Predictive Factors for Short-term Symptom Persistence in Children After Emergency Department Evaluation for Constipation

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Background: Children with symptoms and signs of constipation are commonly assessed in pediatric emergency departments (EDs). Little is known about their outcome following the ED visit.

Objectives: To describe the clinical characteristics of children presenting to the ED with constipation and the ED interventions; to measure short-term symptom resolution at 48 hours and 7 days after the ED visit; and to identify predictive factors associated with poor symptom resolution at 48 hours and 7 days after the ED visit.

Design/Methods: Cohort study conducted between July 10, 1997, and September 10, 1997, in a tertiary care pediatric hospital ED. All children (aged 1-18 years) with idiopathic constipation were included. Constipation was diagnosed if there were at least 2 of the following: abdominal pain, infrequent bowel movements, hard feces, fecal soiling, pain on defecation, and/or clinical evidence of excessively retained feces. Data on the presenting symptoms, signs, and ED treatment plan were collected on study enrollment and then in 2 standardized 10-minute telephone interviews at 48 hours and 7 days after the ED visit. At each follow-up, patient disposition was measured and dichotomized based on symptom resolution to “improved” vs “not improved.” The presenting features and ED management were compared between groups using \( \chi^2 \) analyses and \( t \) tests.

Results: Consent and full questionnaire completion was obtained in 102 children. The mean ± SD age was 6.5 ± 3.8 years; 47 (46%) were male. The predominant presenting symptom was abdominal pain (83 [81%]); the most frequent sign was palpable abdominal stool (67 [66%]). A high-fiber diet (75 [74%]) and mineral oil (48 [47%]) were prescribed most frequently. Enemas were given to 64 (63%) of the children. Improvement was found in 32 (31%) of the children at 48 hours and in the majority at 7 days (77 [75%]). Risk factors for poor symptom resolution at both 48 hours and 1 week included: female sex (odds ratio [OR] = 2.6; 95% confidence interval [CI] = 1.0-6.6); history of recurrent abdominal pain (OR = 2.8; 95% CI = 1.2-6.5); duration of primary presenting symptom longer than 2 days (OR = 2.4; 95% CI = 1.0-6.4); and history of medical visits for the same symptom (OR = 2.3; 95% CI = 1.0-5.3). There was no difference in outcome based upon ED treatment (enema vs oral or no therapy) (OR = 1.0; 95% CI = 0.4-2.3).

Conclusions: Most children with constipation evaluated in the ED have acute symptoms and rapid improvement, regardless of presentation characteristics or ED management. In this study, 4 risk factors for poor outcome were found consistently at 48 hours and 7 days. This subgroup of children deserve closer clinical attention. Emergency department therapy did not influence short-term symptom resolution. Further studies are warranted to examine the effects of therapy for constipation in the ED setting.

Acute constipation is a common condition in children presenting for urgent care to an emergency department (ED). Previous studies report that 3% to 16% of children with acute abdominal pain are diagnosed with idiopathic constipation. Similarly, at The Montreal Children’s Hospital (MCH) ED, approximately 90 to 120 children are evaluated each month for defecation difficulties labeled “constipation” as the discharge diagnosis. Apart from recognizing the frequency of the condition, little more is known about this group of children. Specifically, to our knowledge, ED interventions and short-term outcomes after the ED visit have not yet been described.

In almost all practice settings, there is limited information on constipation in children. Most available data concern children with encopresis and those with severe disease who are evaluated by pediatric gastroenterologists or psychologists. Nonetheless, it is clear that a substantial number of children with constipation are evaluated in alternate health care settings, like the ED.

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PATIENTS AND METHODS

A prospective cohort study was conducted in the MCH ED. The MCH is a Canadian urban tertiary care pediatric center with an estimated annual volume of 85,000 ED patient visits.

