Vaishnavi Kashyap, 2026, 14:1
ISSN (Online): 2348-4098
ISSN (Print): 2395-4752

International Journal of Science, Engineering and Technology
An Open Access Journal

A Systematic review on the efficacy of common antacids components.

Vaishnavi Kashyap
School of Pharmacy, G.H Raisoni University Saikheda

Abstract - For many years, antacids have been a mainstay in the treatment of gastrointestinal problems, providing symptomatic relief from ailments like peptic ulcers, acid reflux, and heartburn. A cornerstone of gastrointestinal care for many years, offering symptomatic relief from conditions like heartburn, acid reflux. This review study provides a thorough overview of the safety profile, efficacy, and mechanisms of action. It looks at the many antacid classes, including those based on aluminum, magnesium, and calcium, and outlines the benefits and drawbacks of each, Additionally, it talks about the potential side effects and drug interactions associated with antacid usage, emphasizing the importance of proper dosing and supervision. Antacids are medications that neutralize gastric acids to treat indigestion and heartburn. Antacids that are prescribed to oneself are a common drug. It is composed of various mixtures of aluminum, magnesium, and calcium salts. Antacids fall into two main categories: absorbable and non-absorbable. Fever adverse effects and additional benefits are associated with non-absorbable antacids. Each antacid has a different active ingredient that has a different effect on stomach acid. This narrative overview describes the mechanisms, properties, and disadvantages of the many antacid ingredients as well as the tools and resources for studying antacid compositions' capacity to buffer acid.

Keyword - antacid, symptomatic relief, non-absorbable antacids, gastrointestinal disorders, systematic review.

I. INTRODUCTION

A medication that helps neutralize stomach caustic substances is known as a stomach settling agent. It is used to treat heartburn, indigestion, and reflux symptoms. Calcium, magnesium, aluminum, or a combination of these substances can be found in antacids[1]. Gastritis, reflux esophagitis, dyspepsia, and gastroesophageal reflux disease (GERD) can all be treated with antacids. Antacids lessen the acidity of stomach acid by raising its PH. It lessens the burning feeling in the throat or chest that results from stomach acid refluxing into the esophagus[2]. Over-the-counter antacids come in a variety of forms, including liquids and chewable tablets. Antacids are substances that increase the pH of the stomach and duodenum, reducing the stomach's acidity[3].

Mechanism of Action

Antacids are primarily used to neutralize hydrochloric acid[4]. The stomach produces it in order to digest food. The natural mucosal barrier that protects the stomach lining from damage may weaken due to excessive stomach acid production, resulting in discomfort and irritation. Acid reflux can sometimes occur, which can damage the esophagus. Antacids' alkaline ions reduce pain and harm to the stomach and esophageal linings by chemically neutralizing stomach acid. Pepsin, an enzyme that can damage the esophagus and result in acid reflux, is inhibited by several antacids. Antacids do not directly prevent acid secretion, in contrast to medications that reduce acid, such as proton pump inhibitors (PPIs) or h2-receptor antagonists. Helicobacter pylori is the bacterium[5].

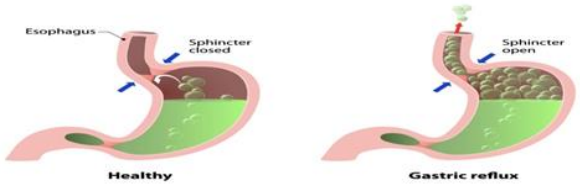

Diagram 1:- Formation of Gastric Reflux

Classification of Antacids

Based on Active Ingredients:

Calcium Carbonate: Provides immediate relief, it may also increase the formation of acid.

Magnesium Compound (e.g. magnesium hydroxide and magnesium carbonate): Can cause diarrhea when taken in excess.

Aluminum Compound (e.g., aluminum hydroxide): Might make some people feel constipated.

Sodium Bicarbonate: Offers immediate relief, but because of its high sodium concentration, it might not be appropriate for long-term use[6].

Based on the Mechanism of Action:

Acid neutralizers: Stomach acid directly to release it quickly. Magnesium hydroxide, aluminum hydroxide, and calcium carbonate are a few examples.

Acid Reducers: Lessen the amount stomach acid. Incretion example. Proton pump inhibitors (like omeprazole) and H2 blockers (like ranitidine) are two examples.

Mucosal Protector: Helps protect the stomach lining coating against acid damage. (e.g. sucralfate)[7].

Based on the Formulation:

Tablets: They them with water and swallow them whole.

Chewable Tablets: For immediate relief, chew these before ingesting.

Liquid: Could offer quicker relief and be simpler to take.

Medicinal Uses

- Antacids are over-the-counter medications that are administered orally to promptly relieve indigestion and heartburn, the main symptoms of gastroesophageal reflux disease[8].
- Antacids alone are symptomatic and should only be used to treat mild symptoms[9].
- Other conditions for which antacids can be used include diarrhea, constipation, hyperphosphatemia, and urine alkalinization. Sodium citrate and magnesium trisilicate, two non-particulate antacids, raise stomach pH but have little to no effect on stomach volume. Might not be very useful for pre-operative procedures.

