

Endoscopic Ultrasound-Guided Liver Biopsy (EUS-LB) in Pediatric Non-Alcoholic Fatty Liver Disease (NAFLD): A Single Center Study

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INTRODUCTION

Pediatric NAFLD has become the leading cause of chronic liver disease in children in the United States.

Liver biopsy is the gold standard in diagnosing non-alcoholic fatty liver disease. Histology is useful for diagnosis, staging, and prognostication. Currently, EUS-LB is being readily applied in the adult population. The applicability in pediatric patients is still underreported and data is sparse regarding the utility and safety of EUS-LB in the pediatric population.

The aim of this study is to assess the utility and safety of EUS-LB in the evaluation of pediatric NAFLD.

METHODS AND MATERIALS

Single center retrospective review at Community Regional Medical Center, Fresno, CA.

Patient characteristics, biopsy sample characteristics, and safety data were collected during the review.

Pediatric patients \leq 18 years of age undergoing liver biopsy for evaluation of NALFD were included in the study.

We compared other forms of hepatic assessment including laboratory values, imaging, and traditional methods of liver biopsy.

RESULTS

Patient Characteristics

A total of 15 patients (7 female) ages ranging from 7 – 18 years old (median age 16 years) were included in the review. Of the 15 patients, 80% identified as Hispanic and 20% identified as non-Hispanic Caucasian.

BMI (percentile)	% Patients
\geq 95% (obese)	93.3% (14/15)
85-94% (overweight)	6.7% (1/15)
5-84% (healthy)	0%

Biopsy Sample Characteristics

Twelve patients underwent transgastric fine needle biopsy (FNB), with an average of 1.92 passes. Two patients underwent transduodenal FNB with an average of 1.33 passes. One patient underwent both transgastric and transduodenal FNB. The shortest specimen length was 0.7 cm and the longest was 2 cm in length with a median of 1.3 cm. The average specimen length was 1.35 cm (\pm 0.43). The smallest specimen contained 10 portal tracts and was 0.7 cm in length, the second specimen contained 7 portal tracts and was 1.0 cm in length. The number of portal tracts ranged between 11 to 35.

All biopsies performed were technically successful and adequate for histopathologic evaluation with a diagnostic yield of 100%. 86.67% (46.15% female, 92% Hispanic) were diagnosed with NAFLD and of those, 61.54% of patients found to have NASH.

Safety

93.33% of procedures were performed under general anesthesia, the rest under monitored anesthesia care. No major (bleeding that requires transfusions, surgery, or intensive care management, hemothorax, pneumothorax, or death) or minor (pain, subcapsular bleeding that does not require transfusion or prolonged hospitalization, infection, minor bile leak or hemobilia, and hemobilia) post-procedural complications were identified or reported.

We analyzed the relationship (Pearson correlation) between several patient data points (BMI, AST, ALT) and the histopathological findings on liver biopsy (fibrosis stage, steatosis score, lobular inflammation score, and hepatocellular ballooning score).

Positive correlation	No correlation
BMI and lobular inflammation (p=0.028)	BMI and fibrosis stage, steatosis, or hepatocellular ballooning
AST and fibrosis stage (p=0.045)	AST and steatosis, lobular inflammation, or hepatocellular ballooning
ALT and hepatocellular ballooning (p=0.029)	ALT and steatosis, lobular inflammation, or fibrosis stage

DISCUSSION

There was a positive correlation between BMI and lobular inflammation, AST and fibrosis stage, and ALT and hepatocellular ballooning.

No formal consensus on the definition of an adequate biopsy specimen in pediatric populations exist. Widely used criteria are extrapolated from data from adults¹. We identified 2 specimens that were adequate for diagnosis despite their small size.

Reported complication rates in children for PCLB (1-25%)², TJLB (0-17%)³, limited data on laparoscopy and EUS-LB (0-2.3%)⁴. We report no major or minor complications.

We recognize the small sample size as well as the disproportionately Hispanic population of the patients in as a limitation of our study.

CONCLUSIONS

Noninvasive investigation may be useful for screening and identifying patients at risk of NAFLD, however noninvasive methods have limitations. Accurate staging, histologic review, and prognostication for NAFLD are best characterized by liver biopsy. EUS-LB is a efficacious and safe procedure that should be considered as the primary method when pursuing liver biopsy in pediatric patients.

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