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Long-term results of cholecystectomy for biliary dyskinesia: outcomes and resource utilization



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ABSTRACT

Background: The purpose of this study is to describe a cohort of pediatric patients undergoing cholecystectomy for biliary dyskinesia (BD) and characterize postoperative resource utilization.

Methods: Single-institution, retrospective chart review of pediatric patients after cholecystectomy for BD was done. Patient demographics and clinical characteristics as well as operative details and postoperative interventions were abstracted. Telephone follow-up was performed to identify persistent symptoms, characterize the patient experience, and quantify postoperative resource utilization.

Results: Forty-nine patients were included. Twenty-two patients (45%) were seen postoperatively by a gastroenterologist, of which, only 32% were known to the gastroenterologist before surgery. Postoperative studies included 13 abdominal ultrasounds for persistent pain, 13 esophagogastroduodenoscopies, five endoscopic retrograde cholangiopancreatographies (ERCPs), one endoscopic ultrasound, one magnetic resonance cholangiopancreaticogram, and five colonoscopies. Of the patients with additional diagnostic testing postoperatively, one had mild esophagitis, three had sphincter of Oddi dysfunction, and one was suspected to have inflammatory bowel disease. Telephone survey response rate was 47%. Among respondents, 65.2% reported ongoing abdominal pain, nausea, or vomiting at an average of 26 mo after operation. Of note, all patients who underwent postoperative ERCP with sphincterotomy reported symptom relief following this procedure.

Conclusions: Relief of symptoms postoperatively in pediatric patients with BD is inconsistent. Postoperative studies, though numerous, are of low diagnostic yield and generate high costs. These findings suggest that the initial diagnostic criteria and treatment algorithm may require revision to better predict symptom improvement after surgery. Improvement seen after ERCP/sphincterotomy is anecdotal but appears to merit further investigation.

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Introduction

Rates of cholecystectomy in pediatric patients have risen dramatically in the past decade, driven in part by an increased acceptance of biliary dyskinesia (BD) as an indication for surgery. With diagnosis often based on the ROME III criteria for functional gastrointestinal disorders, BD now accounts for nearly half of all cholecystectomies performed in pediatric centers.¹⁻³ Symptom improvement after cholecystectomy in this group, however, is disappointingly inconsistent.^{4,5} When compared to patients with symptomatic cholelithiasis and other gastrointestinal pathologies, patients with BD have been found to use more resources perioperatively with lower rates of symptom resolution in single-center studies.⁶

In this study, we sought to evaluate the experience with BD at a single institution and to characterize postoperative resource utilization in patients with and without persistent symptoms after cholecystectomy. We hypothesized that a large number of studies would be performed postoperatively, particularly in patients with little or no symptom improvement after surgery.

Materials and methods

The study protocol, telephone interview script, and use of electronic medical records (EMRs) were reviewed by the institutional review board of the State University of New York, University at Buffalo, and informed consent was obtained before the telephone interview (UB IRB: STUDY00000836).

Data source and patient selection

We performed a retrospective review of patients under age 18 who underwent cholecystectomy at a freestanding children's hospital in Western New York between December 1, 2010 and July 2, 2016. The Women and Children's Hospital of Buffalo (now the John R. Oishei Children's Hospital) is the region's largest children's hospital. Patients who had undergone a cholecystectomy were initially identified for inclusion. Diagnostic codes were then reviewed to identify and include patients with a diagnosis of BD. EMRs were reviewed for all patients meeting the inclusion criteria. Additional information regarding resolution of symptoms and subsequent procedures or testing was obtained through follow-up phone calls with patients and families. Billing information was obtained for analysis of resource utilization as related to symptom resolution.

Statistical analysis

A retrospective descriptive analysis of the data was performed. Categorical variables were compared using the Pearson's Chi-squared and Fisher's exact test, with Student's *t* test for continuous variables. All statistical analyses were performed using Excel and IBM SPSS Statistics 24 software.

Results

Chart review

A total of 49 patients who underwent cholecystectomy for BD were identified during the study period. Four patients were removed for preoperative diagnosis of cholelithiasis with or without pancreatitis. Patient characteristics were obtained through chart review. For the entire cohort, 62.2% of patients were women, and the average age of patients was 14.2 ± 2.1 y (Table 1). The average body mass index (BMI) did not vary significantly between women and men (average 27.0 ± 9.1 versus 26.0 ± 8.1 ; $P = 0.68$). All patients underwent laparoscopic procedures without an intraoperative cholangiogram. Preoperative workup in this cohort, as documented in the EMR, included a hepatobiliary iminodiacetic acid (HIDA) scan for 40 (88.9%) patients, with cholecystokinin (CCK) given to 34 (85.0%) patients undergoing the HIDA scan; CCK injection reproduced pain symptoms in 25 (73.5%) patients. The remaining five patients reportedly had the HIDA scan performed at an outlying facility and were referred with a diagnosis of BD though the specific results were not available for review. Right upper quadrant ultrasound was performed on 31 patients (68.9%) and esophagogastroduodenoscopy on 15 (33.3%) patients. Endoscopic retrograde cholangiopancreatography (ERCP) and sphincterotomy were performed preoperatively on two patients, both of whom were noted to have normal cholangiogram with prompt drainage. The most common presenting symptom was abdominal pain followed by pain specifically with high-fat meals and nausea. Other changes in bowel

Table 1 – Characteristics of pediatric patients undergoing cholecystectomy for BD (n = 45).

Patient characteristics	All patients
Age, average (standard deviation [SD])	14.2 (2.1)
Gender (female), n (%)	28 (62.2)
BMI, average (SD)	25.9 (7.3)
Preoperative testing	
Hepatobiliary iminodiacetic acid scan, n (%)	40 (88.9)
Cholecystokinin given	34 (85.0)
Pain with cholecystokinin	25 (73.5)
Ejection fraction, average (SD)	13.6 (13.7)
Right upper quadrant ultrasound	31 (68.9)
Esophagogastroduodenoscopy	15 (33.3) [†]
Preoperative symptoms, n (%) [‡]	
Abdominal pain (42)	41 (97.6)
Pain with fatty food (40)	35 (87.5)
Nausea (31)	28 (90.3)
Vomiting (30)	21 (70.0)
Diarrhea (28)	8 (28.6)
Constipation (26)	9 (34.6)

[‡] Mild gastritis or esophagitis was seen in five patients (27.8%).

[†] Percentage of patients with a specific symptom was documented.

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