Article published online: 2021-07-30

Hepatic subcapsular flow: An early marker in diagnosing biliary atresia

Ramesh RL, Vishnu Murthy GS[1], Vinay Jadhav[2], Ravindra S[2]

Departments of Pediatric Radiology, [1]Pediatric Gastroenterology and [2]Pediatric Surgery, Indira Gandhi Institute of Child Health, Bangalore, Karnataka, India

Address for correspondence: Dr. Vishnu Murthy GS, No 52/32, 37th Cross, 9th Block, Jayanagar, Bangalore - 560 069, Karnataka, India.
E-mail: dr_upadhya@yahoo.co.in

ABSTRACT

We report an interesting sign in the sonological evaluation of neonatal cholestasis, which is hepatic subcapsular flow. Hepatic subcapsular flow is an early and useful marker in diagnosing biliary atresia.

Key words: Biliary atresia; hepatic artery diameter; hepatic subcapsular flow; triangular cord sign

Introduction

Even with all available investigations, it is very difficult to differentiate biliary atresia from non-biliary atresia cases. In this context, we report the usefulness of a color Doppler finding, that is, hepatic subcapsular flow, in diagnosing biliary atresia.

Case Report

An 11-day-old male baby presented with yellowish discoloration of eyes and dark urine and persistently pale-colored stools since birth. On clinical examination, the baby was active and weight gain was adequate, with hepatomegaly 3 cm below the costal margin, firm, and no splenomegaly.

On further evaluation, the baby was found to have conjugated hyperbilirubinemia with high gamma-glutamyl transpeptidase (GGT). Prothrombin time (PT) was normal and serum albumin 2.9 was g/dl; Ig M antibodies against Toxoplasma, Rubella, Cytomegalo virus, Herpes virus, sepsis, Inborn Error of Metabolism screening, serum ferritin, alpha-fetoprotein, and urine examination were normal. Hepatobiliary iminodiacetic acid (HIDA) scan showed no gut activity even after 24 h.

USG [LOGIC 500MD GE Japan] showed the following: Enlarged liver with diffuse mild increased echotexture, triangular cord sign: 3.2 mm, hepatic artery diameter 0.9 mm, and subcapsular flow was present [Figure 1].

In view of persistently pale stools in a well-thriving child, high GGT, non-excretory HIDA, and presence of subcapsular hepatic flow (though the triangular cord sign was negative), the baby was taken up for peroperative cholangiogram/Kasai's procedure on 23rd day of life.

At surgery, gall bladder was found to be atretic and cord-like. Cannula could not be passed, hence complete peroperative cholangiogram could not be done, and we proceeded to do modified Kasai's portoenterostomy. Liver was dark green, and the surface of the liver showed telangiectatic hepatic artery branches [Figure 2] and no micro/macro nodules. Portal dissection was done. No demonstrable bile duct was seen; fibrotic portal plate was excised and roux-en-Y jejunal loop was anastomosed to porta hepatis. Liver biopsy done showed features suggestive of biliary atresia with fibrosis score of 1/6 (Ishak's score).

Discussion

No single test is confirmatory for diagnosing biliary atresia. USG is a useful noninvasive test used for the evaluation of

Access this article online

Quick Response Code:

Website: www.ijri.org

DOI: 10.4103/0971-3026.155875

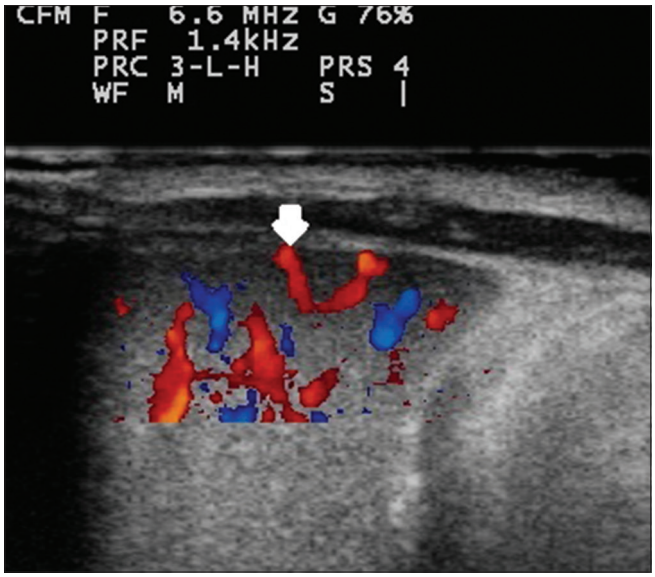

Figure 1: Transverse section USG of left lobe of liver showing subcapsular hepatic blood flow (white arrow)

