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# Bowel Care for Individuals with Spinal Cord Injury: Comparison of Four Approaches

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## ABSTRACT

The efficacies of four bowel care regimens (bisacodyl suppositories, glycerin suppositories, mineral oil enemas and docusate sodium mini-enemas) were compared in seven subjects with traumatic spinal cord injury. Efficacy was assessed in terms of colonic transit time, bowel evacuation time and subjective responses to a questionnaire. Both docusate sodium mini-enemas and mineral oil enemas decreased total and left-sided colonic transit time. However, docusate sodium mini-enemas were superior to mineral oil enemas in terms of the decrease in bowel evacuation time and symptom reduction. Results in this small group of subjects suggest that docusate sodium mini-enemas may have advantages in the management of bowel evacuation in individuals with spinal cord injury. (*J Spinal Cord Med* 1998;21-24)

Key words: bowel care, colonic transit time, difficult evacuation, paraplegia, quadriplegia

## INTRODUCTION

Gastrointestinal problems are common after spinal cord injury (SCI) and adversely affect quality of life in a significant number of individuals. These problems include severe constipation, prolonged bowel evacuation time and poorly localized abdominal pain. Collectively, these complaints are termed difficulty with evacuation (DWE). Other common GI complications include hemorrhoids, abdominal distention and autonomic dysreflexia.<sup>1-3</sup> Prolonged bowel evacuation time is due, in part, to increased total colonic transit time. Abnormal colonic motility has been well documented<sup>4-8</sup> and appears to be especially profound on the left side of the colon. Different pharmacologic and non-pharmacologic approaches, including dietary fiber, digital stimulation, enemas, suppositories and stool softeners have been used<sup>9,10</sup> but none has been validated in controlled studies. We, therefore, designed an open-labeled trial to compare the efficacies of four commonly used bowel care preparations in hospitalized patients with clinically complete transection of the spinal cord who lacked spontaneous defecation. Evacuation time, total colonic transit time and segmental colonic transit time were used as measurements of effectiveness. Further, we assessed other aspects of DWE including

abdominal distention, time taken for complete evacuation and abdominal discomfort.

## METHODS

Seven male subjects with SCI were studied. The mean age of our subjects was 45 yr (range 21- 76 yr) and the mean interval since injury was 16 yr (range 2 - 25 yr). Each patient was assessed by a neurologist who determined the level of injury. All subjects had clinically complete traumatic transection of the spinal cord between C-4 and T-12 (Table 1). None of these patients had bowel problems prior to spinal cord injury. Prescribed medications were not discontinued. All patients were fed a regular diet in terms of fiber content. Patients with a history of diabetes mellitus, multiple sclerosis, inflammatory bowel disease and hypothyroidism were excluded. All but one subject were inpatients during the study and bowel care was performed by the same caregiver. Each subject was studied after receiving one week of therapy with one of the follow-

Table 1. Characteristics of subjects

| Subject # | Age | Level of injury | Duration of SCI |
|-----------|-----|-----------------|-----------------|
| 1         | 65  | C6              | 35 yrs          |
| 2         | 35  | T12             | 8               |
| 3         | 45  | C4-5            | 15              |
| 4         | 33  | C5-7            | 2               |
| 5         | 40  | C6-7            | 20              |
| 6         | 76  | C4-5            | 30              |
| 7         | 21  | C5-7            | 2               |

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ing four modalities: 1) two bisacodyl suppositories, 2) two glycerin suppositories, 3) one mineral oil enema (118 ml) and 4) one docusate sodium mini enema (Theravac SB) daily. Digital stimulation (five-10 minutes) and abdominal massage supplemented each of these modalities in each individual. After one week on each regimen, total and segmental colonic transit times were determined by administering 20 radio-opaque markers on three successive days. The markers were obtained by dividing an 8 Fr Keofeed II radio-opaque nasogastric tube (IVAC Corporation, San Diego, CA.) in such a way that twenty of these could be incorporated within two 00 gelatin capsules. On day four, plain X-rays of the abdomen were obtained. Markers were easily visible on abdominal films. Localization of the markers relied on bony landmark identification and gaseous outlines. In the absence of clear outlines of the bowel, markers located to the right of the vertebral spinous processes above a line from fifth lumbar vertebra to the pelvic outlet were assigned to the right colon. Markers to the left of the vertebral spinous processes and above an imaginary line from the fifth lumbar vertebra to the anterior superior iliac crest were assigned to the left colon. Markers below a line from the pelvic brim on the right and superior iliac crest on the left were assigned to rectosigmoid and rectum. Total colonic and segmental colonic transit times were calculated as previously published by using the following formula where  $n_i$  is the total number of markers present in a given film sector and  $j$  is the number of abdominal films taken:<sup>11</sup>

