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RESEARCH ARTICLE

EFFECT OF BUSCOPAN COMPARED WITH GLUCAGON DURING GASTROSCOPY, COLONOSCOPY, AND ERCP- A NARRATIVE REVIEW

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Abstract

Objective: To provide a comprehensive overview of Buscopan and glucagon, comparing their mechanisms, efficacy, safety profiles, and guidelines for use in gastrointestinal endoscopy and ERCP. This review aims to offer insights into the optimal use of these agents, emphasizing the importance of personalized medicine in endoscopic practice. A narrative review was conducted, analyzing studies, clinical trials, and guidelines from prominent gastroenterological associations, including the Canadian Association of Gastroenterology (CAG) and the British Society of Gastroenterology (BSG) to compare the effects and efficacy of Buscopan and Glucagon. Buscopan is effective in enhancing visualization and reducing patient discomfort during endoscopic procedures. However, its use is contraindicated in certain conditions such as angle-closure glaucoma and with specific drug interactions. The CAG recommends against its routine use in gastroscopy and colonoscopy but acknowledges its benefits in ERCP (Endoscopic Retrograde Cholangiopancreatography). Glucagon, with a rapid onset and short half-life, is a viable alternative, particularly for patients who cannot use Buscopan. It has minimal side effects but requires careful management of potential hyperglycemia. Buscopan remains the preferred choice for spasmolysis in endoscopic procedures due to its efficacy and cost-effectiveness. Glucagon serves as an important alternative in cases where Buscopan is contraindicated. Personalized medicine, considering individual patient needs and potential risks, is essential in optimizing the use of these agents in gastrointestinal endoscopy. This review highlights the need for clinicians to carefully select and dose these spasmolytic agents to enhance patient safety, comfort, and procedural outcomes.

Introduction:-

Buscopan, a medication containing hyoscine butyl bromide, has become a mainstay in gastrointestinal procedures like gastroscopy and colonoscopy due to its ability to relax smooth muscles, thereby reducing spasms and improving visualization. Despite its widespread use, Buscopan's efficacy and safety have been scrutinized, leading to varying recommendations across medical guidelines, which we have discussed about in this article. Glucagon, a hormone with primary functions in glucose metabolism, has also been explored as an alternative spasmolytic agent in endoscopic procedures. This narrative review aims to provide a comprehensive overview of Buscopan and glucagon,

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comparing their mechanisms, efficacy, safety profiles, and guidelines for use in gastrointestinal endoscopy. By examining the latest research and clinical guidelines, we seek to offer insights into the optimal use of these agents, emphasizing the importance of personalized medicine in endoscopic practice. The review synthesizes findings from the latest studies that compare the two agents' effectiveness and safety in different patient populations. It also considers the practical aspects of their use, such as dosing strategies, administration routes, and potential interactions with other medications. By evaluating these factors, the review highlights the clinical scenarios where each agent may be preferred and the specific patient conditions that necessitate careful selection and personalized dosing.

Literature Discussion:-

Background

Buscopan a.k.a. hyoscine butyl bromide characteristics and properly non-opioid, non-narcotic as well as an antimuscarinic medication that is administered orally, intramuscularly, or intravenously, known to act in the body by inhibiting the action of acetylcholine, a neurotransmitter responsible for muscle contractions (1, 2). This, in turn, leads to improved visualization during gastroscopy and colonoscopy procedures. As per the article titled "A Randomized Study Comparing Glucagon and Hyoscine N-Butyl Bromide before Endoscopic Retrograde Cholangiopancreatography," we can note that Buscopan has stood the test of time, since 1995, to be proven efficacious for imaging techniques. Hyoscine is an alkaloid found in the leaves of plants of the Datura and Duboisia genera. Hyoscine butyl bromide is produced from hyoscine by chemically adding a butyl group to form a quaternary ammonium structure, which renders it unable to cross the blood-brain barrier (4). This is how the properties of Buscopan in endoscopy and colonoscopy, allow endoscopists to perform their examinations with greater efficiency and accuracy. The patient's comfort is also improved, as Buscopan can reduce anxiety and discomfort associated with the procedures since good visualization minimizes injuries. Furthermore, Buscopan's effect on muscle relaxation can prevent potential complications, such as perforation or bleeding, which may occur due to spasms or contractions in the gastrointestinal tract (4,5).

