Gastrointestinal radiology

Hilar cholangiocarcinoma: radiological assessment of resectability

J. Triller¹, C. Looser¹, H. U. Baer², L. H. Blumgart²*

¹ Institute for Diagnostic Radiology, University Inselspital of Berne, CH-3010 Berne, Switzerland
² Clinic for Visceral and Transplantation Surgery, University Inselspital of Berne, CH-3010 Berne, Switzerland

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Abstract. A pre-operative study of 31 patients with proximal cholangiocarcinoma was carried out with ultrasonography (US), duplex sonography (DS), computed tomography (CT), percutaneous transhepatic cholangiography (PTC), endoscopic retrograde cholangiography (ERC) and angiography. US, DS and PTC are the most effective techniques for pre-operative staging assessment of proximal cholangiocarcinoma. A tumour was visualised by US in 89% of cases, and the extent of extraductal tumour invasion was correctly established in 64%. Lobar segmental tumour extension was correctly documented in 80% of cases; however, the exact definition of tumour extension required the use of PTC. Vascular patency was correctly visualised by DS in 85% of cases. Altogether, tumour invasion was correctly documented in 68% in cases. In the event of radiologically localised tumour extension, radiological interpretation was correct in 64% of cases. The extent of tumour infiltration was radiologically underestimated in 36% of cases, especially in documenting lymph node metastases, infiltration of the hepatoduodenal ligament and segmental liver invasion.

Key words: Cholangiocarcinoma – Radiological diagnosis – Resectability – Tumour staging – Ultrasound/duplex sonography

Introduction

Hilar cholangiocarcinomas have been known as Klatskin tumours since the classic description by Klatskin [1, 2]. They are typically adenocarcinomas with a relatively small diameter ranging from 1 to 3 cm. They are slow-growing tumours of the bile duct bifurcation with locally invasive growth in the proximal and distal bile ducts, in the liver and into the vascular structures. It is difficult to assess these tumours at operation [3–5].

The aim of radiological investigation is the pre-operative assessment of the resectability of these tumours with respect to a curative or a palliative surgical procedure. Since an individual (or single) investigative method does not always permit a comprehensive evaluation of tumour extension, it is necessary to deploy a range of investigative procedures in assessing resectability [6, 7].

The current study assessed the usefulness of ultrasound (US), duplex sonography (DS), computed tomography (CT), angiography, percutaneous transhepatic cholangiography (PTC) and endoscopic retrograde cholangiography (ERC) in a group of 31 patients with histologically established proximal bile duct tumours.

Methods

Between 1986 and 1991, 31 patients with hilar bile duct carcinoma were examined pre-operatively. The average age of the 18 male and 13 female patients was 60 years (range 41–83 years). In 28 cases the tumour site was the region of the hepatic bifurcation, in 2 cases it was the common proximal hepatic duct and in 1 case the left hepatic duct. Morphologically, all the tumours showed an infiltrating stenotic mass.

US and DS were performed in 28 patients using a Toshiba SSH 100 and Acuson 128. The transducers used (sectorial and curved array) had frequencies between 3.5 and 5.0 MHz.

Twenty-seven patients were examined by CT using machines of various types. Most of the examinations were performed with a 3–5 s scanner, some with a sub-second scanner of the last generation. About 50% of all these examinations were routine scans of the liver and the bile ducts, performed in an outside hospital. In this group of patients the most common technique was 10-mm contiguous scans through the liver. In our hospital we first per-
Fig. 1a, b. Intraductal cholangiocarcinoma. a US: small intraductal carcinoma in the right hepatic duct. Oblique scan through the liver hilum. P, portal vein. Size of the tumour: 9.6 × 7.4 mm. b CT: dilatation of the intrahepatic bile ducts. Small tumour mass (arrow) at the level of the confluence. P, portal vein

Fig. 2. Intraductal cholangiocarcinoma. CT after contrast enhancement. Small bile duct tumour (size 1.5 cm) in the left hepatic duct. Good definition of the tumour (T) against the portal vein (P), the periductal fat tissue and the liver. C, inferior vena cava

Fig. 3a, b. Infiltrating cholangiocarcinoma. a US: tumour (arrows; size 1.5 × 3 cm) in the common hepatic duct with infiltration of the hepato-duodenal ligament. P, portal vein; V, inferior vena cava. b PTC: complete obstruction of the common hepatic duct.