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Case Report

Hepatectomy of a Hepatocellular Carcinoma after SIRT in a Cirrhotic Liver

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Background

Hepatocellular Carcinoma (HCC) is the most common malignant liver tumor with more than 700,000 new diagnoses per year worldwide [1]. The incidence of HCC in developed western countries is comparatively low (2-6/100,000 residents) [2]. The main risk factor for developing HCC is cirrhosis, and consequently, 80-90% of autopsied patients with HCC show signs of cirrhosis [3]. The most common cause of cirrhosis and subsequent HCC are chronic Hepatitis B (HBV) and C (HCV) infections, chronic alcohol abuse and, increasingly, non-alcoholic fatty liver disease [3,4]. In general, the treatment of patients with HCC is multidisciplinary. The therapy of HCC is based on the guidelines of the Barcelona Clinic Liver Cancer (BCLC) and the European Association for the Study of the Liver - European Society for Medical Oncology (EASL-ESMO) [5]. These guidelines provide a treatment algorithm based on the patient's performance status, Child-Pugh status, tumor diameter, and number of lymph nodes per BCLC status.

Based on these recommendations, the surgical treatment of HCC is limited to very early stages, for example singular tumors <2 cm in diameter, as well as early stages of HCC, either a single tumor <5 cm or 3 nodes each <3 cm (Milan criteria) [6]. Patients with contraindications for liver surgery or transplantation should not be treated surgically. In these patients, ablative therapies, intravascular embolization or palliative chemotherapy are recommended. The guidelines also state that patients with advanced HCC will not benefit from surgical resection of their respective tumor. The decision for the most appropriate and promising approach for each patient must be made in multidisciplinary tumor boards, where representatives of all departments involved in HCC therapy, including experienced hepatobiliary surgeons, must be present. However, the limitation of surgery to very early and early stages of HCC is increasingly called into question, as evidence for the benefit of extension of the indication for surgery increases. Surgical treatment of HCC can either be done by anatomical or by atypical liver resection [5].

Case

A 57-year old male patient with a fine-nodular cirrhotic remodeling of the liver, CHILD-Pugh Score B, was diagnosed with a HCC by punch biopsy. The Computer Tomography (CT) showed a central HCC, relating to segments II, III, IVa and IVb and a satellite focus at the border of segments IVa / VIII (Figure 1A). Cirrhosis was compatible with the well-known, recently stopped, alcohol abuse. The patient had already suffered from an upper gastrointestinal haemorrhage due to esophageal varices. Furthermore, steatohepatitis with severe fibrosis of the portal fields was evident histologically. During the interdisciplinary tumor board, treatment by Selective Internal Radiation Therapy (SIRT) for the centrally located HCC was decided upon. After the test injection with 99mTc-MAA, the SIRT was successfully carried out using 90Yttrium SIR- spheres. A pronounced enrichment was shown and a good response to treatment was assumed (Figure 1B and 1C).

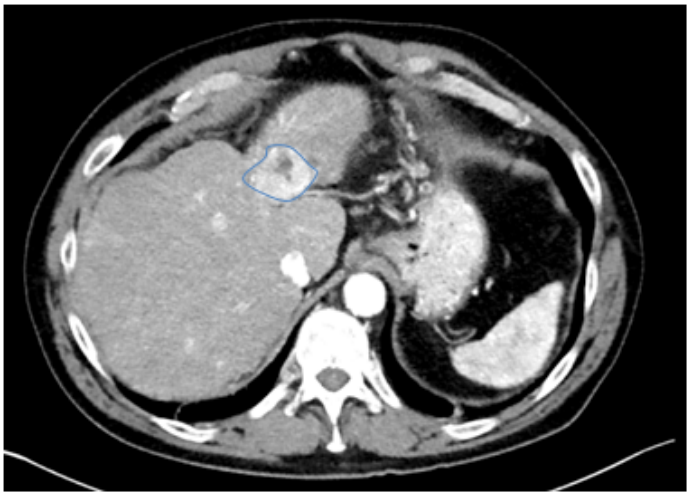

Figure 1A: Pre-SIRT with tumor-formation segment II/III (blue-framed).

