

Occult Constipation: A Common Cause of Recurrent Abdominal Pain in Childhood

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Abstract

Background: An estimated 10% of all children are subject to recurrent attacks of abdominal pain of unknown origin. When no organic cause is found, the working diagnosis is usually functional abdominal pain.

Objectives: To investigate the possible causative role of occult constipation.

Methods: We defined occult constipation as the absence of complaints of constipation on initial medical history or of symptoms to indicate the presence of constipation. The diagnosis was made by rectal examination and/or plain abdominal X-ray.

Results: Occult constipation was found to be the cause of RAP in 42.6% of children examined. Treatment consisted of paraffin oil and phosphate enema. In 82.84% of cases the abdominal pain subsided considerably or disappeared within 2 weeks to 3 months of treatment. On telephone interview of the parents at 1–1.5 years after discharge, 96.5% reported that both the abdominal pain and constipation had subsided or disappeared.

Conclusions: Occult constipation can be easily identified and treated in a large number of children with RAP who were diagnosed as having functional abdominal pain.

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One of the most common complaints encountered by pediatricians in clinical practice is abdominal pain. An estimated 10% of all children have recurrent attacks of abdominal pain of unknown origin [1]. In 1959, Apley [2] defined recurrent abdominal pain as at least three episodes of debilitating abdominal pain over at least 3 months during the year preceding the clinical examination. Despite its high prevalence in the pediatric population, the pathophysiology and treatment of RAP are unknown [2]. Researchers have attributed the disorder to a genetic vulnerability in patients with a relevant family history, a psychological profile of internalizing behavior, motility disorders, visceral hypersensitivity and lactose intolerance [1,3]. The non-specificity of the symptom, which is common also in urinary tract infection, inflammatory bowel disease and liver diseases, may pose a diagnostic problem [4,5]. Stordal et al. [6] reported the frequency of organic abnormalities in 44 children referred to pediatric departments for RAP. Constipation was diagnosed in 16%, gastroesophageal reflux or esophagitis in 22%, lactose intolerance in 5%, and nodular gastritis with intolerance in 2%; 24 children (55%) did not have signs of organic disease. In a

study from the Mayo Clinic, Gunnar and colleagues [7] followed 161 children under 15 years old who suffered for RAP for at least 5 years. They found that the symptoms resolved either spontaneously or after intervention in 123 children (76.4%), including 34 who had undergone unnecessary surgical procedures. In 38 children (23.6%) there was no change.

Constipation is also a common complaint in children [8–11] and one of the major causes of RAP [3]. However, the definition of constipation is controversial. Blethyn et al. [12] suggested a scoring system for fecal loads and concluded that when a diagnosis of constipation is considered but cannot be substantiated, an abdominal radiograph may provide a simple solution. During evaluation of the children with RAP in our ambulatory clinic, we found that constipation was often missed by the primary physician even though a precise medical history was taken, as there were no significant symptoms to indicate constipation. We termed these cases "occult constipation." The aim of the present study was to investigate the possible causative role of occult constipation in RAP.

Patients and Methods

The present prospective study was conducted at the Day Care Unit of the Schneider Children's Medical Center of Israel, a tertiary care facility serving Tel Aviv and surrounding areas. The sample included all children who presented with RAP from March 1998 to February 1999 and were either referred for evaluation in the unit by their primary pediatrician or the hospital emergency department, or were after hospitalization.

All children were interviewed for general complaints and signs and symptoms of constipation. For younger patients, the parents were interviewed as well. All patients underwent a general physical examination, including rectal examination, by one of three departmental senior physicians. The same physicians followed the patients until discharge. The initial laboratory workup included blood count, erythrocyte sedimentation rate, urinalysis and culture, amylase, liver enzymes, calcium, albumin and total protein, urea and creatinine.

