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The "hepatic subcapsular flow sign" in early diagnosis of biliary atresia

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The "hepatic subcapsular flow sign" is a feature that can potentially be seen in case of biliary atresia and consists of a hepatic arterial flow signal reaching the hepatic capsular surface on color Doppler ultrasound (US) [1].

Biliary atresia is an inflammatory and fibro-obliterative disease of the biliary tree which leads to cholestasis and hepatic fibrosis which may progress to liver cirrhosis [1, 2]. Discrimination between biliary atresia and other causes of neonatal cholestatic jaundice is essential because they require different approaches towards treatment; medical management is the mainstay of treatment for hepatocellular cholestasis while surgery is required for biliary atresia. Therefore, early diagnosis of biliary atresia is critical because the Kasai portoenterostomy operation is more successful when performed precociously [1, 2].

Lee [1] described the presence of the hepatic subcapsular flow sign as being useful in differentiating between biliary atresia and other causes of neonatal jaundice with high sensitivity (100%) and relatively low specificity (86%). Subsequently, El-Guindi [2] described a sensitivity of 96.3% and a specificity of 96.3% for the same sign. Evaluation of this sign on color Doppler US (pulse repetition frequency, 1000–1500 Hz; power gain percentage, 80–90%; medium wall filter) employs transverse scanning, usually using a linear transducer, with a color box (height, 1 cm; width, 3–4 cm) positioned on the anterior surface of the liver around the falciform ligament (Fig. 1) [1, 2]. This sign has been associated with subcapsular telangiectatic vessels on the liver surface observed during the time of the Kasai procedure in patients with biliary atresia, and with dilatation of small arteries in the hepatic subcapsular area on microscopic examination in the same patients [1–4].

Other signs such as the triangular cord sign (triangular or tubular echogenic area of more than 4 mm along the anterior wall of the portal vein) and gallbladder abnormalities (atretic gallbladder, less than 15 mm long, irregular or lobular contour, and lack of smooth/complete echogenic mucosal lining with an indistinct wall) have been described more extensively in literature and have been shown to be more accurate in the diagnosis of biliary atresia (Fig. 2) [5]. That being said, the hepatic subcapsular flow sign has been reported to have a high negative predictive value (100%) [1] and should be kept in mind when evaluating neonates with jaundice as both its presence and absence can be useful in reaching a timely diagnosis.

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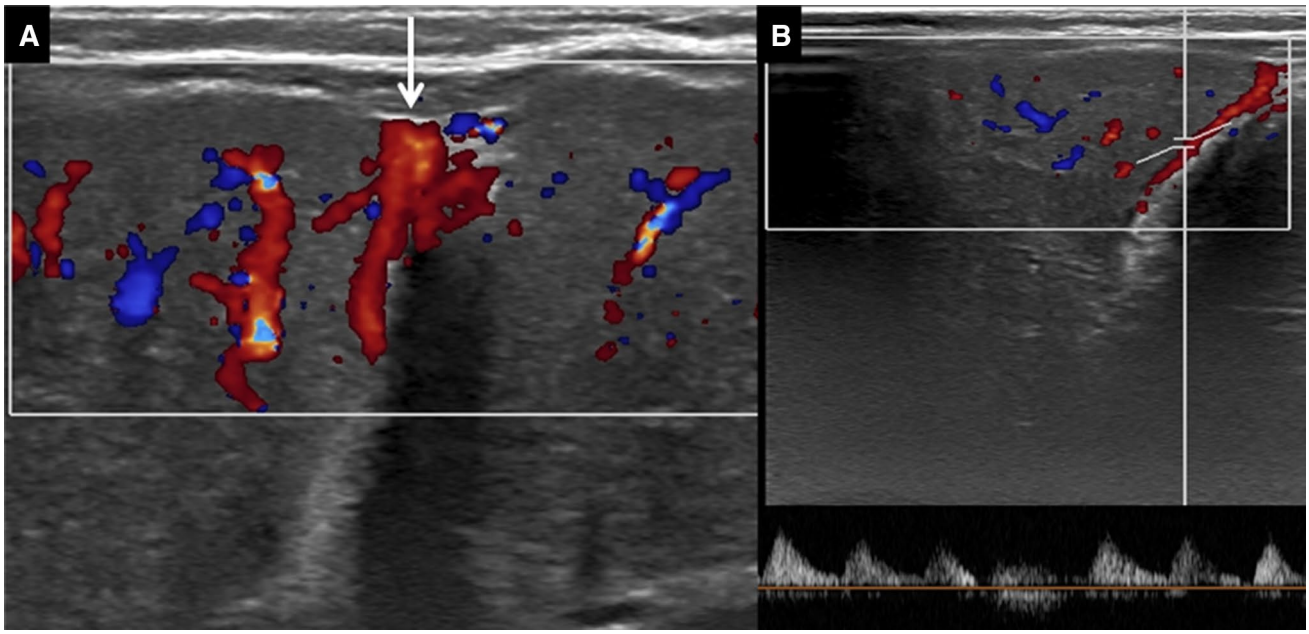

