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MINI REVIEW

Liver biopsy in children 2014: Who, whom, what, when, where, why?

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Summary Liver biopsy is the standard procedure for obtaining hepatic tissue for histopathological examination. The three major techniques are percutaneous, transvenous, and laparoscopic/open biopsy, with either cutting or suction needles. The indications for liver biopsy are shifting as knowledge of etiologies, non-invasive biomarker alternatives, and treatment options in paediatric liver disease expand. This mini-review presents specific indications, alternative approaches, methods, complications, and contraindications for paediatric liver biopsy.

Introduction

The role of liver biopsy (LBx) in the management of patients with acute and chronic liver diseases has greatly evolved in recent years. Its importance in diagnosis, staging, and prognosis largely depends on the indication and on the context.

LBx is useful not only in primary hepatobiliary disorders but also in assessment of secondary problems (e.g., graft-versus-host disease). In many settings, LBx remains the gold standard for the diagnosis and the staging of disease. Moreover, guided LBx remains essential for the diagnosis of focal liver lesions.

This article is to systematic and encompassing reviews as is a pencil sketch to final paintings in oils. The connoisseur may enjoy our suggestions for their sprezzatura; she is nonetheless advised to seek out exhaustive accounts of the various disorders on which this necessarily incomplete rendering touches lightly.

Indications for LBx in children

These include cholestasis, hepatomegaly, evidence of portal hypertension, and biomarker abnormalities, with and without known diagnoses. Biopsy-specimen triage (culture; snap-freezing for eventual biochemical, molecular-genetic, or ultrastructural study; fixative choice) is best conducted at the bedside. Whether clinical, imaging-study, or laboratory personnel address triage will vary among settings. Discussions before biopsy is undertaken can avoid loss of information through specimen mis-handling and discussions

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Table 1 Expected value of liver biopsy in various settings in children.

Disease	Value of LBx for primary diagnosis	Value of LBx for prognosis	Non-invasive (less invasive) alternative assessment routes
Biliary atresia	Yes	No	Cholangiography
PFIC 1	Differential diagnosis (IS), PFIC 2 and TJP2 disease	Before partial biliary diversion	Molecular analysis of *ATP8B1*
PFIC 2	Differential diagnosis (IS), PFIC 1 and TJP2 disease	Before partial biliary diversion	Molecular analysis of *ABCB11*
PFIC 3	Yes (IS)	Under study	Molecular analysis of *ABCB4*
TJP2 disease	Differential diagnosis (IS) PFIC 1 and 2	Under study	Molecular analysis of *TJP2*
Inborn errors of bile acid synthesis	Rarely (perhaps retrospectively)	No	Urinary bile acid and bile alcohol profile
Alagille syndrome	Yes, in selected cases	Yes, before biliary diversion in selected cases	Clinical features; molecular analysis of *JAG1* and *NOTCH2*
Alpha-1-antitrypsin storage disorder	Only to exclude co-existent disease	Yes, in very select cases	Protease-inhibitor (Pi, as PiZZ) phenotyping/*SERPINA1* genotyping
Glycogen storage disease	Yes (Types II and IV)	Yes	Transmission electron microscopy, peripheral-blood leucocytes; molecular analysis
Cholesterol ester storage disease/Wolman disease	No	No	Reduced acid lipase activity in cultured skin fibroblasts; rapid blood spot test
Wilson disease	Yes; copper content of liver definitive	Assessment of baseline liver injury	Molecular analysis of *ATP7B*
Carbohydrate-deficient glycoprotein syndromes	No	Yes, in selected cases	Transferrin isoforms
Hepatitis B virus infection	No	Yes, in selected cases	Serologic studies, molecular analysis for viral sequences; elastography of liver
Hepatitis C virus infection	No	Yes, in selected cases	Serologic studies, molecular analysis for viral sequences; elastography of liver
Cytomegalovirus	Yes, in selected cases	No	Serologic studies, molecular analysis for viral sequences
Epstein-Barr virus	Yes, in selected cases	No	Serologic studies, molecular analysis for viral sequences
Haemophagocytic lymphohistiocytosis (HLH)	No	No	HLH criteria 2004 [15]
Cryptogenic hypertransaminasaemia	Yes	Yes, in selected cases	Clinical, biomarker, and imaging-study findings
Drug-induced liver disease	Yes	Yes, in selected cases	Under study (molecular pharmacogenetics)
Obesity-related liver disease	Yes	No	Biomarkers of liver fibrosis and inflammation
Congenital hepatic fibrosis and other ciliopathies	Yes, in selected cases	Yes, in selected cases	Clinical, biomarker, and imaging-study findings
Autoimmune hepatitis (AIH)	Yes	Yes	Clinical, biomarker, and imaging-study findings
Primary sclerosing cholangitis (PSC)	No	Yes, in selected cases	Clinical, biomarker, and imaging-study findings
AIH—PSC overlap syndrome	Yes	Yes	Clinical, biomarker, and imaging-study findings
Liver-transplant follow-up	Yes	Yes	Clinical, biomarker, and imaging-study findings
Acute liver failure	Yes	No	Clinical, biomarker, and imaging-study findings

IS: immunostaining; PFIC: progressive familial intrahepatic cholestasis; TJP2: tight junction protein 2.