Children who clearly met the criteria for overt constipation were treated according to the clinical diagnosis of overt constipation. Children who had other symptoms consistent also with other working diagnoses, such as weight loss, loss of appetite, vomiting, pain on awakening from sleep, or physical findings, were sent for plain abdominal X-ray imaging, carbon 13 urea breath test, ultrasound of the abdomen, radiologic studies of the gastrointest-

RAP = recurrent abdominal pain

inal tract, or endoscopy, at the discretion of the senior physician. Children who did not have other symptoms and in whom no diagnosis was apparent from the anamnesis were sent for plain abdominal X-ray. The radiologic criteria for constipation grades II-III were defined according to the study of Blethyn et al. [12]. Abdominal X-rays were interpreted by the same two experienced pediatric radiologists. Functional abdominal pain was diagnosed after exclusion of the organic problems. We defined three clinical conditions:

- RAP: according to Apley's definition [2].
- *Overt constipation*: spontaneous complaints of constipation and/or the presence of three of the following criteria, according to the definition of Loening-Baucke [9]: a) low frequency of defecation (<3 per week), b) positive history of recurrent soiling, c) hard painful stools, and d) voluntary stool retention.
- *Occult constipation*: no complaints of constipation on initial medical history and no symptoms to indicate the presence of constipation, but at least one of the following signs: a) hard consistency of stools (described as "rock-like" or "pellet-like") on rectal examination, and b) plain abdominal X-ray film showing distended large intestines loaded with fecal material.

For analysis, the children were divided into three diagnostic groups: occult constipation (group 1), overt constipation (group 2), and other diagnosis (group 3). One child with evidence of *Helicobacter pylori* infection and constipation was included in group 3 because he was cured after treatment for the bacterial infection.

Statistical analysis

Statistical analysis was performed with BMDP software [13]. Pearson's chi-square test and Fisher's exact test were used to compare discrete variables between groups, and analysis of variance was used for continuous variables.

Results

The study population comprised 76 individuals, 42 females and 34 males, with an age range of 2.5 to 18 years (10.7 ± 3 years).

Diagnosis

Table 1 presents the final diagnosis of the children with RAP. Approximately half the children had constipation: 42.6% occult and 14.2% overt. A diagnosis of functional abdominal pain was made in 13.2% of cases. The youngest patient, age 2.5 years, who had recurrent abdominal pain and fever, was diagnosed with familial Mediterranean fever on the basis of family history, clinical tests and genetic analysis.

Demographics and medical history

No differences were found in demographic data or clinical symptoms between the children with occult and overt constipation [Table 2]. A comparison of the 39 children with occult and overt constipation (groups 1 and 2) with the 29 children with other diagnoses (group 3) showed that the non-constipated group had statistically significantly more clinical symptoms not directly related to constipation, such as loss of appetite, vomiting, weight loss, and fever and abdominal pain on awakening ($P < 0.05$).

Table 1. Final diagnosis of patients with recurrent abdominal pain (n = 68)*

Diagnosis	No.	(%)
Occult constipation	29	(42.6)
Overt constipation	10	(14.7)
Positive <i>Helicobacter pylori</i> infection/gastritis	9	(13.2)
Functional abdominal pain	9	(13.2)
Lactose intolerance	4	(5.9)
Crohn's disease	4	(5.9)
Constipation + <i>H. pylori</i> infection	2	(3)
Familial Mediterranean fever	1	(1.5)

* Does not include the eight children lost to follow-up

Table 2. Demographic data and clinical symptoms in children with occult and overt constipation

	Group 1 occult constipation	Group 2 overt constipation	P
Patients	17 females, 12 males	3 females, 7 males	NS
Age (yrs)	9.7 \pm 3.3	10.1 \pm 4.4	NS
Duration of complaints (wks)	62.5 \pm 73.9	71.1 \pm 84	NS
Clinical symptoms	3 (10.3%)	2 (20%)	
Loss of appetite (n)	1 (3.4%)	1 (10%)	NS
Vomiting (n)	9 (31%)	3 (30%)	NS
Awakening abdominal pain (n)*	0	0	NS
Fever (n)	1 (3.4%)	0	NS
Weight loss (n)**			NS

* Abdominal pain that causes the patient to wake from sleep.