STUDY POPULATION

A consecutive series of children aged 1 to 18 years who presented to the ED with defecation difficulties initially recorded as either “constipation” or “abdominal pain” between July 10, 1997, and September 10, 1997, were approached for potential inclusion in the study. Children were included in the study if they had at least 2 of the following: abdominal pain, infrequent bowel movements, hard feces, fecal soiling, pain on defecation, and/or clinical evidence of excessively retained feces. This latter sign was determined by the attending ED physician and included children with impacted stool in the rectum, a dilated rectum, or palpable abdominal stool. Infrequent bowel movements were defined as 1 bowel movement less often than every other day. This definition was based on reported population norms. Children with an apparent or possible underlying cause for the constipation were excluded (eg, a history of prior abdominal or rectal surgery, hypothyroidism, hypercalcemia, known gastrointestinal anatomic abnormalities, inborn errors of metabolism, developmental delay, spina bifida, neuromuscular abnormalities, or recent exposure to medications known to cause constipation). Only children whose parents were fluent in either French or English were included. Families without a working telephone and those who declined to provide informed consent were excluded.

METHODS

Following scientific and ethical approval from the MCH Research Institute and Institutional Review Board, respectively, informed consent was sought for all eligible patients during their ED visit. Baseline information and outcome data were collected using the ED medical record, a standardized physician questionnaire, and standardized telephone questionnaires for the patient or family at 48 hours and 7 days post-ED visit. Telephone interviews were conducted by one trained, bilingual research assistant (A.L.). Collected baseline information included patient demographic features, presenting symptoms and signs, history of defecation difficulties, and duration of the presenting complaint. Parent or child responses on symptoms in the previous 3 months were based on a Likert categorical scale for frequency of the event. For example, families were asked if their child had fecal soiling: always, often, occasionally, rarely, or never. Both ED physician and the patient/family questionnaires were pretested among hospital clinicians and families, respectively, for face validity, clarity, and comprehensiveness. The ED management and discharge plans were recorded. For the purpose of this study, we categorized children as having “poor” improvement in short-term symptoms if there were 2 or more of the following features at the time of telephone follow-up: overall parent or child report of persistent symptoms, bowel movement frequency of less than once every other day, presence of pain on defecation, presence of abdominal pain in between bowel movements, and/or persistence of the main presenting symptom documented at the time of the ED visit. Children had “successful” resolution of short-term symptoms if there was persistence of none or only 1 of these features at the time of telephone follow-up.

Following a review of the background literature, we hypothesized that children with acute severe symptoms of constipation on top of having had chronic bouts with lower-grade symptoms would have poorer short-term symptom resolution than those with a more transient problem. Thus, the following prospectively collected factors, reflecting the heterogenic condition of chronic constipation, were considered as potential risk factors for unsuccessful short-term symptom resolution in this group of children: older age, female sex, long pre-ED duration of the complaint, presence of recurrent abdominal pain (RAP) (Apley’s criteria); previous ED visits for the same complaint; pre-ED history of fecal soiling, toileting refusal, or hard bowel movements; presenting symptoms of anal fissure or vomiting; and ED signs of palpable abdominal stool or a dilated or impacted rectum. Given the controversy over enema therapy in children, we compared outcome by ED intervention (enema vs other therapy) also.

The relationship between potential risk factors and short-term outcome was examined in 2 × 2 tables. The χ² test was used to determine statistical significance for categorical variables and the t test was used for comparison of means for continuous variables. Odds ratios (ORs) with the 95% confidence interval (CI) were calculated for potential risk factors. Descriptive characteristics of all constipated children are presented by measures of central tendency and proportion.

Overall, constipation is prevalent in approximately 5% of the general pediatric population. Primary or idiopathic constipation in children is defined as difficult defecation, often with evidence of excessive stool retention, not caused by underlying pathology (ie, anatomic, neurological, endocrine, metabolic, or pharmacological causes). Acute, recurrent, and chronic abdominal pain are common presenting features in children with constipation. Bowel movements are considered pathologically infrequent (less often than once every other day) only when other symptoms or signs of difficult defecation, such as painful, large, or hard stools, are present. Physical signs of constipation, indicating excessive stool retention, include palpable abdominal stool, a dilated rectum, or the presence of rectal fecal impaction.

