Dilatation of the intrahepatic bile ducts associated with benign liver lesions: an unusual finding

Abstract  In three patients presenting different types of liver lesions, including isolated cyst, focal nodular hyperplasia (FNH), and hemangioma, intrahepatic bile duct dilatation was observed on US and CT. Final diagnosis was obtained by surgery in two cases (cyst and FNH) and by 1-year follow-up in one patient presenting an isolated hemangioma. The only common characteristic in our three cases was that lesions were present in segment four according to Couinaud’s classification, at the level of the transverse fissure, suggesting that a space-occupying lesion at this site may cause compression of the common hepatic duct and right or left intrahepatic bile ducts. Our report indicates that compression may occur even with lesion of moderate size (35–40 mm in diameter). A benign liver lesion may cause a bile duct dilatation, particularly if located in segment 4, close to the hilum. Awareness of this possibility is important to avoid unnecessary invasive diagnostic procedures, particularly when all imaging criteria are consistent with a benign lesion.

Keywords Intrahepatic bile duct dilatation · Diagnosis · Benign liver mass · Segment 4 · Focal nodular hyperplasia · Hemangioma · Cyst

Introduction
Dilatation of the intrahepatic bile ducts can occur as a result of either compression or tumor spread in patients with malignant liver tumors such as cholangiocarcinoma and hepatocellular carcinoma [1]. Benign liver tumors, even those of huge size, are not considered a cause of bile duct dilatation. In three patients with different types of benign liver lesions, all located in the medial sector of the left liver or segment 4, we found imaging study evidence of intrahepatic bile duct dilatation. This finding must be known to avoid other unnecessary and invasive procedures.

Case reports
Case 1
Ultrasound study was performed in a 46-year-old woman for right upper abdominal pain and a 1.5-fold increase in the gamma glutamyl transferase level, demonstrating multiple anechoic liver lesions with posterior enhancement in the two lobes with an isolated left intrahepatic biliary tract dilatation, close to the largest lesion, posteriorly to the falciform ligament. Dynamic CT confirmed the dilatation of the left intrahepatic bile ducts in the vicinity of a 4-cm cystic lesion (Fig. 1). To rule out a cystadenoma or localized Caroli’s disease, segment 4 was removed. A simple cyst was found. Intraoperative opacifications failed to demonstrate any communication between the cystic cavity and the biliary tract. A follow-up US examination performed 6 months after surgery showed no bile duct dilatation. Liver function tests were normal.

Case 2
Spiral CT and MR imaging were done to investigate multiple hypoechoic liver masses demonstrated by US in a 36-year-old woman. Liver function tests were normal. Typical findings of multiple focal nodular hyperplasias (FNHs) were demonstrated by both investigations. There was dilatation of the left hepatic duct and intrahepatic ducts in the area of a 4-cm FNH lesion in segment 4 (Fig. 2). To rule out the possibility of a malignant tumor raised by this finding, intraoperative 14-gauge needle biopsies were performed. The histological features were typical of FNH.
Case 3

Ultrasound showed a 4-cm hyperechoic lesion in a 60-year-old woman, accompanied with bilateral intrahepatic biliary dilatation. Liver function tests were normal. Dynamic CT and MR imaging studies demonstrated typical findings of hemangioma in segment 4 and confirmed that the intrahepatic bile ducts were dilated (Fig. 3). A follow-up CT study obtained 1 year later demonstrated identical findings.

Discussion

Intrahepatic bile duct dilatation is a well-known finding in patients with malignant liver lesions. Numerous mechanisms can be proposed, including (a) tumor spread to and sheathing of the bile ducts in cholangiocarcinomas, (b) growing cast within the bile ducts in hepatocellular carcinomas, and (c) metastatic infiltration of the bile ducts, particularly in colon adenocarcinomas [1, 2]. Bile duct dilatation also occurs as a feature of congenital diseases, such as Caroli’s disease or congenital cyst, in which the bile ducts communicate with the cystic cavities [3].

Our cases demonstrate that intrahepatic bile duct dilatation can also occur in association with benign liver