Diagnosis of constipation does not correlate with trans-abdominal ultrasound of rectal distention

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Summary

Introduction

Constipation has been shown to have a significant impact on lower urinary tract symptoms (LUTS) in children, and treatment of constipation in children with bowel bladder dysfunction (BBD) has been shown to improve or completely resolve LUTS in many cases. Recent studies utilizing trans-abdominal ultrasound (US) to assess stool burden have correlated diagnosis of constipation with US appearance of rectal stool. An US scoring tool was published in 2008 to assess stool burden, showing linear correlation with constipation severity by symptom questionnaire in an outpatient pediatric constipation clinic population. We hypothesized that this US scoring tool would correlate with constipation symptoms in our outpatient pediatric urology population.

Methods

In 2010, our pediatric urology outpatient clinic began administering a previously published validated BBD questionnaire to new toilet-trained patients, containing three questions addressing bowel function. Patients in our clinic undergoing trans-abdominal US of the bladder also have assessment of their stool burden by the previously published US scoring tool. We retrospectively reviewed patient charts beginning in June 2013 who had undergone trans-abdominal US of the bladder, gathering data on the first 100 patients with a complete BBD questionnaire and a completed stool burden US scoring tool.

Results

Chart review of 272 consecutive patients was required to enroll 100 patients with a completed US scoring of stool burden and a completed BBD questionnaire. Of these 272 patients, 225 (82%) had a complete scoring of stool burden during their US examination. BBD questionnaires were complete in 107 of 272 patients (39%). Median patient age was 8.2 years, with 69% of patients being female. The most common diagnosis was incontinence or bladder dysfunction (41%). Only one patient (1%) had constipation as the primary diagnosis for their visit. Linear regression analysis showed no correlation of US score to patient reported frequency of bowel movement, frequency of hard stool, frequency of fecal incontinence, or all three symptoms combined. When investigating the subgroup of patients who had diagnoses of BBD/incontinence, this group was seen to have higher mean symptom scores than the entire cohort as a whole, but US scores were still widely variable and again did not correlate with symptom scores.

Conclusion

US examination has previously been shown to correlate with symptom severity for children with chronic constipation in a pediatric constipation clinic setting. However, in a pediatric urology outpatient clinic setting at our institution, US examination did not correlate with patient reported symptoms.

Introduction

Constipation has been shown to have a significant impact on lower urinary tract symptoms (LUTS) in children, and treatment of constipation in children with bowel bladder dysfunction (BBD) has been shown to improve or completely resolve LUTS in many cases [1–4]. Recent studies utilizing trans-abdominal ultrasound (US) to assess stool burden have correlated diagnosis of constipation with US appearance of rectal stool [5–7]. In 2008, a new US scoring tool to assess stool burden was published by Lakshminarayanan et al. [8]. In their outpatient pediatric constipation clinic, US score had a linear correlation with constipation severity by symptom questionnaire. We subsequently began using this US scoring tool at our outpatient pediatric urology clinic for patients undergoing trans-abdominal US of the bladder. We hypothesized that this US scoring tool would correlate with constipation symptoms in our outpatient pediatric urology population.

Methods

Beginning in 2010, our pediatric urology outpatient clinic began administering a previously published validated BBD questionnaire (Vancouver Nonneurogenic Lower Urinary Tract Dysfunction/Dysfunctional Elimination Syndrome) [9,10] to new toilet-trained patients. This questionnaire contains 14 items on a 5-point Likert scale, with a score of 0 representing no symptoms and a score of 4 representing severe symptoms. Questions 11, 12, and 13 of this questionnaire specifically address bowel function. Question 11 addresses frequency of bowel movement, scoring 0 points for "more than once per day," 1 point for "every day," 2 points for "every other day," 3 points for "every 3 days," and 4 points for "more than every 3 days." Question 12 addresses frequency of hard stool, scoring 0 points for "never," 1 point for "less than half of the time," 2 points for "half of the time," 3 points for "more than half of the time," and 4 points for "everyday." Question 13 addresses frequency of fecal incontinence, scoring 0 points for "never," 1 point for "1–2 times per week," 2 points for "3 times per week," 3 points for "4–5 times per week," and 4 points for "everyday." We analyzed the responses to each of these three questions as well as a total score of all three questions combined (possible score of 0–12).

