Using liver biopsies to characterize biliary atresia and predict outcomes: New results from the Childhood Liver Disease Research Network

Biliary atresia is a rare disease of the liver and bile ducts that occurs in infants. It is a type of cholestatic disorder, an umbrella term for any condition in which the flow of bile from the liver stops or slows. A liver biopsy is a key step in distinguishing biliary atresia from other cholestatic disorders. However, the interpretation of liver biopsies in infantile cholestasis is challenging as the histologic features of many of the disorders causing infantile cholestasis overlap, are dynamic, and vary with age. Previous studies of the histologic features which characterize biliary atresia and their correlation with outcomes have been limited, mostly based in single institutions with interpretation by a limited number of pathologists.

The Childhood Liver Disease Research Network (ChiLDReN), supported by the National Institutes of Diabetes and Digestive Kidney Diseases (NIDDK), provided the opportunity to evaluate liver biopsies from a large number of jaundiced infants from multiple institutions enrolled in a prospective clinical database. Using data from 227 needle biopsies, researchers identified five independent histologic predictors of a diagnosis of biliary atresia: bile plugs in ducts/ductules, portal stromal edema, no bile duct paucity, absent to rare giant cell transformation, and absent to rare extramedullary hematopoiesis.

“This study shows that there is greater variability in the histologic features of biliary atresia in liver biopsies than previously emphasized, which can be problematic for the pathologist,” said lead author Dr. Pierre Russo. “Nonetheless, a number of histologic features, some of which have not been previously well described, together have a high concordance rate with the diagnosis of biliary atresia.”

The authors also investigated whether any histologic features in the livers of biliary atresia patients could predict clinical outcomes after a hepatoportoenterostomy (HPE), the primary treatment once a diagnosis of biliary atresia is established. An HPE results in successful bile drainage in half the patients with biliary atresia, but even with successful drainage, most patients will ultimately require liver transplantation. They found that although no histologic features predicted successful bile drainage at six months post-HPE, higher stages of portal fibrosis, ductal plate malformation, bile duct injury, increased INR, and older age at HPE were associated with increased risk of transplantation.

CITATION:
Russo P, Magee JC, Anders RA, Bove KE, Chung C, Cummings OW, Finegold MJ, Finn LS, Kim GE, Lovell MA, Magid MS, Melin-Aldana H, Ranganathan S, Shehata BM, Wang LL, White FV, Chen Z, Spino C; Childhood Liver Disease Research Network (ChiLDReN). Key Histopathologic Features of Liver Biopsies That Distinguish Biliary Atresia From Other Causes of Infantile Cholestasis and Their Correlation With Outcome: A Multicenter Study. Am J Surg Pathol. 2016;40(12):1601–1615.