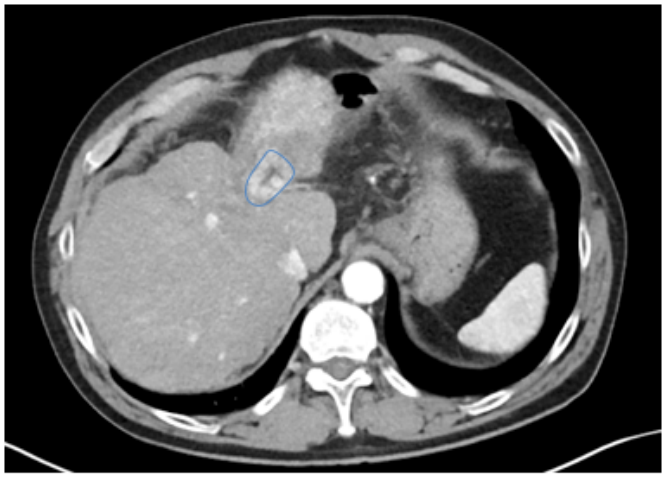

Figure 1B: Post-SIRT with tumor-formation segment II/III (blue-framed).

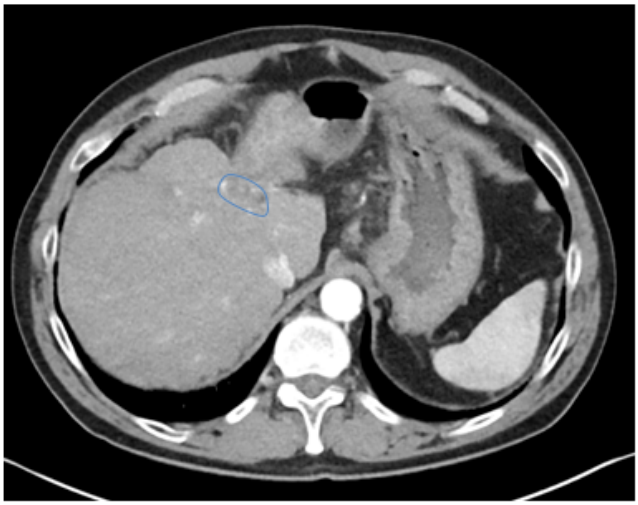

Figure 1C: Recurrence with tumor-formation segment IVa (blue-framed).

The initial control CT after 6 and 12 weeks showed a centrally necrotic, marginally arterial hyperperfused tumor with a small size regression. The satellite finding in segment IVa already described, was slightly proportional to the size compared to pre-SIRT imaging, but progressing in size. However, after 6 months, the control CT showed a progressive lesion in liver segment IVa with an intermediate growth dynamic of +40% and wash-out, corresponding to a grade LI-RAD 5 (Liver Imaging Reporting and Data System), which is morphologically defined as definite HCC [7]. The case was again discussed on the interdisciplinary tumor board and with persistently good liver function, consecutive surgery after prior measurement of portal vein pressure was suggested. The Hepatic Venous Pressure Gradient (HVPG) was 18 mmHg, with an average Wedge Pressure (WHVP) of 23 mmHg and an average Free Liver Pressure (FHVP) of 5 mmHg (HVPG = WHVP - FHVP).

Compared to the HVPG measurement almost one year prior, which was at 14 mmHg and already elevated, a further increase was observed. Bruix et al. described in their work the prognostic value of preoperative measurement of portal pressure in surgically treated cirrhotic patients with HCC [8]. They found that the HVPG was significantly higher in patients who developed liver decompensation [8]. After a detailed discussion of the available findings, a decision was made for surgical treatment and intraoperative HPVG measurement. An important point to decide for an operation was the atrophy of segments II and III after SIRT determined by the CT and therefore we expected no significant loss of liver tissue (20 percent). An anatomical left hemihepatectomy with simultaneous cholecystectomy and closure of an umbilical hernia was successfully performed (Figure 2-4). The Central Venous Pressure (CVP) was 11 mmHg before and after liver resection, whereas the parallel directly measured portal vein pressure was unchanged 24mmHg.