$$CTT = 1.2 \times \sum_{i=1}^j n_i$$

There was a one week wash-out period between each treatment modality. Bowel care sessions were carried out three times per week at the same time each day. The frequency of bowel care was generally the same as the subjects' usual routine. Bowel evacuation time was recorded and subjective evaluation of symptoms was assessed using a DWE (difficulty with evacuation) score. The statistical analysis and comparison of the obtained data was performed using ANOVA and Neuman-Keuls post-hoc test for multiple comparisons.

The study was approved by the Bronx VA Subcommittee for Human Studies and informed consent was obtained from all subjects.

## RESULTS

The total CTT was significantly reduced with docusate sodium mini-enemas. Mean total CTT was 32.0, 34.5, 47.6 and 48.0 hr with docusate sodium, mineral oil enema, bisacodyl suppositories and glycerin suppositories, respectively (Figure 1). There was no significant difference in total CTT between docusate sodium or mineral oil enema (32.0 vs. 34.5 hr,  $p > 0.05$ ) but both produced significantly shorter transit times ( $p < 0.05$ ) than bisacodyl (47.6 hr) or glycerin suppositories (48.0 hr).

Segmental CTT was also calculated for the left, right and rectosigmoid colon. Right-sided CTT were 17.8, 11.2, 17.8 and 9.9 hr for docusate sodium, mineral oil enema, bisacodyl suppositories and glycerin suppositories, respectively, which were not significantly different. There was a significant ( $p < 0.01$ ) reduction in left CTT with docusate sodium (7.2 hr) as compared with glycerine suppositories (23.4 hr) and bisacodyl suppositories (22.0 hr). The effect of docusate sodium on left CTT was similar to that of mineral oil enema (12.6 hr) (Figure 2). The rectosigmoid CTT was 7.0, 10.7, 7.7 and 14.5 hr for docusate sodium, mineral oil enema, bisacodyl suppositories and glycerin suppositories, respectively. These differences were not statistically significant. The combined CTT for left and rectosigmoid was also obtained by adding the individual values. Docusate sodium produced a left + rectosigmoid (L + RS) CTT of 14.3 hr, which was similar to that of mineral oil enema (23.3) but significantly less when compared with bisacodyl suppositories (29.6 hr,  $p < 0.05$ ) and glycerin suppositories (38.0 hr,  $p < 0.001$ ).

Bowel evacuation time (BET) was least (31.5 mins) for docusate sodium mini-enemas. Mean evacuation time was 46.5, 57.6 and 63.5 min after mineral oil, glycerin and bisacodyl suppositories, respectively (Figure 3). In terms of DWE, docusate sodium scored best in symptom reduction followed in descending order of efficacy by mineral oil enema, bisacodyl suppositories and glycerin suppositories (Table 2).

## DISCUSSION

Advances in the care of persons with SCI have increased their expected life span.<sup>12</sup> As a result, the long term management of gastrointestinal problems has become increasingly significant in the care of SCI patients. The observed prevalence of gastrointestinal problems in patients with paraplegia was 27 percent, while difficulty with evacuation accounted for 20 per-

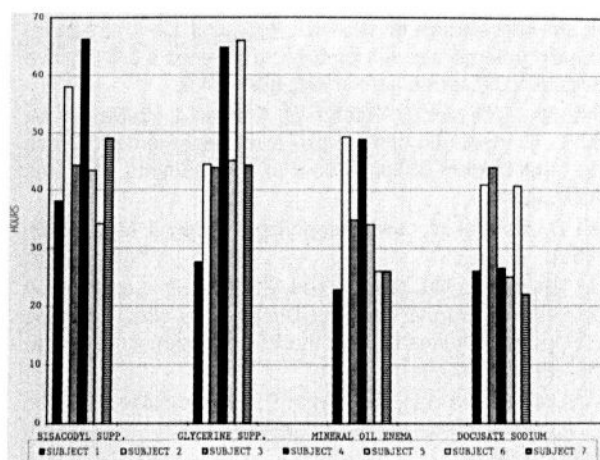


Figure 1. Effect of four bowel care regimens on the total colonic transit time in seven subjects with spinal cord injury. As compared with other approaches, docusate sodium mini-enemas and mineral oil enemas resulted in significant reductions of the CTT ( $p < 0.05$ ).

