

A comparison of sodium picosulphate ('Laxoberal') with standardised senna ('Senokot') in geriatric patients

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Summary

A comparison was made between the effectiveness of sodium picosulphate and that of standardised senna in a group of 50 long-stay geriatric patients. Both were found to be equally effective as laxatives, but there were wide variations in the responses of individual patients to these agents. Side-effects were uncommon. They may well have been reduced further if a small starting dose of sodium picosulphate had been used.

Key words: Laxatives – sodium picosulphate – senna – geriatrics

Introduction

Old people often appear to be preoccupied with colonic function. This was illustrated by one study where 66% of nonagenarians in the community were found to be on laxatives.^{1,6} Defunct medical theories on colonic auto-intoxication have probably contributed to this. Another factor is the age-related decline in gastrointestinal transit times.² This is often mistakenly treated as a manifestation of constipation. For these reasons there seems little doubt that many fit elderly people are needlessly habituated to large doses of laxatives.⁵

The picture is rather different when scrutiny is shifted to sick and disabled old people. Immobility has an important effect in inducing rectal and colonic stasis.³ This is all too frequently followed by faecal impaction.⁴ The patient is then only a short step away from frank faecal and urinary incontinence.² Laxatives may thus play an important part in relieving disabled patients from a considerable amount of embarrassment and distress and reducing the heavy nursing and domestic load imposed on relatives supporting them.

A wide range of substances is available for the treatment of constipation. They include hydrophilic bulking agents, stool softeners and laxatives with a local irritant effect on the colon. Most preparations in the first two groups are open to theoretical and practical objections in the elderly.⁷ Irritant agents include the anthracene and polyphenolic derivatives. Examples include standardised senna, calcium sennosides, and bisacodyl. These drugs are effective laxatives producing little habituation and, because of low absorption, causing little systemic toxicity.

Another recently developed polyphenolic laxative is sodium picosulphate

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('Laxoberal'). This is a sulphuric ester of bis-(p-hydroxyphenyl)-pyridyl-2-methane, Animal work suggested that it might prove to be a potent laxative with a low systemic toxicity.¹² Clinical trials have supported these conclusions.^{10,13-15} The present paper describes a comparison between this drug and standardised senna in the elderly population suffering from severe disability.

Methods

Subjects were selected from patients in two long-stay hospitals who were receiving treatment for chronic constipation. After selection each patient was given a study number. This, when related to a sealed code, indicated whether the patient was to be given standardised senna tablets or sodium picosulphate liquid. Any subject with faecal impaction was treated with suppositories or enemas and only included in the trial once the lower bowel was clear.

The initial starting dose of sodium picosulphate was 20 ml. (10 mg.) in the evening. Nursing staff were instructed to increase or decrease the daily dose by intervals of 5 ml. depending upon the previous response. Half way through the study the starting dose was reduced to 15 ml. It was felt that the higher dose was producing too brisk a response. The starting dose for standardised senna was 2 tablets† in the evening. Nursing staff again increased or decreased this by 1 tablet at intervals dependent on response. Both agents were given over the course of 2 weeks.

During the study, the nursing staff recorded details on the frequency, timing and consistency of bowel motions. They also noted the onset and outcome of any side-effects.

Results

Twenty-five patients on sodium picosulphate and 25 on standardised senna were included in the study. Table I details the sexes, ages and principle diagnoses for people in the two groups. Two of the subjects on sodium picosulphate were excluded from further analysis. One, though agreeing to participate, refused to take the laxative on the first day of the trial. In the other case, as a result of a

Table I. Details of 50 subjects included in the study

Patients	Sodium picosulphate	Standardised senna
Males	6	8
Females	19	17
Median age (years)	79	78
<i>Diagnosis:</i>		
Dementia	10	12
Cerebrovascular disease	6	5
Other neurological disease	2	4
Arthritis	4	2
Others	3	2

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†Each tablet contained sennosides A and B equivalent to 7.5 mg. sennoside B

recording error, no information was collected on the nature of bowel motions during the course of the study. One of the patients on standardised senna refused to continue on the drug during the second week of the trial. Information collected during the first week, however, was used for further analysis.

A comparison was made between the number of bowel actions per day produced by sodium picosulphate and those associated with standardised senna, (Table II). Sodium picosulphate resulted in significantly more actions during the first 2 days of treatment. Throughout the rest of the study period the figures associated with the two agents were almost identical. It should be noted that the mean dose of sodium picosulphate was considerably reduced over the first few days. That for standardised senna remained relatively constant over the 2-week observation period.