Drug Interaction

A drug interaction occurs when two or more medications react with each other or with a food, beverage, or additive.

Antacids can decrease the absorption of acidic drugs (such as digoxin [Digitalis], isoniazid [isoniazid], phenytoin [Dilantin], chlorpromazine [Thorazine], and others), which leads to lower concentrations of these medications in the bloodstream and ultimately reduces their effectiveness[10]. When antacids are taken alongside medications like pseudoephedrine (Sudafed, Semprex D, Clarinex-D 12hr, Clarinex-D 24hr, Deconsal, Entex PSE, Claritin D, among others) and levodopa (Dopar), they can enhance the absorption of these drugs, potentially resulting in adverse effects or toxicity due to elevated blood concentrations. Antacids containing magnesium hydroxide [Mg(OH)2] and magnesium trisilicate are examples of such medications[11]. When combined with certain medications (such as tetracycline), it can bind to these drugs and diminish their absorption and effectiveness. Sodium bicarbonate (Na_2CO_3) significantly impacts urine acidity, which can influence the elimination (excretion) of specific medications through the kidneys. As a result, the presence of sodium bicarbonate decreases the excretion of some basic drugs like quinidine (Quinidex, Quinidine Sulfate, Quinidine Gluconate, Quinidine Injection) and amphetamines, while simultaneously increasing the excretion of some acidic drugs like aspirin.

Side Effect of Antacids

Some antacids can cause changes in bowel habits, leading to either constipation or diarrhea[12].

Some people may experience stomach cramps or discomfort after taking antacids.Long-term use of certain antacids can interfere with the body's ability to absorb calcium which can lead to osteoporosis or other bone- related issues. Antacids might also increase the risk of developing sensitive to certain food[13]. Antacid can either cause constipation or have laxative effect. Some antacids containing calcium carbonate or magnesium tri-silicate may increase the risk of developing kidney stones, especially in individual with a history of kidney stones. Although rare, some people may experience allergic reactions to the ingredients in antacids, such as difficulty breathing, rash, or swelling. Some people may experience allergic reactions to certain ingredients in antacids, such as hives, itching, or swelling of the face, lips, or throat.

Combination of Antacids

- Magnesium hydroxide and aluminum hydroxide: This stomach settling agent combination is recurrence utilized to neutralize the purgative and corrosive neutralizing impacts of magnesium hydroxide and aluminum hydroxide[14].
- Calcium carbonate and magnesium hydroxide: This combination of stomach settling agents can give fast help from side effects and may to offer assistance to progress bone wellbeing by giving a source of calcium[15].
- Sodium bicarbonate and citric acid: This combination of stomach settling agents is commonly utilized in bubbling tablets, which break up in water and give a fizzy, reviving drink.

- Simethicone, magnesium hydroxide, and calcium carbonate: This stomach settling agent combo is recurrence utilized to treat corrosive reflux, acid reflux and gas. In the stomach, simethicone breaks up gas bubbles, and magnesium hydroxide and calcium carbonate neutralize abundance acid[16].

Table 1: Details of Antacids bought from different marketed companies

S.No	Different Companies	Brand Name	Combinations	Cost
1.	Sun pharma	Pantocid-IT	Pantoprazole + Itopride	335/-
2.	Aristo pharma	Pantop DSR	Pantoprazole + Domperidone	210/-
3.	Cipla LTD	Pantosec-LS	Pantoprazole + Levosulpiride	223/-
4.	Meditouch	Peptouch-O	Pantoprazole + Ondansetron	80/-
5.	Dr. Reddy	Omez-DSR	Esomeprazole + Domperidone	204/-

Why doctors prescribe antacid?

Doctors prescribe antacids to combat stomach acid and relieve the symptoms of conditions like indigestion, acid reflux, and heartburn. Antacids may provide instant relief from stomach acidity. molecules like calcium carbonate, magnesium hydroxide, or aluminium hydroxide, which are found in antacids, combine with stomach acid to produce neutral molecules that lessen acidity. This reduces symptoms and speeds up the healing process for ailments like gastric ulcers and gastro-esophageal reflux disease (GERD). Antacids provide instant relief since they work fast but have short-lived effects [17]. For long-term management, doctors frequently suggest lifestyle modifications and other drugs because prolonged or excessive use might result in side effects like electrolyte imbalance.

Table 2: Important antacids and their features

Sr.no	Antacids	Advantages	Disadvantages	Clinical Conditions
1.	calcium carbonate	Potent and rapidly acting	Fast acting gastrointestinal distress Nausea/vomiting Hypercalcemia Hypophosphatemia	Heart Acid indigestion Abdominal disorder
2.	Magnesium Tri-silicate	Slow but long-lasting laxative (at higher doses)	Low solubility and reactivity, systemically absorbed	Dyspepsia Heart burn Hyperacidity Constipation
3.	Magnesium hydroxide	Reacts with HCL is an effective antacid.	Low solubility in water, without systemic alkalosis (mg is poorly absorbed from intestine)	Constipation, digitalis toxicity Hypomagnesemia Peptic ulcer
4.	Aluminium hydroxide	Increase gastric fluid pH, Absorbs pepsin	Effectively,with low systemic absorption	Chronic diarrhea, hyper-parathyroidism Hyperphosphatemia
5.	Sodium bicarbonate	Fastest acting antacids	Metabolic alkalosis with urinary alkalinization Ingestion of large doses.	Heartburn Urine Alkalinization Acidosis