cent of all chronic gastrointestinal problems.<sup>1</sup> Difficulty with evacuation and constipation occurs because of disruption of autonomic nervous system activity which normally regulates and influences a number of physiologic functions.<sup>13,14</sup> Impairment is generally more marked in patients with spinal lesions above the thoracolumbar sympathetic outflow. Several pathogenic mechanisms have been invoked: the lack of conscious urge to defecate, immobilization, motor paralysis of the abdominal and perineal muscles and possible motor changes at the level of the colon, rectum and anus.<sup>5</sup> Studies have shown prolongation of the CTT after SCI, with the prolongation of CTT occurring predominantly at the level of the left colon and rectum.

Bowel evacuation in persons with SCI is usually accomplished using a combination of pharmacologic and non-pharmacologic approaches. These measures include dietary fibers, digital stimulation, enemas, suppositories and stool softeners. Docusate sodium is

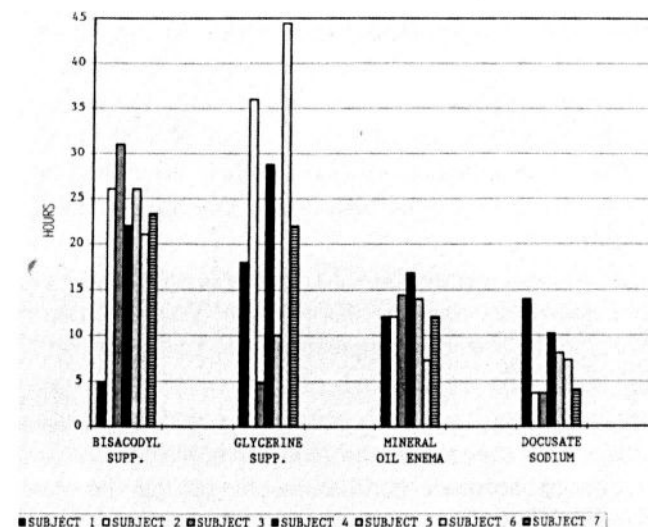


Figure 2. Effect of four bowel care regimens on segmental (left-sided) colonic transit time. CTT during docusate sodium mini-enema administration was significantly less than with either glycerine or bisacodyl suppositories ( $p < 0.01$ ) but comparable that with mineral oil enemas.

a highly efficient surfactant which facilitates absorption of water by the stool to form a soft, more easily evacuated mass. In our study, it appeared superior to the other bowel care modalities and significantly reduced the total CTT when compared with bisacodyl suppositories and glycerin suppositories. Mineral oil enemas, which soften and lubricate hard stools to ease their passage without irritating the mucosa, showed a comparable efficacy in reducing the total CTT but

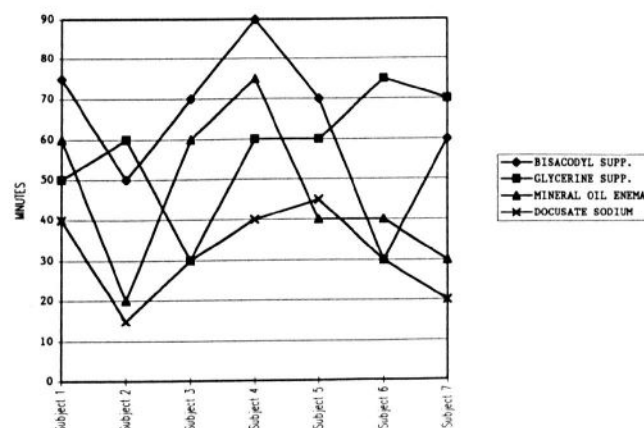


Figure 3. Comparison of the effect of the four bowel care procedures on bowel evacuation time. Docusate sodium mini-enemas reduced bowel evacuation time in all subjects except subject #6.