babies with neonatal cholestasis. Sonographic triangular cord sign, GB length and contractility, hepatic artery diameter, and other parameters have been extensively studied in differentiating biliary atresia from non-biliary atresia cholestasis cases. Stowen for the first time described about the hyperplastic and hypertrophic changes in the branches of hepatic artery in the intrahepatic portal areas of the patients with biliary atresia.[1] In hepatobiliary specimens obtained from patients with biliary atresia, enlargement of the hepatic artery had been noted.[2-5] Enlargement may be a compensatory change to improve the blood supply for the biliary trees, a secondary change of liver cirrhosis, or an essential vascular malformation.[2,3] In an angiographic study[6] of biliary atresia, all patients with biliary atresia had hepatic artery enlargement and the branches of the intrahepatic peripheral hepatic artery manifested with irregular contours suggestive of peripheral occlusion. However, pathogenesis of the hepatic arteriopathy still remains uncertain.

Recently, Lee *et al*. described the usefulness of subcapsular hepatic flow in diagnosing biliary atresia.[7] Color Doppler USG images demonstrated an enlarged hepatic artery and hepatic arterial flow that extended to the hepatic surface in all patients with biliary atresia. Hepatic subcapsular flow had a sensitivity, specificity, and positive and negative predictive values of 100%, 86%, 85%, and 100%, respectively, in their study. All patients with biliary atresia who had hepatic subcapsularflow on color Doppler USG images had subcapsular telangiectasia vessels at the time of the Kasai's procedure.

In our case, though triangular cord sign was less than 4 mm, presence of subcapsular hepatic flow gave a clue to the diagnosis. Per-operative findings confirmed the presence of telangiectic hepatic artery branches. Histopathology showed mild fibrosis (according to Ishak's scoring system for liver fibrosis).[8]

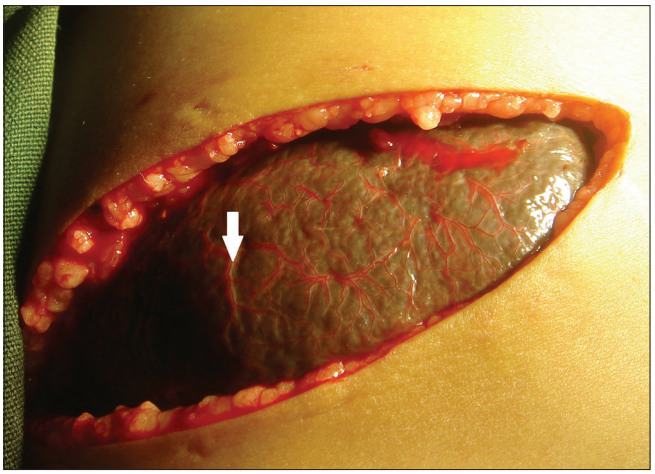

Figure 2: Per operative photograph showing liver surface with prominent sub-capsular hepatic blood flow (white arrow)

Conclusion

Hepatic subcapsular flow is an early sign and further studies are required to demonstrate the usefulness of this sign.

References

1. Stowens D. Congenital biliary atresia. Ann N Y Acad Sci 1963;111:337-57.
2. Ho CW, Shioda K, Shirasaki K, Takahashi S, Tokimatsu S, Maeda K. The pathogenesis of biliary atresia: A morphological study of the hepatobiliary system and the hepatic artery. J Pediatr Gastroenterol Nutr 1993;16:53-60.
3. dos Santos JL, da Silveira TR, da Silva VD, Cerski CT, Wagner MB. Medial thickening of hepatic artery branches in biliary atresia: A morphometric study. J Pediatr Surg 2005;40:637-42.
4. Lefkowitch JH. Biliary atresia. Mayo Clin Proc 1998;73:90-5.
5. Bates MD, Bucuvalas JC, Alonso MH, Ryckman FC. Biliary atresia: Pathogenesis and treatment. Semin Liver Dis 1998;18:281-93.
6. Uflacker R, Pariente DM. Angiographic findings in biliary atresia. Cardiovasc Intervent Radiol 2004;27:486-90.
7. Lee MS, Kim MJ, Lee MJ, Yoon CS, Han SJ, Oh JT, *et al*. Biliary atresia: Color doppler US findings in neonated and infants. Radiology 2009;252:282-9.
8. Ishak K, Baptista A, Bianchi L, Callea F, De Groote J, Gudat F, *et al*. Histological grading and staging of chronic hepatitis. J Hepatol 1995;22:696-9.

Cite this article as: Ramesh RL, Vishnu Murthy GS, Jadhav V, Ravindra S. Hepatic subcapsular flow: An early marker in diagnosing biliary atresia. Indian J Radiol Imaging 2015;25:196-7.

Source of Support: Nil, **Conflict of Interest:** None declared.