Contraindications

An absolute contraindication is hypersensitivity to one of the product's ingredients. Also antacid agents require caution in patients with:

Renal failure, Heart failure, Edema, Low-sodium diets, Uremia

- Renal failure: - Failure of the renal system: A serious illness known as renal failure, or kidney failure, occurs when the kidneys are unable to operate normally. Although antacids are generally thought to be safe when taken as prescribed, there are rare instances in which they can exacerbate renal problems, especially if taken excessively over an extended period of time. Certain antacids contain aluminum compounds, including aluminum hydroxide, which can build up in the body over time and can cause renal issues, particularly in people who already have kidney disease or have reduced kidney function. These antacids can also cause constipation, which may further stress the kidneys [18].
- Heart Failure: - Sodium-containing antacids may cause fluid retention, which may exacerbate the symptoms of heart failure. Patients should select antacids with lower sodium content, if necessary, as they are frequently instructed to decrease their intake of sodium. Although aluminum doesn't directly damage the heart, it can bind to phosphate and change the amount of phosphate in the blood. Antacids with aluminum should be used with caution since low phosphate levels can affect cardiac function.
- Edema: - Choosing antacids with a reduced salt concentration may be advised as they can aggravate edema and cause fluid retention. If magnesium intake is not carefully controlled, it may have a laxative effect and produce diarrhea, which can result in dehydration. It is advisable to take magnesium-containing antacids with caution as dihydration can worsen edema.
- Uremia: - When kidney failure results in an overabundance of urea and other waste

products in the blood, the condition is known as uremia. When taking antacids with aluminum, like aluminum hydroxide, people with uremia should use caution. Since the kidneys are generally responsible for excreting aluminum, individuals with kidney dysfunction run the danger of developing a buildup of aluminum, which can be hazardous.

II. CONCLUSION

Antacids are a common over-the-counter medication used to relieve heartburn and other symptoms of indigestion. They work by neutralizing stomach acid. Antacids are generally safe for short-term use, but some may have side effects, such as constipation or diarrhea.

REFERANCE

1. Wright JV, Lenard L. Why stomach acid is good for you: natural relief from heartburn, indigestion, reflux and GERD. Rowman & Littlefield; 2001.
2. Pope CE. Acid-reflux disorders. New England Journal of Medicine. 1994 Sep 8;331(10):656-60.
3. Ravisankar P, Koushik O, Reddy A, KumarU AP, Pragna P. A detailed analysis on acidity and ulcers in esophagus, gastric and duodenal ulcers and management. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). 2016;15(1):94-114.
4. Alalor C, Avbunudiogba J, Builders F, Okpara L. Evaluation of the acid-neutralizing capacity of Some Commercially Available Brands of Antacid Tablets in Nigeria. East Afr Med J. 2019;2(1):12-6.
5. Crowe SE. Helicobacter pylori infection. New England Journal of Medicine. 2019 Mar 21;380(12):1158-65.
6. Garg V, Narang P, Taneja R. Antacids revisited: review on contemporary facts and relevance for self-management. Journal of International Medical Research. 2022 Mar;50(3):03000605221086457.
7. Ushkalova EA. What drugs are antacids? Antacids: principle of action, examples, indications for use.
8. Lamy PP. Over-the-counter medication: The drug interactions we overlook. Journal of the American Geriatrics Society. 1982 Nov;30:S69-75.
9. Ching CK, Lam SK. Antacids: indications and limitations. Drugs. 1994 Feb;47:305-17.
10. Mitrea LS. Pharmacology. Natural Medicine Books; 2008.
11. Wyllie D. The influence of certain antacids on the acidity of human gastric juice, with special reference to magnesium trisilicate. Edinburgh Medical Journal. 1940 May;47(5):336.
12. Toney RC, Wallace D, Sekhon S, Agrawal RM. Medication induced constipation and diarrhea. Practical Gastroenterology. 2008 May;32(5):12.
13. Pali-Schöll I, Jensen-Jarolim E. Anti-acid medication as a risk factor for food allergy. Allergy. 2011 Apr;66(4):469-77.
14. Patel MJ. Gastrointestinal Agents Acidifying agents and Antacids.
15. Maton PN, Burton ME. Antacids revisited: a review of their clinical pharmacology and recommended therapeutic use. Drugs. 1999 Jun;57(6):855-70.
16. Friend DG. Antacids. Clinical Pharmacology & Therapeutics. 1961 Sep;2(5):703-8.
17. Pegu KD. Pharmacology of antacids. Southern African Journal of Anaesthesia and Analgesia. 2020 Nov 13;26(6):S133-136.
18. Garg V, Narang P, Taneja R. Antacids revisited: review on contemporary facts and relevance for self-management. Journal of International Medical Research. 2022 Mar.