4 Hepatic malignancies

4.1 Hepatocellular carcinoma (HCC)

Hepatocellular carcinomas (HCC) are the most frequently occurring primary hepatic tumors and account for about 85% of the primary hepatic malignancies. In Europe, HCC mostly occurs in patients with concomitant hepatic disease, often a preexisting chronic alcoholic or viral hepatitis and/or cirrhosis of the liver. The annual incidence varies significantly and ranges between 150 per 100,000 in areas where hepatitis is endemic and about 3 per 100,000 in Western Europe. Latency periods of 15 to 50 years are observed between viral infection and diagnosis of hepatocellular carcinoma. The estimated annual rate of new cases also varies with the underlying disease (about 0.5% in hepatitis B, about 5% in hepatitis C). In contrast, the much rarer fibrolamellar HCC variant is regularly observed in patients without underlying hepatic disease and also in younger patients.

The clinical symptoms essentially include non-specific symptoms such as epigastric pain, weight loss, loss of appetite and lack of energy. Jaundice and/or hepatomegaly are also observed.

Depending on the patient's age, hepatic function and tumor size as well as the number of tumors and the distribution pattern, therapeutic concepts may comprise surgical resective procedures as possible courses of treatment. If an appropriate indication is present and the HCC involvement is limited, liver transplantation is also possible. Furthermore, minimally invasive therapies such as transarterial chemoembolization (TACE) or also percutaneous local ablative procedures such as radio frequency ablation (RFA), laser-induced thermotherapy (LITT) and brachytherapy are used.

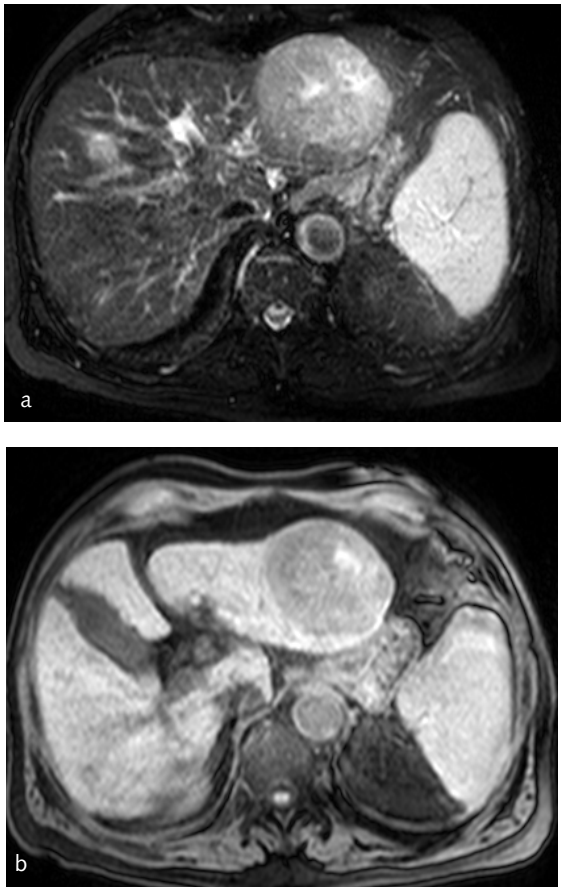
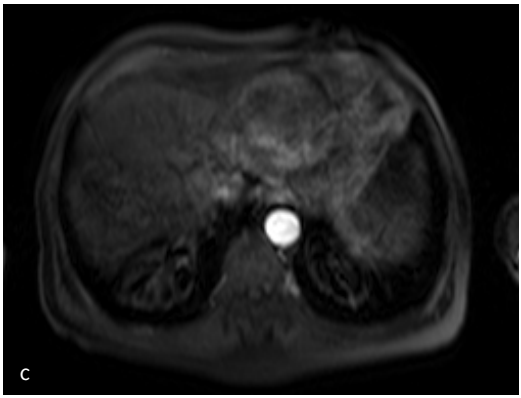


Figure 21a–d Liver cirrhosis with hepatocellular carcinoma in segments 2/3.
(a) T2-weighted images show a hyperintense lesion and **(b)** unenhanced fat-saturated T1-weighted images show hypointense lesion signal characteristics.