The optimal treatment for idiopathic constipation in children has not been adequately evaluated, but it is clear that high-fiber diets, mineral oil, and enemas are commonly used therapies. To our knowledge, the effectiveness of ED interventions in children with constipation has not been examined. From a recent review of our medical records, we suspected that enema therapy was used frequently in our ED. However, we found no evidence beyond opinion to suggest that enemas were more effective compared with oral laxative regimens in children with constipation, regardless of the study setting. Given the method of administration, it is not surprising that many parents...
and physicians feel that enema therapy is excessively invasive.\textsuperscript{16-19} As a part of this predictive factors study, we wished to examine the MCH ED interventions more closely and to describe the outcomes of children who received enema therapy vs those who did not.

Thus, the objectives of our study were to describe the clinical characteristics of children presenting to the ED with constipation, describe the ED interventions, measure short-term symptom resolution at 48 hours and 7 days after the ED (hereafter, post-ED) visit, and identify predictive factors associated with poor symptom resolution at 48 hours and 7 days post-ED visit. We believed that the results would be of use in identifying those children with a more chronic form of constipation vs those who required little follow-up post-ED visit. Lastly, we thought that if no differences in outcome were observed between children who received enemas and those who received alternative care, then this would provide important information for a future randomized trial of ED interventions in this patient group.

RESULTS

During the 12-week study period, there were 11119 ED visits at the MCH. Of these, there were 170 potentially eligible children. Of these, 43 children did not fully meet study inclusion criteria. Of the remainder, consent was not obtained, primarily because of limited on-site availability of the research assistant and subsequently missed recruiting opportunities. In 104 patients, consent was obtained; 102 completed the entire study. Two families could not be reached for the telephone follow-up questionnaires. The mean±SD age of study participants was 6.5±3.8 years. There were 47 (46%) boys in the study group. Parents reported that 83 (81%) of children were toilet trained.

The clinical characteristics of the study group were divided into 3 time periods: (1) pre-ED baseline features (as observed in the 3 months before the ED visit and documented during the first telephone interview with the child and/or parent); (2) ED symptoms, signs, and interventions (based on the ED physician’s assessment recorded on the structured written questionnaire); and (3) post-ED symptoms and interventions (as determined by follow-up telephone interviews).

The most common features in the pre-ED baseline history of study participants were previous health care visits (57 [56%], hard bowel movements (44 [43%]), and a history of RAP (Apley’s criteria) (37 [36%]).\textsuperscript{20} Approximately one third of the children/families reported large bowel movements (operationally defined as those frequently plugging the toilet) (34 [33%]) and “frequent” refusal of the child to go to the toilet or of stool withholding (33 [32%]). There was painful passage of stool in 24 (24%). A minority of families reported “frequent” fecal soiling (18 [18%]) and rectal bleeding with the passage of stool (12 [12%]). “Frequent” symptoms were those reported by the parents with occurrence “often” or “always.” The following presenting signs and symptoms were noted in the population of 102 children on ED visit: acute abdominal pain (83 [81%]), palpable abdominal stool (67 [66%]), infrequent bowel movements (>1 every other day) (53 [52%]), acute loss of appetite (37 [36%]), hard “rocklike” bowel movements (36 [35%]), and painful defecation (23 [23%]). Apart from the finding of retained fecal matter, no other positive findings were noted, ie, no rectal fissures were documented and no child had a stool specimen found positive for occult blood during the rectal examination. Interestingly, a rectal examination was performed in only 52 (51%) of the 102 children. Of the 52 children on whom rectal examination was performed, 19 (37%) were found to have a dilated and/or stool-impacted rectum, and palpable abdominal stool was found in 67 (66%) of the 102 patients.

The ED investigations and interventions were carried out as follows. Of the ED investigations, plain abdominal radiography was ordered in 52 (51%) of the children. The reason for radiography was incompletely documented; a review of radiology requisitions showed the most common written indication as “abdominal pain not yet diagnosed.” Radiographs were taken more frequently in children who did not have a rectal examination compared with those who did. In the 52 children for whom abdominal x-ray films were taken, a large amount of stool was noted in 8. In 15 children, a moderate amount of stool was noted and in 5 a small amount was seen. There was no evidence of excessively retained stool in the remaining 24 children. Urinalyses were performed in a minority of children in the ED; no child received a discharge diagnosis of urinary tract infection. No other imaging studies were ordered for the study group during the ED visit.

