

Differences in Taste between Two Polyethylene Glycol Preparations

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Abstract

Background and aims. Polyethylene glycol preparations (PEG) are increasingly used for chronic constipation in both adults and children. There are some suggestions that PEG 4000 with orange flavour (Forlax®) tastes better than PEG 3350 which contains salt (Movicolon®). Poor taste is an important factor for non-compliance and is one of the leading causes of therapy failure. The aim of the study was to compare the taste of two commonly used PEG preparations, PEG 4000 and PEG 3350. **Methods.** A double-blind, cross over randomised trial. A hundred people were recruited by advertisement. All tasted both preparations without swallowing and after tasting each of the preparations, they rinsed their mouths. Then a score, on a 5-point scale, was given for both preparations. **Results.** 100 volunteers were included (27 males and 73 females, mean age 36). The taste score for PEG 4000 (mean 3.9, SD 0.7) was significantly better than for PEG 3350 (mean 2.7, SD 0.7) ($p < 0.0001$, Wilcoxon matched pairs test). No difference in gender or age was observed. The volunteers which tasted PEG 3350 liked it more, when they tasted it first rather than when they tasted it after PEG 4000 ($p < 0.0001$). The order in which volunteers tested PEG 4000 had no influence on the taste results. **Conclusion.** PEG 4000 tastes better than PEG 3350. This may have implications for patient compliance and effectiveness of treatment in patients with chronic constipation.

Key words

Polyethylene glycol - laxative - constipation

Introduction

Constipation is one of the most common health problems, with a negative impact on quality of life. The frequency of

constipation is not exactly known, it varies from 2-4% for infrequent defecation to more than 10% for excessive straining and up to 20% in nursing homes.(1) The overall incidence of constipation in adults in the Western world is estimated at 15% (2).

Polyethylene glycol (PEG) based products are iso-osmotic solutions, which are effective, safe and increasingly used in chronic constipation in both adults and children. The aim of this study was to compare the taste of two commonly used PEG preparations, PEG 4000 (Forlax®) and PEG 3350 (Movicolon®).

Methods

Study design

A total of 100 healthy volunteers recruited by advertisement were included in a double blind, randomized cross over study. All volunteers were invited to taste both preparations. After tasting the first 25ml without swallowing, the mouth was rinsed and the second preparation was tasted without swallowing. Then a score on a 5-point scale was given (1= very bad taste, 5 = very good taste) for both preparations. This was an investigator initiated study and permission nr. 06/081 was granted from the Central Medical Ethics Review Board of the VU University Medical Centre.

Polyethylene glycol preparations

PEG 4000 (Forlax®) consists of 10g macrogol 4000 per sachet, is an orange-grapefruit flavoured, gentle acting osmotic laxative. It contains no extra salt and electrolytes. It is neither absorbed nor metabolized. PEG 3350 (Movicolon®) contains 13.125g macrogol 3350, sodium hydroxide carbonate 178.5mg, sodium chloride 350.7mg, potassium chloride 46.6mg and citron aroma. The extra electrolytes cause the taste of this laxative.

Each dose of the preparations was dissolved in 150 ml of cold water conforming with instructions.

Statistics

All results were analyzed in the Wilcoxon matched pairs test (GraphPad InStat Software, SanDiego, Ca, USA).

Results

One hundred volunteers were included (27 males and 73 females, mean age 36, range 18-65). Eighty-four volunteers preferred the taste of PEG 4000, 9 found no differences in the taste of the two preparations and only 7 preferred the taste of PEG 3350. The taste score for PEG 4000 (mean 3.9, median 4, SD 0.7) was significantly better than PEG 3350 (mean 2.7, median 3, SD 0.7) ($p < 0.0001$) (Fig. 1). There was no difference in gender or age observed. The volunteers who tasted PEG 3350 appreciated the taste significantly more when it was given first rather than when receiving it second, after PEG 4000 ($p < 0.0001$). The order in which volunteers tested PEG 4000 had no influence on the taste results of this preparation (Table I).

