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Intestinal preparations for colonoscopy. Comparative study: mannitol, picosulphate and macrogol

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ABSTRACT

Bowel preparation is mandatory prior to elective colonoscopy and their effectiveness is closely related to the quality of the examination. There are many preparations on the market and there is no consensus on which is best. This study aimed to compare three solutions for colon preparation in patients undergoing colonoscopy. We conducted a prospective study with 61 patients divided randomly into three groups: one that received a standard dose of macrogol, another received a standard dose of 10% mannitol and another received a standard dose of sodium picosulphate. Patients and examining endoscopists responded to questionnaires for compiling data. In the results we noticed that 10% mannitol, despite being less tolerated by the patient when compared to sodium picosulphate, presents better results in colonic cleaning, being therefore superior in this regard. Macrogol was considered as an intermediate in relation to the other two preparations. As for tolerability, preference is given to sodium picosulphate as best tolerated, followed by mannitol and by macrogol, which is poorly tolerated by the patient. We conclude that as the main objective of bowel preparation in colonoscopy is the quality of colonic cleaning, 10% mannitol was superior to the other preparations studied.

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Preparos intestinais para colonoscopia. Estudo comparativo: manitol, picossulfato e macrogol

RESUMO

O preparo intestinal é mandatório antes da realização das colonoscopias eletivas e sua eficácia está intrinsecamente relacionada à qualidade do exame. Existem diversos preparos no mercado e não há consenso sobre qual é melhor. Este estudo teve como objetivo comparar

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Manitol
Picossulfato de sódio
Macrogol

três soluções para preparo de cólon em pacientes submetidos à colonoscopia. Foi realizado um estudo prospectivo com 61 pacientes distribuídos de forma randomizada em três grupos: um recebeu macrogol, outro manitol a 10% e outro picossulfato de sódio em doses padrão. Os pacientes e os endoscopistas examinadores responderam a questionários para compilação de dados. Nos resultados notamos que o manitol a 10%, apesar de ser menos tolerado pelo paciente quando comparado ao picossulfato de sódio, apresenta melhores resultados na limpeza colônica, sendo, portanto, superior neste quesito. O macrogol foi considerado como intermediário em relação aos outros dois preparos. Quanto à tolerabilidade, a preferência recai sobre o picossulfato de sódio como o mais bem tolerado, seguido pelo Manitol; macrogol foi o menos tolerado pelo paciente. Concluimos que, como o principal objetivo do preparo intestinal na colonoscopia é a qualidade da limpeza colônica, o manitol a 10% mostrou-se superior aos demais preparos estudados.

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Introduction

Colonoscopy is an increasingly used procedure because it allows direct visualization of the colonic mucosa. However, its effectiveness depends directly on a good bowel cleansing. The success of colonoscopy is linked to the efficacy of the colonic preparation.¹ This preparation consists of emptying the colon of all its fecal contents, thus allowing a complete verification of the mucosa. Therefore, it is considered the gold standard for the investigation of several disorders of the colon.²⁻⁴

Bowel preparation has also evolved a lot over time. At first, bowel cleansing lasted for several days.⁵ This cleaning strategy consisted of a special diet, repeated bowel washes, and the use of purgatives that caused many side effects, for example, severe intestinal cramps. In the 1970s, mannitol appeared, this was the first modification in the form of bowel preparation, a medication with a faster effect, better tolerated and with fewer side effects. Subsequently, other new drugs emerged, with varied actions and adverse effects.

The ideal preparation is one with superior efficacy, good safety, low monetary cost, ease of administration and excellent tolerance for the patient.⁶ However, despite the existence of several preparations in the market, there is not one that is currently considered perfect.

Regardless of the product used, this type of cleaning stimulates peristalsis and intestinal spasms, causing symptoms such as colic, abdominal distension, liquid diarrhea, hydro-electrolytic losses, and anal discomfort.¹

Currently, the most widely used methods for this purpose have been mannitol, macrogol or sodium picosulphate solutions.²

Mannitol (MANITOL, Fresenius Kabi, Itapeceira da Serra, Brazil) is one among several drugs available. This product has been used by parenteral route since the 1950s as an osmotic diuretic and renal vasodilator. However, it was only in the 1970s that mannitol was administered orally as a bowel preparation.

This preparation is digested by some bacteria, specifically *E. coli*.⁷ Because of its chemical characteristics and also because it is a polyol (sugar-alcohol), a nonabsorbable carbohydrate, when administered in high doses, causes osmotic diarrhea.⁵

Thus, mannitol was administered as a preparation of the large intestine for both surgeries and colonoscopic examinations.

When emerged as an alternative to colon preparation, mannitol was a great promise. It was expected that this would be a product with a rapid effect, easy administration, good patient acceptance, and few side effects. In addition, it was a cheap option.⁵ However, due to the dehydration that occurred after its use and the colonic blasts during electrocautery procedures, mannitol was abandoned in many countries. The United States is not adept at its use, because of the risk of colonic explosions, giving preference to macrogol solutions. In Brazil, Colombia, Cuba, and England, mannitol is widely used. As a consequence, new protocols of preparation began to be studied.⁸

Regarding dosage and administration, variations may occur among different Services. In general, 20% mannitol should be diluted in water in equal proportions and subsequently taken. The product can be ingested within 2 hours, which is known as “mannitol express”, or within 12 hours. However, when administered within 12 hours. This product should be administered in greater amounts.⁹ Mannitol can sometimes be diluted with lemon or orange juice, without bagasse, or in flavored water. This is done to improve the taste of the product because mannitol is very sweet, which can cause problems with its intake.^{2,8}

Generally, the result of the use of mannitol is described as favorable, for promoting an adequate cleaning in all segments. In addition, it is also considered as a fast cleaning method.⁹

Macrogol (MUVINLAX, Libbs Pharmaceuticals, Embu, Brazil) is a high-molecular-weight polyethylene glycol (PEG). When combined with electrolytes in an iso-osmolar solution for the purpose of bowel cleansing, this product is considered a good preparation for colonoscopy.^{1,5} This is a non-toxic solution, even when used in large quantities.¹ Macrogol associated with electrolytes is not absorbed by the colon and does not cause secretion of water and sodium, thereby reducing large fluid changes.

The great advantages of macrogol are to provide the same cleaning quality achieved by the other preparations used for colonoscopy, without limiting the risk of colonic explosion, since this preparation reduces the concentration of combustible intestinal gases to levels much lower than those

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