Of ED interventions, a high-fiber diet was recommended by the ED physician to 74% (75) of all the children. At the 48-hour phone call, 17 of the families (22%) did not recall this recommendation; only 27 families (36%) had actually started to incorporate appropriate dietary changes. Of other ED interventions, enemas were used most frequently. Pediatric Fleet enemas were used almost exclusively (1 child received a soapsuds enema). Of the 64 children who received an enema (63%), one third had 2 or more enemas given in the ED (10 [10%]). Oral mineral oil was the most frequently recommended medication and was prescribed to 48 children (47%) before discharge from the ED. At 48 hours, 32 children remained on the mineral oil regimen. At 1 week, 18 children continued to take the mineral oil. The most common reasons specified for discontinuing the mineral oil therapy included: “no particular reason,” child improved therefore medication regimen stopped, child resisted or refused treatment, and medication too difficult to administer. Rectal suppositories and other laxatives (mainly senna preparations and lactulose) were used infrequently (9 [9%]). Behavioral therapies such as regular sits on the toilet were recommended and documented in 3 children. In 8 children (8%), no specific therapy was recommended.

At 48 hours' follow-up, 70 families/children (69%) reported the continued experience of the “same” or “worse” symptoms compared with the ED visit. Most children (75%) had a global improvement (“symptoms in the ED improved or completely resolved”) by the 1-week follow-up period. More specifically, 58 children had persistence of 2 or more of the following features at 48 hours’ follow-up: overall parent or child report of persistent symptoms, bowel movement frequency of less than once every other day, any pain on defecation, any abdominal pain, and/or any rectal symptoms. No significant intervention was recommended at discharge. At 48 hours, only 7 children (7%) had received an alternative therapy: 4 children received mineral oil, 2 received Fleet enemas, and 1 child had laxatives prescribed.

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pain in between bowel movements, or persistence of the main presenting symptom documented at the time of the ED visit. For the purposes of this study, these children were considered to have a “poor” outcome at 48 hours. Although global symptoms were reported as “improved” or “resolved” in 77 families (75%) by the 7-day follow-up, 54 continued to report persistence of 2 or more specific symptoms. That is, symptoms were more often “improved” vs “resolved.” Specific components of short-term symptom resolution are given in the Table.

There were a total of 35 children with return visits to a health care provider over the 7-day study period. At 48 hours, 11 children had already had at least 1 additional health care visit; most of these were at the MCH ED. By 7 days, an additional 24 children had return visits; more than 18 (75%) of these visits were to the child’s family physician. No child had an alternative diagnosis to idiopathic constipation at the end of the 7-day follow-up period as reported by the parents.

Of the potential risk factors for “poor” outcome at both 48 hours and 7 days, 4 positive characteristics were found. Girls were more likely to have poor short-term symptom resolution (OR = 2.6; 95% CI = 1.0-6.6). Children presenting to the ED with a history of recurrent abdominal pain were 2.8 times more likely to have persistence of short-term symptoms (OR = 2.8; 95% CI = 1.2-6.5). Lastly, those children with a pre-ED symptom duration of more than 2 days (OR = 2.4; 95% CI = 1.1-6.4) and children with previous medical visits for the same complaint (OR = 2.3; 95% CI = 1.0-5.3) were more likely to have poor symptom resolution during the study period. The following factors had no influence on short-term symptom resolution: age; presence of fecal soiling, refusal to sit on the toilet seat, or hard bowel movements pre-ED visit; presence of an anal fissure, palpable abdominal stool, or a dilated rectum, as assessed in the ED; and ED therapy (enemas vs other therapy) (OR = 1.0; 95% CI = 0.4-2.3).