Table 2. The effect of bowel regimens on DWE score

| Preparation                | Mean DWE Score |
|----------------------------|----------------|
| Bisacodyl suppositories    | 6.57           |
| Glycerine suppositories    | 7.71           |
| Mineral oil enema          | 5.81           |
| Docusate sodium mini-enema | 4.71           |

was associated with longer evacuation times and poorer DWE scores. Both types of enema may have additional effects on colorectal physiology in addition to altering the physical properties of stool. For example, one can speculate that these enemas modify colorectal compliance and/or reflex thresholds, parameters that might ultimately ameliorate DWE symptoms.

In terms of segmental CTT, glycerin suppositories and mineral oil enemas were better than docusate sodium and bisacodyl suppositories in reducing right CTT. Furthermore, bisacodyl suppositories, a contact stimulant laxative which stimulates sensory nerve endings to increase colonic peristaltic activity, is as effective as docusate sodium in shortening the rectosigmoid CTT. None of the four modalities produced a statistically significant alteration in rectosigmoid CTT. However, docusate sodium and mineral oil enemas were superior to the other modalities in shortening left CTT which, as previously noted, is significantly impaired in subjects with SCI. Finally, docusate sodium decreased bowel evacuation time and scored higher in improving difficulty with evacuation. Thus, docusate sodium mini-enemas may have advantages in the management of DWE in some individuals with spinal cord injury. However, given the heterogeneous nature of SCI (level and completeness of injury, interval since injury, GI baseline prior to injury), a larger study will be required before the role of docusate sodium mini-enemas in defecatory management after SCI is fully defined.

## REFERENCES

1. Stone JM, Nino-Murcia M, Wolf VA, Perkasch I. Chronic gastrointestinal problems in spinal cord injury patients: a prospective analysis. *Am J Gastroenterol* 1990; 85:1114-9.
2. Cornell SA, Campion L, Bacero S, Frazier J, Kjellstrom M, Purdy S. Comparison of three bowel management programs during rehabilitation of spinal cord injured patients. *Nur Res* 1973;22:321-8.
3. Munro D. Control of bowel emptying. *N Eng J Med* 1953; 248:43-8.
4. Binnie NR, Smith AN, Creasy GH, Edmond P. Constipation associated with chronic spinal cord injury: the effect of pelvic parasympathetic stimulation by the Brindley stimulator. *Paraplegia* 1991; 29:463-9.
5. Connell AM, Frankel H, Guttmann L. The motility of pelvic colon following complete lesion of spinal cord. *Paraplegia* 1963;1:93-115.
6. Meshkinpour H, Nowroozi F, Glick ME. Colonic compliance in patients with spinal cord injury. *Arch Phys Med Rehabil* 1983; 64:111-2.
7. Menardo G, Fazio A, Marangi A, et al. Large bowel transit in patients with paraplegia. *Gut* 1984; 25:1314.
8. Glick ME, Meshkinpour H, Haldeman S, Hoehler F, Downey N, Bradley WE. Colonic dysfunction in patients with thoracic spinal cord injury. *Gastroenterol* 1984; 86:287-94.
9. Emerick CA. Nursing management of the neurogenic bowel. *ARN J* 1979;4:16-8.
10. Markman, LJ. Bladder and bowel management of the spinal cord injured patient. *Plast Surg Nurs* 1988;8:141-5.
11. Metcalf AM, Phillips SF, Zinsmeister AR, MacCarty RL, Beart RW, Wolff BG. Simplified assessment of segmental colonic transit. *Gastroenterol* 1987;92:40-7.
12. Frisbie JH; Kache A. Increasing survival and changing causes of death in myelopathy patients. *J Am Paraplegia Soc* 1983;6:51-6.
13. Guttmann L. The regulation of rectal function in spinal paraplegia. *Proc R Soc Med* 1959; 52:86-8.
14. Longo WE, Ballantyne GH, Modhin IM. The colon, anorectum and spinal cord patient: a review of the functional alterations of the denervated hindgut. *Dis Colon Rectum* 1989;32:261-7.