



# Macrogol 4000: evidence-based self-medication for functional constipation

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Macrogol preparations are one of the first-line treatments for constipation in both, children and adults. A review has confirmed the efficacy and tolerability of macrogol 4000 compared with lactulose and macrogol preparations with added electrolytes. The osmotic laxative is a good recommendation on pharmacoeconomic grounds as well.

## Macrogol preparations: first-line therapy in evidence-based self-medication

Macrogol 4000 consists of a mixture of non-absorbable polyethylene glycol (PEG) with a mean molecular weight of 4000 Da. The action is based on a physical principle: Macrogol 4000 is taken orally together with water. With that, water molecules already bind to the polymer before entering the intestine. Reaching the intestine the stool volume is increased and stool consistency becomes softer. This stimulates and eases the defecation process.

There is no loss of effectiveness with long-term use (no habituation), and neither relevant disturbances in electrolytes nor relevant changes to the intestinal microbiome occur [1]. Considering advices, macrogol 4000 can also be used in specific patient groups (Tab. 1).

## Macrogol with or without added electrolytes Comparable in efficacy and tolerability

A network meta-analysis compared the relative efficacy of macrogol 3350/4000 ± electrolytes in the treatment of functional constipation in 1032 adults [3]. Macrogol preparations with and without electrolytes were comparably effective in relation to the increase in weekly stool frequency relative to placebo [increase of 1.8 (95% CI 1.0–2.8) and 1.9 (95% CI 0.9–3.0) bowel motions/week]. In addition, the analysis showed no difference between macrogol ± electrolytes in terms of safety and tolerability.

## Electrolyte-free formulation improves patient acceptance

In a head-to-head study in 91 children, the stool frequency under macrogol 4000 was significantly better compared to macrogol 3350 + electrolytes ( $p = 0.025$ ). There were no significant differences between the groups in relation to other criteria. It is worth noting that the macrogol 4000 formulation

Tab. 1. Summary of the use of macrogol 4000 in specific groups of patients [1]

Specific groups of patients	Advice on use
Pregnant and breast-feeding women	Macrogol 4000 can be used, since the absorption of macrogol 4000 is negligible. Physician consultation is advised.
Patients with a low-sodium diet	Electrolyte-free macrogol formulations should be preferred.
Diabetics, patients with fructose intolerance	Use of flavored preparations is not advised, due to potential content of sucrose and/or sorbitol

was accepted by children significantly better than the electrolyte formulation ( $p < 0.001$ ) [2].

## Macrogol compared to lactulose

A meta-analysis of 10 randomised clinical studies with a total of 868 participants aged 3 months to 70 years compared the effects of macrogol and lactulose in chronic constipation [4]. Macrogol preparations increased weekly stool frequency, softened stool consistency, relieved abdominal pain and reduced the need for additional laxatives significantly more than lactulose. Moreover, its use is typically associated with less vomiting and flatulence, since in comparison to lactulose, macrogol is not fermented by intestinal bacteria with the concomitant development of gas. As an inexpensive, long-term effective laxative with a high therapeutic safety, macrogol is an interesting alternative to lactulose also in pharmacoeconomic terms [5].

## Summary

The efficacy of macrogol 4000 for the treatment of functional constipation is well established and well-proven. According to the author of the review, the addition of electrolytes does

not influence effectiveness nor improves tolerability or safety, since there is no loss of electrolytes with macrogol 4000 treatment. Patients are said to prefer the taste of the electrolyte-free preparation, which can improve adherence and hence the efficacy, especially in children and the elderly.

Regarding the comparison of macrogol 4000 and lactulose, the author considered macrogol more effective than lactulose in increasing stool frequency and improving stool consistency and other constipation-related outcomes. In addition, treatment with macrogol is typically very well-tolerated, with less vomiting and flatulence compared to lactulose, since the biologically inert polyethylene glycols are not fermented by intestinal bacteria.

#### Literature

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