

Prokinetic Agents in Children with Poor Appetite

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Abstract

Background : Of the feeding disorders in children, poor appetite is probably one of the most common complaints notified by parents. Since gastric motility disorders may be the cause of this symptom, the aim of our study was to investigate the effect of prokinetics on children with poor appetite and delayed gastric emptying.

Methods : Poor appetite was graded by VAS at start and end of treatment. Delayed gastric emptying was assessed by ^{99m}Tc-tincolloid scintigraphy. *Malnutrition was defined according to Waterlow criteria.* After initial assessment *behavioural* feeding recommendations were provided and trimebutine given for 6 months. Scintigraphy was repeated during treatment. Anthropometrical measurements and daily energy intake calculations were performed monthly

Results : 21 children (M/F : 12/9) with a mean age of 7 ± 3 years were studied. At the end of treatment, weight and height *standard deviation scores* improved significantly (-1.0 ± 0.6 vs. -0.8 ± 0.7, p = 0.008 and -1.1 ± 1.0 vs. -0.8 ± 0.9, p=0.003, respectively) and malnutrition rate decreased from 81% to 66.7%. Improvement of gastric emptying was shown in 11 out of 16 children but was not statistically significant (P = 0.059). The visual analogue scale scores of appetite showed significant improvement with therapy (7.5 ± 1.3 vs. 5.3 ± 2.0, p = 0.012).

Conclusion : Children with poor appetite who have delayed gastric emptying might benefit from prokinetic agent therapy combined with behavioural feeding recommendations (*Acta gastroenterol. belg., 2005, 68, 416-418*).

Key Words : Prokinetic, gastric emptying, poor appetite, failure to thrive.

Introduction

Of the feeding disorders, poor appetite is probably the most common complaint notified by parents with a reported prevalence of 25% (1,2). Factors involved in regulating appetite are complex and not completely understood, but signals from stomach and small bowel are thought to be important (3-6). Gastric distension and food presence in small bowel induce satiety (3,4,6,7). Gastric motility disorders may therefore be considered as one of the etiological factors of feeding disorders (1,8,9). We have indeed previously shown that delayed gastric emptying (GE) may cause poor appetite by prolonged food presence in stomach. Malnutrition rate in this group of children was found to be as high as 81 percent (10).

Prokinetics like bethanechol, cisapride, metoclopramide, domperidone, macrolides and trimebutine are agents which enhance the transit of intestinal material through the gastrointestinal tract (11,12). They can be used for the treatment of gastroesophageal reflux, gastroparesis, non-ulcer dyspepsia, chronic intestinal pseudo-obstruction, postoperative ileus, irritable bowel syndrome and constipation (11).

In this study, we investigated the response of children with poor appetite, who also had delayed GE, to prokinetic agent therapy by evaluating the change in symptoms, anthropometrical data and scintigraphical findings.

Patients and methods

Between July 2001 and June 2002, 36 children presented with poor appetite and accepted to be involved in the study. A total of 21 children with delayed GE according to the results of scintigraphic scan were subsequently enrolled (13). Physical examination and anthropometrical measurements were performed. Standard deviation scores (SDS) for weight and height, and daily energy intakes were calculated from a three day-diet recall. Malnutrition was defined with regard to height for age and weight for height according to Waterlow criteria (14). This study was approved by local Ethical Committee.

Gastric emptying time was measured by using pudding labelled with ^{99m}Tc-tincolloid (1.0 mCi), used within six hours after preparing. Scan was performed after four hours of starvation for children and a routine interval between mealtimes for infants, and not taking any drug affecting gastrointestinal motility. General Electric (GE XRT) gamma camera was used. The patients were placed in supine position for a one hour recording. Regions of interest were drawn over stomach and time-activity curves were formed. The results were expressed as the percentage of initial activity remaining at the 60th minute (R60 %). The R60 % values were compared to the ones found in the study by Di Lorenzo et al (13).

Children with delayed GE were started on trimebutine (Debridat, Abdi İbrahim İlaç Sanayi ve Ticaret A.Ş., İstanbul, Turkey ; 5-6 mg/kg/d) for six months. Behavioural feeding recommendations about mealtime regularity, mealtime duration, snacks and food selectivity were given to the families. During follow-up of six months nutritional anthropometrical measurements and energy intake calculations were repeated monthly and compared to the baseline values. Scintiscan was repeat-

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Table 1. — Baseline characteristics of children with delayed gastric emptying

Variable	Before therapy Mean ± SD	After therapy Mean ± SD	p
Age (years)	7 ± 3	7 ± 3	-
Male/Female	12/9	12/9	-
Daily energy intake (kcal/kg/d)	73.8 ± 29.9	92.5 ± 30.9	0.003
Body Weight (kg)	19.3 ± 5.6	23.4 ± 6.9	0.003
Body Height (cm)	115.1 ± 17.1	124.6 ± 16.7	0.002
Weight SDS	-1.0 ± 0.6	-0.8 ± 0.7	0.008
Height SDS	-1.1 ± 1.0	-0.8 ± 0.9	0.003
Malnutrition ratio	81%	66.7%	-
R60 % values (%)	67.1 ± 16.9	53.4 ± 21.5	0.059
VAS score of poor appetite	7.5 ± 1.3	5.3 ± 2.0	0.012

ed. At the onset and end of the therapy, poor appetite complaint was graded by visual analogue scale (VAS) by mothers (15).