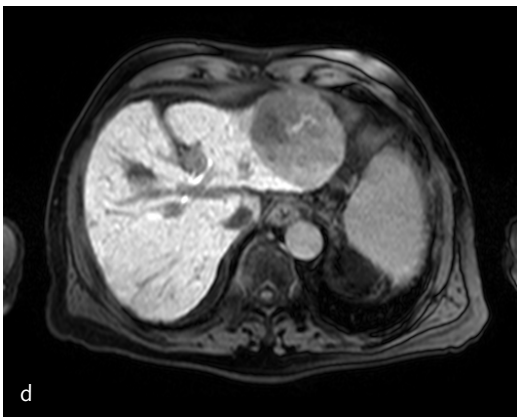


Figure 21c, d
(c) After i.v. application of a hepatocyte-specific contrast agent, irregular contrast uptake on T1-weighted images and **(d)** no uptake of contrast agent in the hepatobiliary phase 20 min after contrast agent application can be seen.

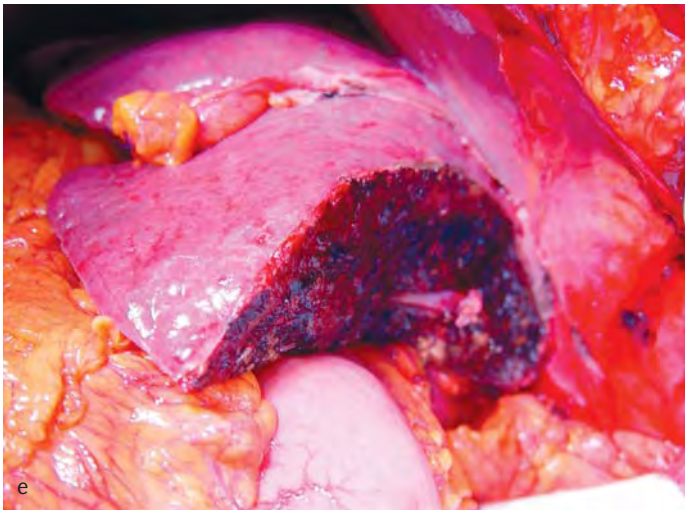


Figure 21e
(e) Intraoperative situs after anatomical resection of segment 2/3. One recognizes the preserved central middle vein shortly before its confluence into the vena cava at the base of the wound and the resection surface that has been treated with bipolar and infrared contact coagulation. Furthermore, signs of an existing fibrotic liver are present and include the slightly plumper shape of the liver and the discretely altered, bumpy surface of the liver.

Hepatocellular carcinomas are signal hyperintense in T2-weighted images and hypointense in unenhanced T1-weighted images. Significant signal alterations are partially present as are regressive alterations with hemorrhaging and necroses. In contrast, the very rare fibrolamellar HCC appears relatively homogeneous, frequently without necroses. After the administration of extracellular MR contrast agents using dynamic protocols, hypervascularized lesion patterns are often encountered. In this way HCC lesions can be better detected as

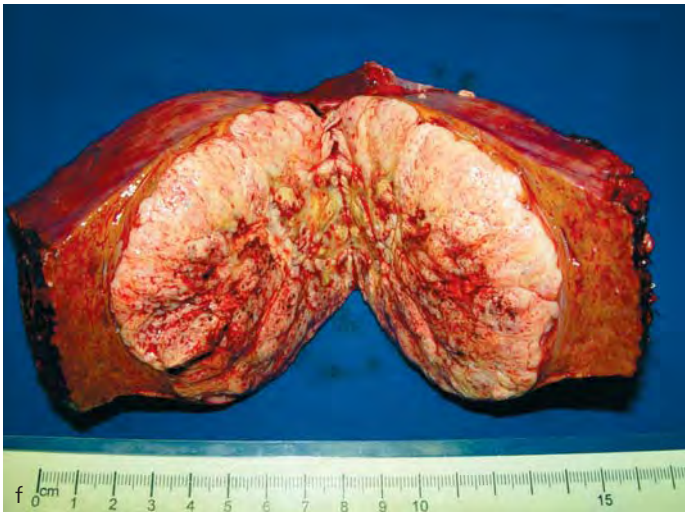


Figure 21f
(f) Cut open partial resectate of the liver. One recognizes the whitish HCC with small hemorrhages and signs of central necroses as well as the minimum safety margin of at least 2 cm between the HCC and the plane of the resection.

contrast-enhanced during arterial examination phases compared with the not yet significantly contrasted liver tissue. However, the certain and final classification of small hypervascularized lesions occasionally proves unsuccessful when using non-specific hepatic contrast agents.

When using hepatocyte-specific contrast agents, the detection of contrast agent uptake by benign lesions in the dynamic and the hepatobiliary phase can result in a better differentiation of benign lesions versus hepatocellular carcinomas. However, it should be noted that highly differentiated hepatocellular carcinomas – because of a small number of functioning hepatocytes – likewise can