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Colonic motility and functional assessment of the patients with anorectal malformations according to Krickenbeck consensus

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Abstract

Background/Purpose: In this study, the patients operated on for anorectal malformations (ARM) were evaluated in terms of segmental (SCTT) and total colonic transit times (TCTT) and clinical status according to Krickenbeck consensus before and after treatments.

Methods: Forty-one patients with ARM (28 males/13 females) older than 3 years (median age, 7.7 years; range, 3-25) who had no therapy before were assessed for voluntary bowel movements (VBM), soiling (from 1 to 3), and constipation (from 1 to 3), retrospectively. Distribution of the patients were rectourethral fistula (17), perineal fistula (PF; 8), vestibular fistula (VF; 8), cloaca (3), rectovesical fistula (1), rectovaginal fistula (1), pouch colon with colovestibular fistula (1), no fistula (1), and unknown (1). The patients ingested daily 20 radiopaque markers for 3 days, followed by a single abdominal x-ray on days 4 and 7 if needed. The results were compared with the reference values in the literature.

Results: Mean follow-up period was 36 months (range, 1-108.5 months). All patients but 1 had soiling in different degrees. Twenty-one patients who had VBM were divided into group 1, with constipation (n = 9), and group 2, without constipation (n = 12). The other 19 patients who had no VBM were divided into group 3, with constipation (n = 14), and group 4, without constipation (n = 5). The longest TCTT and rectosigmoid SCTT were found in group 3 (69.5 and 35.2 hours, respectively). Group 1 had long SCTT in rectosigmoid but normal TCTT (27.8 and 47.4 hours, respectively). Groups 2 and 4 had normal SCTT and TCTT, and there was no significant difference between them. After the appropriate treatment, of the patients, 45% (18/40) had no soiling, and the soiling score decreased to grade 1 in 27.5% (11/40) and to grade 2 in 10% (4/40). Four had unchanged soiling score, and 3 were excluded from the study because of follow-up problems. Half of the patients in group 3 (4 VF, 2 rectourethral fistula, PF) gained VBM without soiling after laxative treatment. Only four of 23 patients had decreased constipation score (2 cloaca, PF, VF).

Conclusions: In this study, ARM patients complaining of constipation with or without VBM had prolonged SCTT in the rectosigmoid region. Percentage of the improvement in soiling scores was more conspicuous than that of constipation scores. The dismal figure observed at the first examination

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in the assessment of VBM was not associated with an unfavorable improvement with laxative treatment. So, it is suggested that assessment of VBM initially may be deceptive for clinical status.

Anorectal malformations (ARM) has been an area of pediatric surgery interest for centuries. In the modern era, an International Conference for Development of Standards for the Treatment of ARM was organized at Krickenbeck Castle, Germany, in 2005. Recently, a new international classification and follow-up assessment for ARM and standards for surgical procedures have been reported under the name of the Krickenbeck consensus [1].

The patients in the present study were inspected in the light of this new insight, and in addition, their colonic motility was evaluated by total and segmental colonic transit time studies.

1. Methods

Of 60 patients, 41 with ARM older than 3 years who completed their surgical procedures were retrospectively evaluated according to the Krickenbeck consensus recommendations. Median age of the patients was initially 7.7 years (range, 3-25 years). Distribution of the types of anomalies and surgical procedures is shown in Table 1. There was no obstructive problem at the anorectal region in any of the patients studied. Before evaluation, clinical status of the patients were scored for voluntary bowel movements (VBM), soiling, and constipation (Table 2). Feeling of urge, capacity to verbalize, and holding the bowel movement were described as VBM. Soiling was graded as 1, occasionally (once or twice per week); 2, everyday without social problem; and 3, constant with social problem. Constipation was graded according to the treatment as 1, manageable only with diet; 2, requirement of laxatives; and 3, resistance to diet and laxatives. Colonic motility was assessed according to the study reported by Bautista et al [2]. During the course of the motility study, the patients continued to eat a normal diet and did not take any medication. They ingested 20 radiopaque markers at the same time daily for 3 days. On day 4 and, if needed, on day 7, a single high-voltage abdominal radiograph was obtained. Total (TCTT) and segmental (right-left-rectosigmoid colon) colonic transit time (SCTT) was calculated and compared with the reference values in the literature [2]. Colonic anatomy of the patients was obtained with barium enema studies, and rectal index was calculated to establish if there was megarectum [3]. The patients with any abnormality on the sacral bone were evaluated with spinal magnetic resonance imaging.

Table 1 Distribution of the types of the anomalies and surgical procedures

Types of the anomalies		Types of surgical procedures	
PF	8	Perineal operation	6
RUF	17	Anterior sagittal approach	7
RVF	1	Sacroperineal procedure	9
VF	8	PSARP	14
CL	3	Abdominosacroperineal pull through	4
NF	1	Abdominoperineal pull through	1
PC	1		
RVGF	1		
UN	1		
Total	41		41

The patients with constipation received a fiber diet and hyperosmolar (Duphalac, Solvay Company, İstanbul, Turkey) or stimulant laxative (X-M laxative solution, Yenisehir Company, Ankara, Turkey). In contrast, the patients with rapid TCTT received a constipating diet, loperamide HCl (Lopermid, Saba Company, İstanbul, Turkey), and enemas, if needed. All patients, were encouraged to eat and visit the toilet regularly during the day. After appropriate therapy protocol, clinical status was noted at the last control.

Kruskal-Wallis and Mann-Whitney *U* tests were used for statistical analysis of TCTT and SCTT, with a $P < .05$ accepted as statistically significant. Spearman rank test was used for correlation analysis.

2. Results

Mean follow-up period of the patients was 36 months (range, 1-108.5 months). Almost all patients except one (rectourethral fistula [RUF]) had soiling, so, these patients were grouped as to presence of VBM with or without constipation (Table 3). Twenty-one patients who had VBM were divided into group 1, with constipation (n = 9), and group 2, without constipation (n = 12). The other 19 patients who had no VBM were divided into group 3, with constipation (n = 14), and group 4, without constipation (n = 5).

Results for TCTT and SCTT are shown in Table 4. Although group 1 had normal TCTT (47.4 hours) but prolonged SCTT in the rectosigmoid region (27.8 hours), group 3 had both prolonged TCTT and SCTT in the rectosigmoid region (69.5 and 35.2 hours, respectively). Groups 2 and 4 had normal SCTT and TCTT values, and there was no significant difference between them.