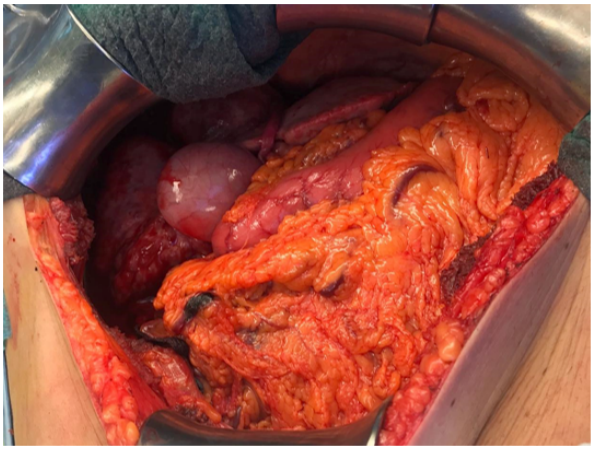

Figure 2A: Situs with Gallbladder.

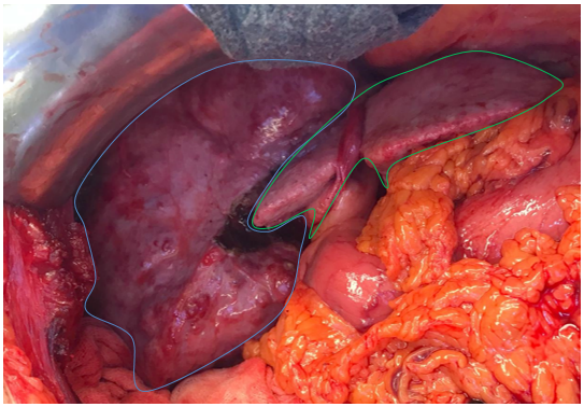

Figure 2B: Situs after cholecystectomy (black), right hepar with cirrhosis (blue-framed) and atrophic left hepar after SIRT (green-framed).

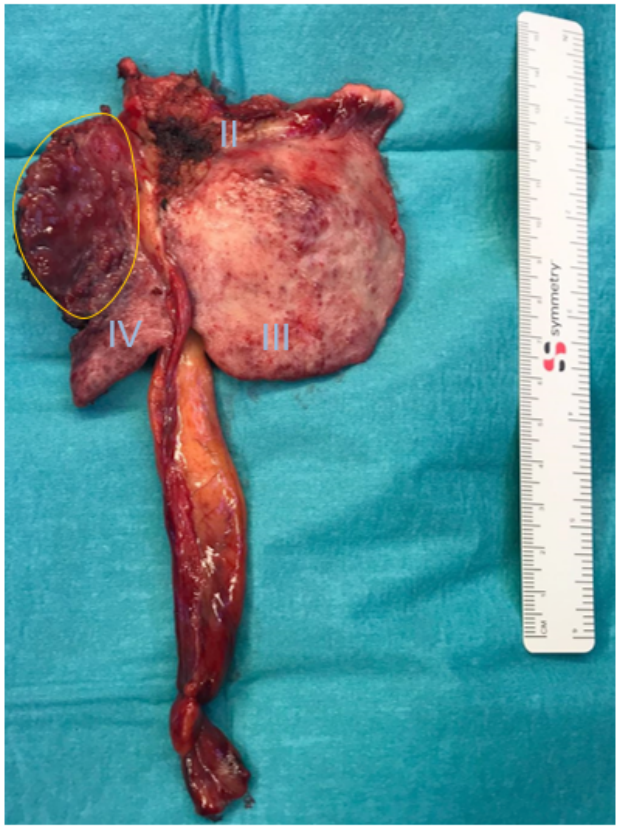

Figure 3A: Left hepar after resection (including Ligamentum falciforme), tumor-formation between Iva and IVb (yellow framed).

