Preparatory hepatic resection with right hepatic vein reconstruction for paracaval liver tumor

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Abstract A liver tumor in the paracaval portion was very difficult to resect because of its anatomical situation. We therefore employed a technique using right hepatic vein (RHV) resection and reconstruction following the resection of segments VII/VIII with the paracaval portion. The patient was a 70-year-old man who had a hepatocellular carcinoma in the paracaval portion, and the root of the RHV was compressed by the tumor. Computed tomography (CT) during arterioportography under temporary balloon occlusion of the RHV demonstrated hypoattenuation of the entire posterior segment, meaning that RHV reconstruction following the resection of segments VII/VIII with RHV resection would be necessary. We performed the above-mentioned operation without any trouble. On mobilizing segments VI/V to the caudal direction after dissecting the distal RHV, the paracaval Glissons were easily exposed and dissected anteriorly from the first order of the right Glissonean sheath. Our preliminary surgical technique, based on IVR-CT, could provide a better surgical field and result in decreased operating time and decreased blood loss in paracaval liver malignancy.

Key words Hepatic resection · Hepatic vein reconstruction · Paracaval liver tumor

Introduction

Surgical strategies for treatment of tumor of the caudate lobe are varied and complex. Most patients have required hemihepatectomy or preparatory segmentectomy concomitant with caudate lobectomy, and isolated caudate lobectomy has been attempted in liver cirrhosis with poor functional reserve. Except for hemihepatectomy with caudate lobectomy, the approach to the caudate lobe is a troublesome obstacle to solve. Some authors have also suggested that tumors of the paracaval portion pose great difficulty during dissection of the liver parenchyma in the antero-superior part. In the patient described here, special attention was paid to the right hepatic vein (RHV) for overcoming tumors in the paracaval portion. To obviate unnecessary effort for good visualization of the operative field and to prevent unexpected bleeding from large hepatic veins, we employed a new surgical approach for paracaval liver malignancy.

Case report

A 70-year-old man, who had suffered from chronic hepatitis C since 1995, was admitted to our hospital with a liver tumor in May 2000. Ultrasonography revealed that the tumor was about 4 cm in diameter and located between the roots of the middle hepatic vein (MHV) and right hepatic vein (RHV) and inferior vena cava, in the domain of the paracaval portion of the right caudate lobe. After routine preoperative angiography, computed tomography under transarterial portography (CTAP) confirmed the location of the tumor and showed it to compress the proximal RHV (Fig. 1). Therefore, CTAP under temporary RHV balloon-occlusion was employed in order to determine whether hepatic vein reconstruction was necessary. Balloon-occlusion CTAP demonstrated hypoattenuation in almost all of segments VI/V, except for a small medial part of the posterior segment (Fig. 2). This finding indicated that RHV reconstruction following the resection of segments VII/VIII with RHV resection would be necessary to preserve the function of residual segments VI/V, regardless whether the inferior right hepatic vein (IRHV) was present.

Preoperative serological tests showed that the peripheral blood counts were normal, but the serum aspartate aminotransferase level was 79 IU/l and alpha-
fetoprotein level was elevated to 1470 ng/ml. Indocyanine green retention at 15 min (ICGR15) was 21%, which allowed combined segmentectomy, based on the principle of the value of ICGR15 and an acceptable extent of hepatic resection. On June 7, 2000, resection of segments VII/VIII with the paracaval portion plus the RHV, and reconstruction of the RHV, was performed.

After cholecystectomy, a 4-Fr catheter was introduced to the cystic duct for confirmation of posthepatectomy bile leakage. On mobilizing the right lobe anteromedially, the short hepatic veins, including the IRHV were divided cranially to free the paracaval portion of the caudate lobe from the cava. The bifurcation of the right anterosuperior and -inferior branches was verified and marked on the surface of the liver (called

Fig. 1. Computed tomography under transarterial portography (CTAP) films reveal that the tumor existed in the paracaval portion between the middle and right hepatic veins, and the root of right hepatic vein was deformed by the tumor (arrow)

Fig. 2A–C. CTAP films with temporary right hepatic vein obstruction produced by using a balloon catheter. Segment VII was not hypoattenuated, because the superficial branch of the right hepatic vein was not occluded (A). Almost all of segments VI/V were hypoattenuated, except for a small medial part of the posterior segment (B, C)