It is proven by many studies conducted, one example being a study with the title "Use of intravenous hyoscine butylbromide (Buscopan) during gastrointestinal endoscopy" showing clearly that patients who received Buscopan had a significantly clearer view of the gastrointestinal tract compared to those who did not receive the medication because of the drug's ability to relax the smooth muscles in the stomach and intestines, thus reducing spasms and contractions that could distort the endoscopic image (6). Hence, this is an evidence-based practice. Furthermore, the importance of careful selection and dosage of medications in endoscopic procedures. It was found that the optimal dosage of Buscopan was 20 mg, which provided maximal relaxation of the smooth muscles without causing adverse effects such as respiratory difficulties or heart rate changes (2,7). This underscores the importance of personalized medicine, as each patient may require different doses.

Buscopan has garnered a lot of attention for endoscopies globally but another agent that provides the same potential is glucagon, a hormone primarily produced by the pancreatic alpha cells. Glucagon's primary function is to raise blood glucose levels by stimulating the liver to release stored glucose (8). This property has led to the exploration of its utility in the context of endoscopic procedures. The actions of glucagon include a stimulation of insulin secretion in a glucose-dependent manner, a suppression of glucagon, a reduction in appetite and food intake, a deceleration of gastric emptying, and stimulation of β-cell neogenesis, growth, and differentiation (9). The potential benefits of using glucagon during endoscopic examinations are multifaceted. While the short half-life of glucagon may pose a challenge, researchers have found that the continuous infusion of exogenously administered GLP-1 receptor agonists, such as exenatide and liraglutide, can overcome this limitation and result in a decrease in blood glucose concentrations (9, 10). Indeed, the use of glucagon during endoscopic procedures may contribute to improved patient comfort and satisfaction by facilitating the examination process and reducing any potential discomfort associated with gastric distension or hypoglycemia (11).

What happens in the body? Glucagon versus Buscopan

Once administered IV, Buscopan has a fast distribution into abdominal and smooth muscle, with a small extent of spread to other areas of the body, as well as poor systemic absorption from the gastrointestinal tract which explains its disability to cross the blood-brain barrier as mentioned previously. The liver is the main site of metabolism of this drug with a total clearance of 1.2 liter/min. Two-thirds of excretion is renal and one-third is by fecal matter (4).

Patients with myasthenia gravis, mechanical stenosis of the gastrointestinal tract, paralytical or obstructive ileus, megacolon, and those who have previously shown hypersensitivity to hyoscine butylbromide or any other ingredient

in the products should not use buscopan. Furthermore, buscopan shouldn't be given intravenously in cases of untreated narrow-angle glaucoma, tachycardia, or prostate hypertrophy combined with urine retention. Buscopan injections intramuscularly are contraindicated in patients receiving anticoagulant medications because they may cause intramuscular hemorrhage. The intravenous or subcutaneous routes may be used for these patients (12). Drugs like quinidine, amantadine, disopyramide, tri-and tetracyclic antidepressants, antihistamines, antipsychotics, and other anticholinergics (like tiotropium, ipratropium, and atropine-like compounds) may have an increased anticholinergic effect when taken with buscopan. Metoclopramide and other dopamine antagonists may lessen each other's effects on the gastrointestinal tract when taken concurrently as well as The tachycardic effects of beta-adrenergic agents may be enhanced. The drug showed no contraindications concerning pregnancy but there is insufficient research done on its effects on breastfeeding (12). Other known side effects are unexplained abdominal pain that persists or worsens, or occurs together with symptoms like fever, nausea, vomiting, changes in bowel movements, abdominal tenderness, decreased blood pressure, fainting, or blood in stool (12).

While multiple studies, research, and guidelines support the use of buscopan as a spasmolytic before endoscopy, the Canadian Association of Gastroenterology (CAG) advises against its administration prior to gastroscopy and colonoscopy as they state that buscopan does not provide any significant improvement in outcomes concerning abnormality detection but; did not mention any adverse effects as well. The CAG has highlighted that they do not have significant data to prove any major benefits of using buscopan in colonoscopies but high evidence against buscopan use for gastroscopy. However, they have also mentioned that buscopan is highly beneficial for ERCP, and all benefits outweigh the risks. It is highly beneficial for the cannulation of the biliary tract (13). According to guidelines from the British Society of Gastroenterology (BSG), patients who have a history of angle-closure glaucoma should not take the buscopan during a colonoscopy. On the other hand, angle-closure glaucoma is uncommon, asymptomatic at first, and curable with a single laser treatment (if detected early). Hyoscine does not affect open-angle glaucoma (14). Since buscopan is less expensive and more effective in distending the colon than glucagon, it is more common in routine use (15).