Fig. 1 Color Doppler US images in a 30-day-old girl with biliary atresia. **a** Presence of hepatic arterial flow reaching the hepatic capsular surface (arrow). **b** An arterial waveform flow is seen in a vessel at the hepatic surface

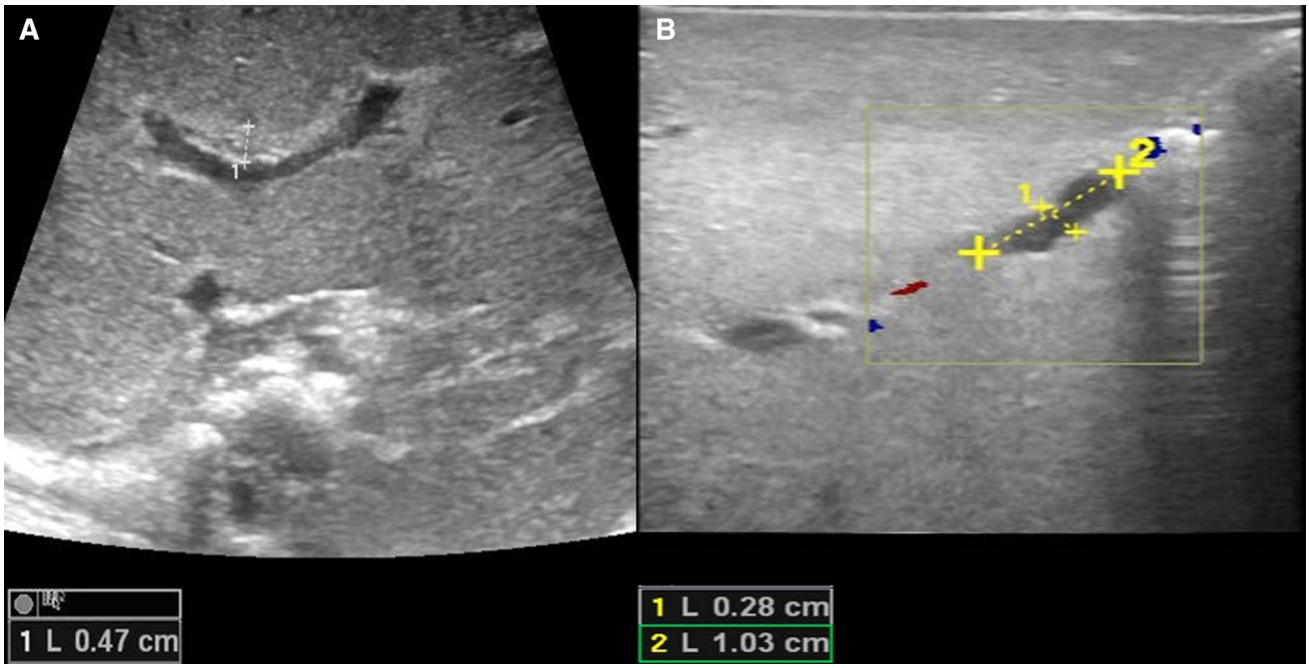

Fig. 2 US images show the typical findings of biliary atresia: **a** triangular cord and **b** gallbladder abnormalities

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interests.

Informed consent Statement of informed consent was not applicablesincethe manuscript does not contain any patient data.

Research involving human and animal rights This article does not contain any studies with human participants or animals performed by any of the authors..

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