins c and e, nadph, antioxidant enzymes such as peroxidase, superoxide dismutase, glutathione peroxidase, glutathione educates .

Contraindication of anti -ulcer :

The contraindications of anti-ulcer medications vary depending on the specific class of drugs. Here are some general contraindications for common anti-ulcer medications:

Proton Pump Inhibitors (PPIs):

Severe Hypersensitivity: Known allergy to PPIs.

Liver Disease: Caution in patients with severe liver impairment, as metabolism may be affected.

H2-Receptor Antagonists:

Severe Hypersensitivity: Known allergy to the specific H2-blocker.

Renal Impairment: Dosage adjustment may be necessary in patients with severe renal impairment.

Antacids:

Severe Renal Failure: Risk of electrolyte imbalances (e.g.,

magnesium or aluminium accumulation).

Hypophosphatemia: Use with caution if phosphorus levels are low.

Misoprostol:

Pregnancy: Contraindicated as it may induce labour.

History of Allergic Reactions: Caution in those with known hypersensitivity.

General Considerations:

Drug Interactions: Caution in patients taking other medications that may interact, affecting absorption or metabolism.

Conclusion:

In conclusion, anti-ulcer medications, including proton pump inhibitors (PPIs), H2-receptor antagonists (H2RAs), and other agents, play a crucial role in the management of acid-related disorders such as peptic ulcers and gastroesophageal reflux disease (GERD).

These medications effectively reduce gastric acid secretion, promote healing of the gastrointestinal lining, and alleviate symptoms. Lifestyle modifications, along with proper use of these medications, enhance treatment outcomes and reduce the risk of recurrence.

However, it is important to monitor for potential side effects and contraindications, as well as to tailor treatment to individual patient needs. Ongoing research and awareness of emerging data continue to refine our understanding of anti-ulcer therapies, ensuring safer and more effective management of ulcer-related conditions.

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