Osmotic Laxatives

Osmotic laxatives work by increasing osmotic load in the gastrointestinal lumen. These medications are indicated for hepatic encephalopathy and constipation. Examples include magnesium hydroxide, magnesium citrate, polyethylene glycol, sorbitol, and lactulose. Common side effects are diarrhea and dehydration. These drugs are often misused in patients with bulimia nervosa to induce unhealthy weight loss.



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Mechanism of Action

Increases Osmotic Load
Up-arrow Water-bottle
Osmotic laxatives work by drawing water into the stool by increasing its osmotic load. This results in softer stool and triggers bowel movements within 30 minutes to 6 hours after administration.

Indications

Hepatic Encephalopathy
Liver with Altered Brain
Hepatic encephalopathy is a syndrome of neuropsychiatric abnormalities in advanced liver disease patients. It is related to high levels of toxic ammonia that is unable to be metabolized by the diseased liver. Lactulose is used to decrease ammonia levels by triggering colonic bacteria to uptake ammonia as a nitrogen source for protein synthesis.

Constipation
Corked Con-toilet
Healthcare providers should consider pharmacological options to treat constipation after initial interventions for lifestyle and increased fiber and fluid consumption fail to relieve symptoms. The first pharmacological recommendation is bulk-forming laxatives while osmotic laxatives are second line in this regard.

Drugs

Magnesium Hydroxide
Magnesium-magazine and Hydra-OHs
Magnesium hydroxide is used as an antacid and osmotic laxative. Side effects include diarrhea and hypermagnesemia.

Magnesium Citrate
Magnesium-magazine Citric-lemon
Magnesium citrate is used as an osmotic laxative to treat constipation. It is also used for the preparation of surgery and bowel procedures. It can result in a bowel movement after 30 minutes to 3 hours.

Polyethylene Glycol
Polly with Antifreeze
Polyethylene glycol (PEG) binds to water and keeps it inside the gut lumen. It is often used as a laxative in preparation for colonoscopy with a "two-day" or "one-day" dosing regimen. Preparation for colon surgery and barium X-ray examinations may also use PEG. It is indicated for fecal impaction in adults if the stool is located higher up in the gut and manual disimpaction and enemas fail to pass stool.

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Sorbitol
Sorbet
Sorbitol is a poorly absorbed sugar alcohol with a hyperosmolar effect that can induce bowel movement and water retention in the gut lumen. Some fruits, such as pear and apple, contain sorbitol that can be used as a lifestyle approach to treat constipation.

Lactulose
bLack-tulip
Lactulose is a poorly absorbed, synthetic disaccharide. It is formed from galactose and fructose. Lactulose has a longer onset time (24-72 hours) compared to other osmotic laxatives. Another use for lactulose is in hepatic encephalopathy. It works by reducing the absorption and production of ammonia to decrease ammonia levels in the central nervous system.

Side Effects

Diarrhea
Toilet
Diarrhea is the intended effect for osmotic laxatives. However, it can be classified as an adverse event if it causes significant dehydration or hypovolemia.

Dehydration
Empty-canteen
Dehydration can present with light-headedness, thirst, decreased urination, dry mouth, and weakness. In excessive diarrhea, electrolyte abnormalities can also occur.

Considerations

Misused in Bulimia Nervosa
Abused by Bulimia-bully
Bulimia nervosa is an eating disorder in which patients eat excessively and try to purge it out in several ways, including using laxatives. Laxative abuse is reported in about 14.9% of bulimia nervosa patients, a 3-fold increase over the general population use.

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