Colonic Motility in Children with Constipation*

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CONSTIPATION is a common complaint in children. For the purpose of this paper, it may be defined as incomplete evacuation of the rectum, leading to megarectum and megacolon. The condition may be acquired or congenital.

In those patients who have acquired megacolon, the rectum and distal colon dilate as they are filled by the propulsive activity of the normal proximal colon. These distal segments subsequently become inert, forming a large reservoir incapable of emptying unless stimulated by drugs or mechanical means. Eventually soiling occurs, either as a result of spurious diarrhea or from leakage of stool from the rectum as the fecal mass from above approaches the anus. Soiling is the main reason the patients seek medical help. In acquired megacolon, when carefully sought, a causative factor can be found, such as a previous episode of diarrhea, or an anal fissure, leading to anal discomfort and a reluctance to defecate. Domestic and psychologic problems may be a predominant factor.

In congenital megacolon or Hirschsprung’s disease there is a history of difficulty or delay in passing meconium in the neonatal period. In the case of an older child this may be difficult to elicit, but the mother may recall that the child was constipated with the introduction of solid foods or has had attacks of a diarrhea-like illness associated with abdominal distention suggestive of enterocolitis.

Whether the constipation is congenital or acquired, these children are often found attending medical and psychiatric clinics because of soiling. Outpatient visits are interspersed with admissions for "emptying out" procedures and toilet training. One hundred thirty-eight children with constipation were investigated in the period 1971–1975, inclusive, by anorectal manometry to diagnose Hirschsprung’s disease. The present paper reports the colonic motility findings in 50 of these patients who were selected at random.

Method

Every patient had a digital rectal examination prior to testing, to ensure that the rectum was empty. When necessary, sedation with trimetramine was employed. Anorectal manometry was performed using an air-filled balloon system.

Those patients who manifested a failed "inhibition response" of the internal sphincter to rectal dilatation subsequently had either rectal biopsy or myectomy to confirm the diagnosis of Hirschsprung’s disease.

Colonic motility was recorded using an open-ended multibore water-filled catheter calibrated to record at various levels 5 to 15 cm from the anal verge. The catheter was passed blindly into the rectum, as sig-
moidscopy was found too disturbing, especially in very young patients. Pressure changes were transmitted through Statham transducers and recorded on a Devices multichannel recorder. Pressure changes were recorded as waves of amplitude over a range of 40 mm Hg at a speed of 2.5 cm/sec. A basal resting phase was followed by a measurement of response to food, and in a few patients responses to neostigmine were recorded.

Subjects
Records were obtained for 50 patients with an age range of 2½-14 years. There were 40 boys and 10 girls. The sex ratio is in keeping with the male preponderance seen in Hirschsprung's disease. All 50 patients had been given laxatives, for various lengths of time. Preparations used depended mainly on personal preferences of referring physicians, but the anthracene group was the most common employed.

Results
Patients could be divided into three groups according to the type of basal motility tracing obtained. The largest group, 32, had tracings showing hypomotility: the rectal tracings generally showed the lowest wave amplitudes, and basal motility was sometimes zero (Fig. 1, left). This group contained the largest number of patients who subsequently were found to have Hirschsprung's disease. Three patients who had Hirschsprung's disease agreed to repeat motility testing after myectomy, and the tracing then showed return to a normal pattern (Fig. 1, right).

The second group consisted of eight patients who had a distinctive high-amplitude motility pattern (Fig. 2). Four of this group were subsequently found to have Hirschsprung's disease. Figure 2, left, was obtained from a 13-year-old boy who eventually needed resection for Hirschsprung's disease, which involved the rectum and distal sigmoid colon. A tracing obtained two years after operation shows a lower amplitude, approaching normal (Fig. 2, right). Two other patients in this group who had repeat tracings postoperatively showed more normal patterns.

In the third group of nine patients, a pattern that may be described as normal was seen (Fig. 3). No patient in this group had Hirschsprung's disease.

The responses to food and neostigmine in all three groups followed essentially the same trend, but with enhanced motility, that is, a higher motility index after each stimulus than had been obtained basally (Table 1).

Discussion
The predominant motility pattern seen in the present series was that of low amplitude, and in some cases, a featureless tracing. This finding is different from that found by others investigating children with constipation, and may reflect the method of testing, in that this was carried out before the patients had had any corrective treatment of their constipation. Several investigators have attributed a flat tracing in the adult to the prolonged use of laxatives. Although all children tested in the present series had taken laxatives, the periods were comparatively short.

The following explanation is suggested for the present findings. Many of these children had had episodes when their bowels had not emptied for many days. This resulted in the rectum's becoming dilated and elongated to form an inert reservoir. Thus, the tube at motility testing was lying in an enlarged rectum, in spite of having been passed for several centimeters. The rectal balloon at manometry in these subjects could be inflated to volumes of 100-150 ml of air without producing any sensation of awareness or discomfort.

A finding of hypomotility more often accompanied Hirschsprung's disease, though