Patients in our clinic undergoing trans-abdominal US of the bladder also have assessment of their stool burden by the previously published US scoring tool [8]. This tool assigns a total score of 1–10 based on height of stool visible on US and the amount of bladder indentation caused by rectal stool content. Stool height is scored from 1 to 7 as follows: no stool (1), retro bladder (2), just above bladder (3), nearly umbilicus (4), to umbilicus (5), beyond umbilicus (6), can't see upper edge (7). Bladder indentation is scored from 0 to 3 as follows: empty bladder or no compression (0), indented bladder (1), flattened bladder (2), displaced bladder (3).

Following approval from our institutional review board (#131594), we retrospectively reviewed patient charts beginning in June 2013 who had undergone trans-abdominal US of the bladder. Patients were enrolled in the study if they had a complete BBD questionnaire and a completed stool burden US scoring tool. Patients were excluded if questionnaire responses were incomplete or were answered with a text response instead of a Likert scale response. The first 100 consecutive patients meeting these criteria were analyzed. Primary reasons for clinic visit were determined by ICD-9 diagnosis codes. Patients with ICD-9 codes 596.59 (other bladder dysfunction), 788.1 (dysuria), 788.21 (incomplete bladder emptying), 788.30 (urinary incontinence not otherwise specified), 788.36 (nocturnal enuresis), 788.41 (urinary frequency), 788.63 (urgency of urination), 788.31 (urge incontinence), and 788.64 (urinary hesitancy) were classified as having a reason for visit of BBD/incontinence. Symptoms of constipation by BBD questionnaire were compared with stool burden US score. Linear regression analysis was performed comparing US score with each constipation question score. Statistical analysis was done using GraphPad Prism 6 software for Windows. A p value of <0.05 was considered significant.

Results

Chart review of 272 consecutive patients was required to enroll 100 patients with a completed US scoring of stool burden and a completed BBD questionnaire. Of these 272 patients, 225 (82%) had a complete scoring of stool burden during their US examination. BBD questionnaires were complete in 107 of 272 patients (39%). The characteristics of the 100 patients with completed US scoring of stool burden and completed BBD questionnaires are shown in Table 1. Median patient age was 8.2 years, with 69% of patients being female. The most common diagnosis was BBD/incontinence (41%). Only one patient (1%) had constipation as the primary diagnosis for their visit. Other diagnoses seen in fewer than five patients were abdominal pain, bladder exstrophy, cystic kidney disease, genital anomaly, hematuria, neurogenic bladder, phimosis, urethral stricture, ureteral stricture, ureterocele, and urolithiasis.

When analyzing symptom severity for the group based on the validated BBD questionnaire, all three individual questions assessing bowel symptoms had scores ranging from 0 to 4, with mean values shown in Table 2. The total score of all three symptoms combined ranged from 0 to 7, with a mean total symptom score of 2.11. US scoring for the group revealed stool height score ranging from 1 to 7 (mean 2.84) and bladder indentation score ranging from 0 to 1 (mean 0.05), with overall US scores ranging from 1 to 7 (mean 2.89). Linear regression analysis showed no

Table 1	Patient characteristics.
Age, median (range, years)	8.2 (2.2–17.5)
Gender, female/male	69/31
Primary visit diagnosis, n (%)	
BBD/incontinence	41 (41)
UTI	14 (14)
Vesicoureteral reflux	13 (13)
Hydronephrosis	5 (5)
Nocturnal enuresis	5 (5)