**Weight loss was defined as change of 5% or more in body weight.

Table 3. Physical and imaging examinations in a group of children with occult and overt constipation

Findings	Group 1 – occult constipation	Group 2 – overt constipation	P
Palpable bowel loops on abdominal examination	8 (27.6%)	3 (30%)	NS
Fecal impaction on rectal examination	12 (41.4%)	3 (30%)	NS
Abdominal X-ray*	22 (76%)	8 (80%)	NS

* All plain abdominal X-rays were indicative for constipation

Physical examination

There were no statistically significant differences in findings on physical examination of the abdomen between patients with occult and those with overt constipation [Table 3]. Palpable bowel loops were found in 27.6% and 30% of groups 1 and 2 respectively, and fecal impaction on rectal examination was noted in 41.4% and 30% respectively (not significant). However, fecal impaction on rectal examination was noted in only one child (3.4%) in the group with

other diagnoses (who had constipation with *Helicobacter pylori* infection) compared to 15 children (38.5%) with constipation (occult + overt) ($P < 0.01$).

Laboratory and imaging studies

Children with overt constipation underwent fewer laboratory and imaging examinations than children with occult constipation (mean 0.4 vs. 2.37 examinations per child, $P < 0.001$). The pertinent laboratory and imaging results were similar in the two groups. There were also no differences in complete blood count, sedimentation rates, amylase, liver enzymes, calcium, albumin and total protein, urea, creatinine and thyroid function among all children with constipation (groups 1 and 2).

Twenty-two patients with occult constipation, 8 patients with overt constipation, and 23 patients with other diagnosis underwent plain abdominal X-ray. There was no inter-rater disagreement in interpretation of the findings. The findings were indicative of constipation in all the children with overt constipation and in one child from group 3 who had constipation and *H. pylori* infection. According to our definition, all children with plain abdominal X-ray findings indicative for constipation but no symptoms or complaints of constipation ($n=22$) were diagnosed as having occult constipation.

Treatment

All children with constipation (occult and overt) were treated with paraffin oil, phosphate enemas, and cream that contained local anesthetics to relieve anal pain.

Short-term follow-up of patients with occult constipation

Patients continued to visit the Day Care Unit until their condition improved, they decided to stop follow-up on their own, or the abdominal pain disappeared. Of the 76 patients, 10.5% were lost to follow-up.

Three (10.3%) of the 29 children diagnosed with occult constipation failed to comply with the prescribed treatment. The abdominal pain subsided considerably or disappeared within 2 to 4 weeks of treatment in 14 patients (48.3%) and within 1 to 3 months of treatment in 10 patients (34.5%). Two patients (6.9%) did not show signs of improvement during short-term follow-up.

Short-term follow-up of patients with other diagnosis

The nine patients with positive *H. pylori* infection were cured with triple antibiotic treatment. The four patients with lactose intolerance were prescribed a lactose-free diet. The patients with Crohn's disease were referred to the gastrointestinal department. All patients with functional abdominal pain continued to complain of pain after 4 weeks of follow-up.

Long-term follow-up of patients with occult constipation

At 1–1.5 years after discharge from the Day Care Unit, the parents of the patients with occult constipation were interviewed by telephone. In 96.5% of cases, the parents reported that both the abdominal pain and the constipation had subsided or disappeared. Only one patient continued to suffer from RAP, but with no clinical

deterioration. Fifteen (79.3%) of the patients who improved reported compliance with treatment, and 3 (10.5%) reported partial compliance. Two patients who did not comply with treatment improved spontaneously, and the one who continued to suffer from RAP reported not having taken the prescribed medication.

Discussion

Recurrent abdominal pain is a frustrating diagnostic problem because, despite its high prevalence (10–18%) [3], it is associated with a low incidence of organic disease [2–4], and physicians find it difficult to decide when to perform laboratory and imaging studies. The most frequent diagnosis in children with RAP is functional abdominal pain [1,3,4]. Apley and Hale [14] suggested that simple reassurance of patients and parents combined with a good explanation of the disorder may be sufficient. However, the diagnosis can actually make the parents even more frustrated and anxious.

At diagnosis, clinicians need to differentiate among primary, functional, and secondary constipation. Constipation may be associated with a variety of disorders: neurologic – e.g., agangliosis (Hirschsprung disease), neuronal dysplasia, and hypergangliosis; obstructive, e.g., anterior ectopic anus, anal ring stenosis, and small left colon; and endocrinologic/metabolic – e.g., congenital pseudo-obstructive disease, diabetes, and hypothyroidism. It may also be a side effect of laxative abuse or of treatment with diuretics, iron supplements, or tricyclic antidepressants [8].