Glucagon on the other hand results in rapid onset of peristaltic inhibition making various diagnostic and therapeutic endoscopic procedures simpler or even possible, similar to buscopan however; compared with the usual atropin-like antispasmodics, glucagon has the advantage of being free from side effects with an exception of transient hyperglycemia. Diabetes mellitus requiring insulin is a (relative) contra-indication to the use of glucagon. crystalline glucagon (0.2 to 0.5 mg., average dose 1 u/kg. body weight given at a single intravenous injection) resulted in a significant relaxation and reduction of peristalsis (16). Glucagon must be taken parenterally, often through the intravenous route, where it has a rapid therapeutic action within 5 minutes. The typical distribution volume is minimal, at 0.25 liter per kilogram with a short serum half-life of 8-18 minutes, and is quickly metabolized in the liver, kidney, and plasma into amino acids. In individuals who are susceptible to anticholinergic agent adverse effects, the brief duration of action may be advantageous over alternative spasmolytic agents (4). Glucagon also does not affect parasympathetic activity as well as shows a minimal increase in heart rate and a transient decrease of the same after endoscopic examinations (17). While Glucagon is a safe drug, and no significant side effects have been reported in the literature detailing its usage in endoscopy, reactive hypoglycemia may be a serious event in patients premedicated with glucagon, because glucagon stimulates insulin release. Symptoms of hypoglycemia may begin to occur 90–120 min after the administration of glucagon (4, 17). Glucagon is contraindicated in the context of pheochromocytoma since it has occasionally been shown to trigger pheochromocytoma crisis (4).

A similar opinion has been stated across literature for ERCP procedures as well, stating that buscopan and glucagon show no significant difference in anti-peristaltic effect (18, 19, 20). Comparing Buscopan and glucagon for ERCP involves evaluating their effects on duodenal motility and procedural outcomes. Buscopan, an anticholinergic agent, reduces smooth muscle spasms and aids in bile duct cannulation. It is cost-effective but can cause side effects like dry mouth and blurred vision. Glucagon, a hormone, also reduces duodenal motility and can improve cannulation success but is more expensive and can cause hyperglycemia. Studies indicate that glucagon combined with nitroglycerin may enhance outcomes more effectively than Buscopan (20). However, the Canadian Association of Gastroenterology proving buscopan superior. It is also important to note that buscopan is significantly more cost-effective than glucagon (13, 18). It is also important to note that clinical trials comparing these agents indicate that Buscopan tends to be more effective in terms of reducing patient discomfort (21).

Hence, it would be safe to state based on the provided data that even though buscopan may be the drug of choice for spasmolysis in endoscopic procedures, in all situations where buscopan is contraindicated, glucagon is a wonderful

alternative, keeping in mind the possible hypoglycemia for which the management should be planned accordingly, with the exception of pheochromocytoma where it is best to avoid glucagon.

Conclusion:-

In conclusion, Buscopan, containing hyoscine butyl bromide, has proven to be an effective spasmolytic agent in gastrointestinal procedures such as gastroscopy and colonoscopy. Its ability to relax smooth muscles and reduce spasms enhances visualization and accuracy during endoscopic examinations, contributing to both the efficiency of the procedure and patient comfort. However, its use must be carefully considered in patients with specific contraindications, and its interaction with other medications should be closely monitored. Despite its benefits, some guidelines, like those from the Canadian Association of Gastroenterology (CAG), have raised concerns about its efficacy in improving diagnostic outcomes, particularly in gastroscopy, though they acknowledge its utility in ERCP procedures. The British Society of Gastroenterology (BSG) also highlights the importance of avoiding Buscopan in patients with angle-closure glaucoma.

On the other hand, glucagon presents a viable alternative, especially for patients who cannot use Buscopan. While glucagon offers similar muscle relaxation benefits without significant side effects, its rapid metabolism and potential to cause hypoglycemia must be managed carefully.

Overall, while Buscopan remains the preferred choice due to its cost-effectiveness and efficacy, glucagon serves as an important alternative in cases where Buscopan is contraindicated. Personalized medicine approaches, considering individual patient needs and potential risks, are essential in optimizing the use of these spasmolytic agents in endoscopic procedures.

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