

Purpose

- Determine the usefulness of a HIDA scan in recommending a cholecystectomy for a pediatric patient.
- Analyze additional factors that may contribute to positive outcomes or resolution of symptoms in patients without cholelithiasis who had a cholecystectomy.

Introduction

A HIDA (hepatobiliary iminodiacetic acid) scan is the most relied upon study for determining the benefit of a cholecystectomy in adult patients with functional gallbladder disorder. A HIDA ejection fraction (EF) of 35% or lower in adults is considered abnormal. A low EF suggests a positive outcome for recommending cholecystectomy. There is no standardization for EF in pediatrics currently. Cholecystectomy is recommended in patients who have symptomatic cholelithiasis. However, patients with suspected biliary dyskinesia do not always have resolution of symptoms after cholecystectomy. The purpose of this study was to examine whether specific patient profiles are associated with clinical response to cholecystectomy among a pediatric population in rural east Tennessee.

Methods

This retrospective cohort included 100 pediatric patients without cholelithiasis who had a cholecystectomy between 2014-2017 at a rural children's teaching hospital. Hospital and outpatient clinic records were reviewed for preoperative symptoms, laboratory and radiologic investigations, and postoperative outcomes. Analysis included frequencies of symptoms, cross tabulations between HIDA scan EF, obesity, presence of postoperative symptoms (including abdominal pain, nausea, or vomiting), and work up prior to the procedure, and chi-square tests of association.

Results

The sample size included 150 patients who had a cholecystectomy during 2014-2017. 100 of those patients did not have cholelithiasis. Those with cholelithiasis were excluded from the data analysis. Of the 100 patients without cholelithiasis, there were 75 females and 25 males, ages ranging from 5 to 17 years.

Results cont'd

Of the 100 patients, 78 had a documented HIDA scan reported; 55 of which had an abnormal EF (<35%) and 23 of which had no resolution of symptoms postoperatively, (p<0.05). Table 1 demonstrates the number of patients with and without symptoms post operatively compared to their EF. The severity of the abnormal EF was not statistically significant. Of the documented 41 obese patients (BMI 95% or higher), 23 had an abnormal EF and 9 had persistent symptoms (p<0.06). Of the 55 with an abnormal EF, 30 patients had a documented trial of proton pump inhibitors (PPIs) prior to the HIDA scan, of which 50% had no resolution of symptoms post cholecystectomy (p<0.07). 18 patients had an EGD and a trial of PPIs, of which 10 had persistent symptoms (p< 0.001). 10 patients had documented abdominal Xray (KUB) consistent with constipation, with no statistical significance related to resolution of symptoms or EF. There was no statistical difference between age or gender and EF.

Discussion

This study was limited by a lack of documentation in the electronic health record.

Despite having an abnormal EF, 42% of 55 patients had persistent symptoms post cholecystectomy. A lower EF did not correlate with persistence of post-op symptoms. Therefore, HIDA scan is not diagnostic and should not be the sole criteria regarding diagnosis of biliary dyskinesia in children. Our results indicate that regardless of HIDA EF, BMI, KUB, EGD findings, or a trial of PPI, one cannot predict the resolution of symptoms postoperatively.

Conclusion

- While the HIDA scan is standardized in the adult population, further research is needed to assess gallbladder motility in children.
- Before recommending a cholecystectomy, clinicians should investigate other potential causes for abdominal pain in children.

References

- Misra, S. (2011). Is biliary scintigraphy a reliable diagnostic tool for biliary dyskinesia in children? *Journal of Clinical Gastroenterology*, 45(9): 814-817. doi: 10.1097/MCG.0b013e31820fecff
- Nakayuenyongsuk, W., Choudry, H., & Yeung, K.A. (2017). Decision-making patterns in managing children with suspected biliary dyskinesia. *World Journal of Clinical Pediatrics*, 6(2): 124-131. doi: 10.5409/wjcp.v6.i2.124
- Santucci, Neha R.*; Hyman, Paul E.*; Harmon, Carroll M.†; Schiavo, Julie H.‡; Hussain, Sunny Z. § . Biliary Dyskinesia in Children: A Systematic Review. *Journal of Pediatric Gastroenterology and Nutrition*. 2017, 64:2. Published 2017 Feb. doi: 10.1097/MPG.0000000000001357
- Simon DA, Friesen CA, Schurman JV, Colombo JM. Biliary Dyskinesia in Children and Adolescents: A Mini Review. *Front Pediatr*. 2020;8:122. Published 2020 Mar 24. doi:10.3389/fped.2020.00122
- Sorenson, M.K., Francher, S., Lang, N.P., Eidt, J.F., & Broadwater, J.R. (1993). Abnormal gallbladder nuclear ejection fraction predicts success of cholecystectomy in patients with biliary dyskinesia. *American Journal of Surgery*, 166(6): 672-675.

HIDA Scan Ejection Fraction (%)

	≤11%	12-23%	24-35%	Total	
Presence of Symptoms Post Operatively	No Symptoms Present	8	7	17	32
	Symptoms Present	6	12	5	23*
	Total	14	19	22	55

Table 1. Comparison of HIDA EF to Post Op Outcomes

*statistically significant, p<0.05