COMMENT

Children with constipation constitute a clinically important proportion of the ED pediatric patient population, particularly when return-visit rates are considered. This study describes this group in detail and provides information on short-term symptom resolution. The morbidity of the condition is highlighted by the fact that 57 (56%) of 102 children already had at least 1 medical visit for the same complaint prior to the ED visit; another 35 (34%) required at least 1 post-ED medical visit during the study period. Although speedy discharge from the ED may be desired for this group of children, a more detailed ED discharge plan may be indicated in children with positive risk factors or evidence of acute on top of chronic symptoms of constipation, if a reduction in recurrent symptoms and health care visits are desired.

In general, most children’s conditions improved throughout the study duration though a significant number did not experience complete resolution of symptoms. Although the defecation difficulties were chronic in a significant proportion of children, acute abdominal pain was the primary presenting symptom in most of the children. Our results show that historical features suggestive of chronic constipation were more predictive of poor short-term symptom resolution compared with the physical features of constipation observed in the ED.

Of the ED interventions, half of all evaluated children had abdominal radiography during their initial ED visit. While most physicians appeared to order the test because of the presence of abdominal pain, the value of plain radiographs is limited in this setting. Specifically, plain radiographs are of little use in the detection of most surgical diseases in children, including acute appendicitis. In children with classical RAP, even ultrasonography has not been found to be diagnostically helpful. Lastly, although abdominal radiographs have been advocated as a measure of constipation severity, correlation between radiographic findings and clinical features is poor. In this study, it is not clear why abdominal radiographs were obtained with such high frequency.

A surprising number of children with presumed constipation (50 [49%]) failed to have undergone a simple rectal examination during the initial ED visit. The diagnostic value for the finding of an impacted and/or dilated rectum may have been underestimated by our physician group. Alternatively, some physicians may have thought that the rectal examination was unnecessarily distressing and/or invasive for the child. This latter hypothesis may still be true even given the high use of rectal enemas (64 [63%]). Enemas, which are likely more distressing than a rectal examination for most children, are invariably administered by nursing staff in the MCH ED. In almost all cases, the ED physician did not witness or participate in enema administration.

The ED therapy for constipation included a recommendation to follow a regimen of a high-fiber diet, oral mineral oil, and rectal enemas. In this sample of 102 children, differences in symptom resolution were not found.
between children who received enemas and those who did not. As well, the presenting symptoms, signs, and demographic features of children who received an enema were no different than those who did not. Previous reports have suggested that enema use in the pediatric ED population deserves careful consideration and has been associated with mortality in specific patient groups. 30 As well, considering the invasiveness of the enemas, particularly in young children, a prospective randomized trial may help determine the risk-benefit balance for this mode of therapy.

All of the risk factors indicating poor short-term symptom resolution are likely interrelated to some extent. That is, RAP is known to be more frequent in females; these patients invariably are seen several times for the same complaint. A prolonged pre-ED duration of symptoms is also more likely in the child with RAP. Certainly, the association of underlying constipation in a significant proportion of children with RAP is not new. A high-fiber diet alone has been found to be an effective therapy for this condition. 31 Given our limited sample size, further statistical analyses such as logistic regression were not performed on the data collected in this study.

As in all predictive factor studies, further testing of positive factors in an independent sample of children with constipation is warranted. This is particularly necessary when the ORs are of low magnitude, as were found in this study. Limitations of this study include limited patient recruitment owing to operational constraints, relatively short follow-up period, and lack of an objective constipation severity score. A validated, responsive, and reproducible constipation severity score would be an invaluable tool in a study such as this. To our knowledge, this type of tool does not exist. As a consequence, a detailed follow-up questionnaire of symptoms was used to follow the course of children in this study.

CONCLUSIONS

In summary, constipation is a frequent complaint in children presenting to a pediatric ED. This study provides a description of such children and indicates the nature of their short-term symptom outcomes. For those children with indicators of a more chronic condition, such as RAP, female sex, previous medical visits for the same problem, or a duration of greater than 2 days of the presenting complaint, more detailed follow-up with a primary caregiver is warranted. This report summarizes the characteristics of children presenting to the ED with constipation and highlights several issues deserving our further study: the role of enema therapy vs oral laxatives of dietary modification, the low performance of the rectal examination in physician assessment, and the potential overuse of plain abdominal radiography.

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