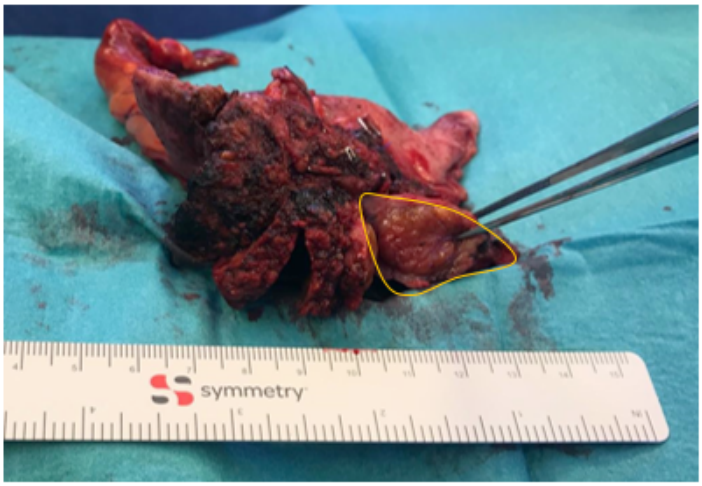

Figure 3B: View from the edge of the resection with the tumor-formation (yellow-framed).

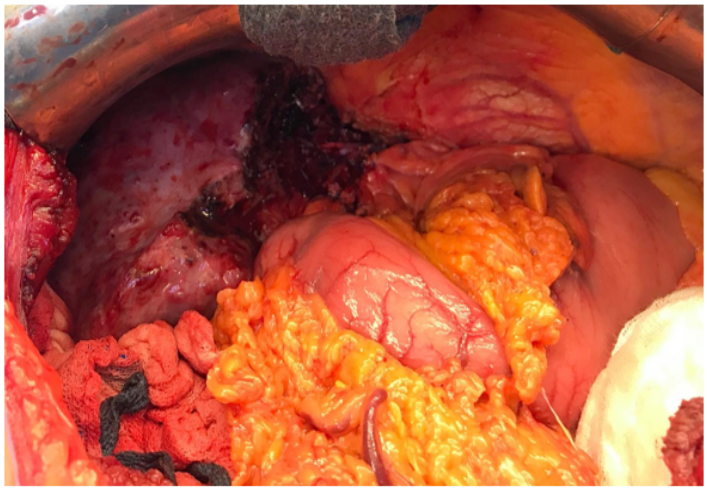

Figure 4: Situs after resection.

Histology showed a recurrence of the known HCC in segment IV, Grade 2 according to Edmondson, with a maximum diameter of 20mm and a TNM classification of rpT1a, L0, V0, Pn0, R0 (locally) [9]. The post-operative stay in the intermediate care unit proved to be without complications in this patient. The Easyflow-Drainage showed a persistently increased flow rate, most likely because of ascites due to the known liver cirrhosis. After starting diuretics, the flow rate was significantly reduced and the drainage was removed. A possible adjuvant immunotherapy with Pembrolizumab was discussed in the interdisciplinary tumor board. The patient was discharged in good general condition on the 12th postoperative day. The CT control almost six months after surgery showed neither a tumor in the liver nor evidence of remote metastasis. The liver cirrhosis showed clear portosystemic bypass circulation without evidence of portal vein thrombosis and only minor splenomegaly.

Discussion

We decided to present this case because of the extremely rare constellation of a HCC-recurrence after SIRT and subsequent resection in the cirrhotic liver. To the best of our knowledge, such a case has not yet been described in the literature. In our patient, the initial stage of the tumor corresponded to BCLC D due to the size of the tumor, the decompensated CHILD B liver cirrhosis and the status after esophageal varices vein bleeding. Instead of the transarterial chemoembolization suggested by EASL-ESMO (TACE, evidence I, recommendation A), we performed alternative therapy by SIRT (III, C) despite CHILD B cirrhosis [5]. Liver surgery can be challenging and risky with regard to the remaining functional liver volume.

The size and location of the tumor and, above all, accompanying liver dysfunctions are risk factors in this respect [10-12]. Of course, the question arises whether a resection would have been preferable in the case of the initially diffusely distributed tumors in several distinct liver segments. In retrospect, with a good postoperative outcome, this question can be answered positively. But the decisive factor was that the patient stopped drinking and thus his liver function improved and he was offered further treatment. Fortunately, the subsequently performed left hemihepatectomy (20 percent of the whole liver volume) was successful and without complications, although several risk factors were present. The patient could thus be treated curatively and remains cancer free upon clinical follow-up.

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