Table II. Number of bowel actions related to dose of laxative

Response	Mean number of bowel actions		Mean dose of laxative	
	Sodium picosulphate	Standardised senna	Sodium picosulphate (ml.)	Standardised senna (tabs.)
No. of patients	23	25	23	25
Day 1	1.26	0.60	16.7	2.0
Day 2	1.30	0.64	15.9	2.0
Day 3	0.78	0.72	13.3	1.8
Day 4	0.65	0.68	13.7	1.9
Day 5	0.74	0.84	11.1	1.7
Day 6	0.87	0.60	11.5	1.7
Day 7	0.61	0.50	10.9	1.8
Day 8	0.61	0.71	10.2	1.7
Day 9	0.43	0.38	11.1	1.7
Day 10	0.61	0.58	10.6	1.7
Day 11	0.65	0.75	11.1	1.8
Day 12	0.26	0.67	9.1	1.7
Day 13	0.48	0.58	11.5	1.8
Mean	0.71	0.63	12.1	1.8
Range			0 to 30	0 to 2

The results given in Table II are mean values. This conceals the fact that there was wide individual variation in the dosage of sodium picosulphate. The drug, after initial titration, was occasionally stopped and only recommenced when bowel function became unsatisfactory. There was much less variation in the dosage of standardised senna.

Table III compares the proportions of hard and loose motions in the two groups and in the sodium picosulphate group there was significantly more loose or un-

Table III. Consistency of motions

Agent	Hard		Soft		Loose or unformed	
	No.	%	No.	%	No.	%
Sodium picosulphate	19	9	101	48	90	43
Standardised senna	30	15	126	64	41	21

$$\chi^2=23.15 \quad p<0.001$$

formed motions and fewer hard motions compared with standardised senna. The consistency of motions for the two groups of patients remained relatively constant through the 2-week period of observation, (Table IV).

Table IV. Proportion of bowel motions which were loose or unformed

Agent	Day													Mean
	1	2	3	4	5	6	7	8	9	10	11	12	13	
Sodium picosulphate	0.45	0.50	0.44	0.47	0.65	0.35	0.38	0.07	0.60	0.50	0.13	0.5	0.45	0.43
Standardised senna	0.13	0.25	0.06	0.29	0.15	0.27	0.31	0.31	0.22	0.28	0.06	0.13	0.28	0.21

There was an almost identical mean latent period between administration and activity for both drugs, (Table V). The individual latent periods for the two drugs showed wide variation. These ranged from less than 8 to more than 24 hours.

There was no difference in the overall incidence of side-effects for the two drugs, (Table VI). The range of side-effects was similar in the two groups and most were directly related to the action of the drugs on the large bowel. Sodium picosulphate might have induced fainting in 1 patient by causing fluid and electrolyte depletion. However, urea electrolytes checked at the beginning and end of treatment were normal. It seems much more likely that the sign was coincidental rather than related to treatment.

Table V. Median time (hrs.) to first bowel action for patients having an action on each particular day

Median time	Sodium picosulphate	Standardised senna
No. patients	23	25 to Day 7 24 to Day 13
Day 1	14½	15¼
Day 2	14	16
Day 3	16	15¾
Day 4	14½	15½
Day 5	16	15½
Day 6	15½	16¼
Day 7	16¼	16
Day 8	14½	15¾
Day 9	15¼	15
Day 10	15¼	15
Day 11	14	15½
Day 12	15	15
Day 13	15	15¼
Overall	15	15½
Range	8½ to 27	7 to 28¼

Consideration of the first and second weeks of treatment separately reveals that side-effects from sodium picosulphate were significantly more common in the first week. This might well relate to the higher initial dose of the drug used in treatment.