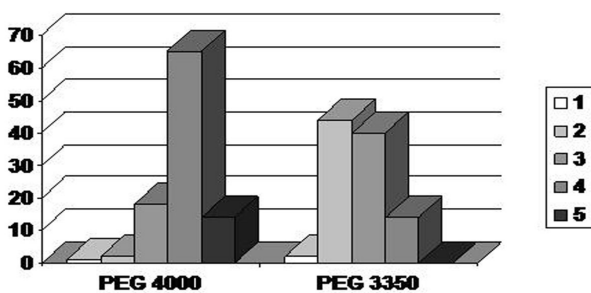


Fig. 1 Taste scores (1= very poor taste, 5 = very good taste) for PEG 4000 and PEG 3350 given by the volunteers ($p < 0.0001$).

Table I Taste scores according to the sequence of tasting of the PEG solutions

Scores	PEG 4000 first attempt	PEG 4000 second attempt	PEG 3350 first attempt	PEG 3350 second attempt
1	0	1	0	2
2	0	2	5	39
3	9	9	32	8
4	34	31	13	1
5	7	7	0	0
mean	3.96	3.82	3.16	2.16
p	0.3161	0.3161	<0.0001	<0.0001

Discussion

The most common causes for chronic constipation are general, such as low fibre diet, low fluid intake and physical inactivity (3-6). Medication (anticholinergic, antidepressants, opioid analgetics, NSAID)(7,) neurological and psychiatric disorders and idiopathic chronic constipation are other common causes (8). There are also socioeconomic, sex, regional and national differences in the prevalence of constipation (9,10). Constipation significantly impairs the health-related quality of life and only 66% of the patients consider their treatment as sufficient (11). Functional constipation is defined according to the Rome III criteria, where both slow transit and difficult evacuation are considered (12).

Mild constipation can be managed with non-pharmacological intervention, such as fibre-enriched diet which increases faecal bulk, increased fluid intake (>2 litres) and a more active lifestyle. Further physiotherapy, biofeedback and yogin breathing can be helpful in relaxing the pelvic floor and thus promoting defecation and evacuation. More severe constipation requires treatment with laxatives. There are several types of laxatives: bulk-forming, osmotic and stimulant (13). Bulking agents include methylcellulose, psyllium and PEG.

Patients suffering from severe chronic functional constipation require a long-term, regular therapy with laxatives. Although the literature is very scarce on this subject we know that the taste of laxatives is often not liked by patients (14,15). Many patients find it difficult to deal with poor tasting medication when prescribed, especially in geriatric and paediatric patients with chronic medication use. Such problems result in high incidence of non-compliance, which is one of the leading reasons of therapy failure (15-17).

Polyethylene glycol (PEG) based products are effective (18-21), safe (22-24) and often used in chronic constipation in both adults and children. The taste of PEG 4000 was liked by the patients (15).

This study showed that PEG 4000 tastes better in comparison to PEG 3350, independent of gender or age. In addition, PEG 3350 was even less appreciated when PEG 4000 was tasted first. The sequence of tasting did not differ for PEG 4000. In spite of mouth rinsing, the PEG 3350 was less liked overall.

Causes of non-compliance in long-term medical treatment are the taste of medication and dosage frequency. It would be helpful to switch to another better tasting preparation when patients dislike the taste. However, this study has only demonstrated a preference for PEG 4000 during a single intake of 25 ml of fluid. Whether this difference is so apparent after months or years is unknown. We chose the method without swallowing since taste was the issue and not the volume load; the volume of PEG as a laxative is only 150-300 ml daily. The odour of the preparation may also influence the judgement of the volunteers.

We suggest that PEG 4000 could be more appreciated by the patients and as a result may be more effective in long-term treatment. On the other hand, mixing with other fluids might also compensate for poor taste.

In conclusion, the taste of PEG 4000 was generally more liked than the taste of PEG 3350. When patients complain about the taste of their PEG preparation, switching to another may be an alternative.

Conflict of interest

None to declare.

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