Statistical analysis

Results are expressed as percentages or as means ± standard deviation (SD). Statistical analysis was carried out by the Wilcoxon signed ranks test for difference in two related groups of measures and Spearman's rank correlation analysis for the relation between two variables on SPSS 10.0 program. A P value < 0.05 was considered significant in all analyses.

Results

Of twenty-one children with delayed GE, male/female ratio was 12/9 and their ages were between 1 - 12 (7 ± 3) years. Baseline characteristics of the patients are shown in table 1. Malnutrition was found in 17 (81%) of 21 children. Acute mild malnutrition (weight for height < 90%) was found in six (28.6%), chronic mild malnutrition (height for age < 95%) was found in eight (38.1%) and chronic moderate malnutrition (height for age < 90%) was found in three (14.3%) children (14). Daily energy intake (73.8 ± 29.9 kcal/ kg/d) was less than the required intake (90.3 ± 18.0 kcal/ kg/d) in 19 (90.5%) children. After the therapy daily energy intake was significantly improved (92.5 ± 30.9 kcal/kg/d, p = 0.003) and only lower than needed in 27.3% (Table 1). *Monthly progression of daily energy intake is shown in table 2.*

With prokinetic therapy, body weight and height values increased significantly (p < 0.05) and malnutrition ratio decreased to 66.7%. Twenty-seven percent of the children with initial malnutrition showed catch-up growth. Weight and height SDS also improved significantly

cantly (-1.0 ± 0.6 vs. -0.8 ± 0.7, p = 0.008 and -1.1 ± 1.0 vs. -0.8 ± 0.9, p = 0.003, respectively) (Table 1).

Scintigraphic scan was repeated in 16/21 cases when permission was given to perform a second test. A non significant (P = 0.059) decrease of emptying rate (R60%) was observed in 11 (68.8 %) of these 16 patients (Table 1).

Poor appetite was graded by VAS at start and end of the therapy. Before the therapy VAS score was 5.2-10 (7.5 ± 1.3) and it decreased significantly to 3-8.5 (5.3 ± 2.0) with prokinetic therapy (p=0.012) (Table 1).

Discussion

Early satiety, which may decrease appetite was found to be associated with delayed gastric emptying for liquids in adults (16). In children, poor appetite secondary to delayed GE is associated with failure to thrive (9,17-19). The observation of one child with delayed gastric emptying treated with a prokinetic agent and showing optimal rate of weight gain (19), raised the question about efficacy of prokinetic agents in poor appetite. We therefore report our study investigating the response of children with poor appetite and delayed gastric emptying to prokinetic agent therapy.

In our study, malnutrition was found in 81% of the cases with delayed GE. Daily energy intake was lower than required in most of the children, supporting the fact that deficient intake may result in failure to thrive. There were however two patients with sufficient energy intake although they were brought to medical attention with poor appetite and malnutrition. The cause malnutrition could not be explained by another underlying pathology. Actual energy intake of these patients might not be accurately reflected by a three day-diet recall.

Weight and height of the children increased significantly and malnutrition ration decreased significantly with prokinetic therapy and behavioural feeding recommendations. These results suggest that malnutrition can be improved by behavioural and prokinetic therapy. Probably prokinetic agents are improving these by increasing nutrient intake. Prokinetics might increase nutrient intake since gastric emptying time is shortened, by decreasing the feeling of satiety raised by gastric distension and food presence (3,4,6,7). Additional effect of prokinetic agents on gastroesophageal reflux may further enhance appetite by impairing the food refusal seen in this condition (1). As expected we observed an increase in daily energy intake with therapy. Because there is also an increase in weight and height SDS besides weight and height values, we may propose that it is due to the effect of prokinetic agents rather than nor-

Table 2. — Monthly progression report of energy intake

	1st month	2nd month	3rd month	4th month	5th month	6th month
Energy intake (kcal/kg/d)	78.8 ± 20.9	80.9 ± 28.5	85.2 ± 23.8	89.1 ± 36.1	96.3 ± 41.7	92.5 ± 30.9

mal expected growth. Our results fell just short ($P=0.05$) to show a significant improvement in gastric emptying rate during treatment due to the small number of patients reevaluated by a second scintigraphic test, but a trend towards decreased emptying rate was observed in most patients.

Our results also demonstrated a significant improvement in appetite VAS values. These were graded by the childrens' mothers before and after treatment. This suggests that prokinetic agents may improve poor appetite by improving gastric emptying. The respective effects of behavioural therapy and prokinetic treatment cannot however be clearly distinguished in our study since we evaluated the effects of combined therapy with a prokinetic agent and behavioural therapy. It would be interesting to evaluate the effect of behavioural feeding recommendations alone on appetite and improvement of malnutrition.

In conclusion, our data showed that children with poor appetite who present with delayed GE might benefit from prokinetic agent therapy. Increase in anthropometrical measurements and daily energy intake, decrease in malnutrition rate and improvement of appetite were demonstrated by this treatment. With the support of behavioural feeding recommendations, prokinetic agent therapy should be considered for children with poor appetite and delayed gastric emptying.

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