Table VI. Side-effects (no. patients)

Side-effect	Sodium picosulphate	Standardised senna
Abdominal pain	7	3
Incontinence	1	3
Colic	1	1
Very offensive motion	1	1
Discomfort	2	
Syncope	1	
Patients with side-effects:		
Total number	8	7
Number reported in Week 1	8*	2
Number reported in Week 2	2*	6

*Standardised error of difference=10.3%, $p < 0.05$

Discussion

This study confirms the conclusion of previous investigations that sodium picosulphate is an effective laxative and provides evidence that it is just as effective in elderly disabled patients as in fit younger subjects. It also suggests that the drug compares favourably with standardised senna, an agent of proven efficacy in old age.⁸

Earlier investigations on rats suggest that sodium picosulphate did not undergo hydrolysis and the intact molecule was responsible for the laxative activity.¹² Further investigations, however, by Jauch, Hankwitz, Beschke and Pelzer⁹ using a more sensitive analytical method have shown that sodium picosulphate is hydrolysed by the colonic microflora to bis-(p-hydroxyphenyl)-pyridyl-2-methane which is then responsible for the laxative activity. Investigations are also currently underway to see what effect antibiotic treatment may have on the laxative activity in man.

It was hoped that the present investigation might provide data on the most appropriate dose of sodium picosulphate for the elderly. The wide individual variation in response makes any such generalisation impossible. Two factors may well have been responsible for the variation. One problem was that the initial dose of sodium picosulphate sometimes proved to be too effective, leading nursing staff to discontinue the drug for several days rather than merely reduce dosage. The other difficulty is that the elderly chronic sick represent a very heterogeneous population. Multiple pathology is common and there is wide variation in the extent to which they are disabled by mental or physical impairment. All that can be suggested is that an initial dose of 20 ml. (10 mg.) may be too powerful in some elderly patients. It might be better to start with either 10 or 15 ml. but increase this if it proves to be insufficient. The liquid presentation of sodium picosulphate makes such titration relatively simple.

Another important issue is the frequency of bowel evacuation that should be considered desirable in old age. Physicians and nurses often aim at achieving one

evacuation per day. However, many fit elderly men and women pass motions less often than this.¹¹ A more useful guide to laxative dosage might be whether it was sufficient to prevent the recurrence of faecal impaction and whether or not it produced symptoms related to excessive stimulation of the colon. In the present study, for example, it is doubtful whether patients on either sodium picosulphate or standardised senna would have benefitted by increasing dosage to achieve daily bowel evacuation. It is likely that the incidence of local side-effects would have been considerably increased.

Loose or unformed bowel motions seemed to be particularly associated with the administration of sodium picosulphate. This phenomenon did not appear to be dose related in that reduction in the dose of the laxative did not affect the incidence of the condition. It may be that the drug, in addition to causing colonic irritation, reduces the absorption of water from the colon.⁶ Whatever their cause, the loose motions do not appear to have been a major source of inconvenience. Indeed, they may have presented a considerable advantage to ill and disabled patients to whom straining at stool can be both hazardous and exhausting.⁵

The mean delay of 15 hours between the administration and onset of action for sodium picosulphate is merely a reflection that it acts on the colon following transit through the gut. There is no evidence of its absorption intact in the upper intestine and its action on the colon through the blood stream.¹⁵ The wide range for the delay period is, in turn, related to the wide variation in gastro-intestinal transit times in old age.² Whereas, in some cases, the agent arrived at the colon in 8 hours, in others, it took over 24 hours to cover the same distance.

The variation in the latent period of polyphenolic laxatives has important practical implications in the elderly. Administration of the agent in the evening does not always result in defaecation the following morning. This may sometimes occur in the afternoon or even the following evening. Adjustment of the time for administration may be necessary in establishing evacuation at a time convenient for both nursing staff and patient.

Assessment of patients for side-effects from sodium picosulphate confirms the impression of previous investigations that systemic toxicity is extremely rare.^{10,13-15} This contrasts with unconjugated phenolphthalein where skin sensitivity and even encephalitis may be encountered.⁷ This probably relates to differences in the extent to which the two substances are absorbed from the gut.

Both sodium picosulphate and standardised senna frequently produced side-effects related to their action on the colon. It is interesting to note, however, that there was a considerable fall in the incidence of these during the second week of administration for sodium picosulphate. This indicates that had the initial dosage of the drug been lower there might have been a considerable reduction in unpleasant symptoms without any important alteration in its efficacy. The limited data available here suggests that sodium picosulphate might, in appropriate doses, be slightly less liable to cause side-effects than standardised senna. Any difference, however, is pretty marginal.

Sodium picosulphate, then, is as effective as standardised senna in controlling constipation in sick elderly patients. Its property of producing soft stools may well

be a positive advantage in this sort of population. Side-effects are marginally less common than those of standardised senna. The drug can, therefore, be recommended as a useful addition to the wide range of substances available for the management of bowel disorders in the elderly.

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