The identification of a mass of hard stools on rectal examination and soft stool consistency are considered reliable indicators of constipation [15]. Weaver and Steiner [16] found a significant correlation among infrequency of bowel movements, long transit time, and hard stools. Indeed, rectal examination should be considered in all children with RAP, as children are unreliable about reporting stool patterns to their parents. Sometimes the primary pediatrician is reluctant to perform a rectal examination in order to avoid inconveniencing or embarrassing the young patient, and the diagnosis may be missed. There may be a lag period of occult constipation before the full picture becomes clear.

The importance of the medical history in differentiating overt and occult constipation from other diagnoses should also be emphasized. In the present study, abdominal pain on awakening from sleep, vomiting, loss of appetite, weight loss and fever all occurred at a significantly higher rate in the patients with other diagnoses. Surprisingly, abdominal pain on awakening was found often in the patients with constipation. However, it was significantly more frequent in the patients with other diagnoses.

In many of the children with occult constipation in our series, the typical complaints of common constipation were absent, and the frequency of stools was high. Nevertheless, we found that occult constipation could be easily differentiated from overt constipation and other diagnoses when a targeted evaluation was used. Despite their outwardly healthy appearance, many of the children with occult constipation had palpable loops on abdominal examination and hard stools, with or without anal fissures on rectal examination. Suspected occult constipation often needs to be confirmed by

abdominal X-ray. Blethyn et al. [12] reported a high inter-examiner agreement in identifying impaction on radiologic assessment of possible constipation. In our study, there were no cases of disagreement between the raters.

Apley and Hale [14] found most laboratory and imaging examinations unhelpful in the differential diagnosis of RAP. In our study, the only reliable imaging examination for identifying occult constipation was plain abdominal X-ray, which was performed in 75.8% of the affected children.

Occult constipation is a common cause of RAP, and we speculate that many patients diagnosed with functional abdominal pain actually have occult constipation. This assumption is supported by the study of Loening-Baucke et al. [17] who noted an amelioration in symptoms of both constipation and abdominal pain when stool consistency was changed by treatment. Abdominal pain was present in the majority of children before treatment but remained in only 10% after treatment. On short-term follow-up in the present study, we also found a positive correlation between improvement or resolution of the abdominal complaints and compliance with treatment with paraffin oil and enemas. Our long-term follow-up confirmed that no serious underlying problems were missed by our method of diagnosis. Although long-term follow-up was conducted by telephone interview, the parents had been given a detailed explanation of the reasons for their children's abdominal pain, and were alerted to the importance of following the frequency of defecation, soiling, and occurrence of soft, watery or painful stools.

The main limitation of this study was the lack of a control group. Our findings warrant a larger, double-blind investigation of children with occult constipation and children with RAP without constipation.

In conclusion, high levels of clinician awareness of occult constipation can lead to the proper diagnosis in children with RAP and save both patients and physician unnecessary clinic visits and laboratory examinations.

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Capsule

Risk and outcome of nosocomial *Staphylococcus aureus* bacteremia

Staphylococcus aureus is the second most frequent cause of nosocomial blood infections. Heiman et al. screened 14,008 non-bacteremic, non-surgical patients for *S. aureus* nasal carriage at admission, and monitored them for development of bacteremia. Nosocomial *S. aureus* bacteremia was three times more frequent in *S. aureus* carriers (40/3420, 1–2%) than in non-carriers (41/10,588, 0–4%). However, in bacteremic patients, all-cause mortality was significantly higher in non-carriers (19/41, 46%) than in carriers

(7/40, 18%). Additionally, *S. aureus* bacteremia-related death was significantly higher in non-carriers than in carriers (13/41, 32% vs. 3/40, 8%). *S. aureus* nasal carriers and non-carriers differ significantly in risk and outcome of nosocomial *S. aureus* bacteremia. Genotyping revealed that 80% of strains causing bacteremia in carriers were endogenous.

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