





# Resection of Retro-Hepatic Vena Cava (RHVC) En-bloc with Caudate Lobe without Vascular Exclusion for a Low Grade Leiomyosarcoma of Inferior Vena Cava

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## ABSTRACT

**Background.** Leiomyosarcomas (LMS) of the inferior vena cava (IVC) originate in the retrohepatic (RHVC) portion in 15% of cases.<sup>1</sup> Due to complex anatomy and need to preserve venous outflow from the infra-diaphragmatic viscera, the operation may require total vascular exclusion, veno-venous bypass and hypothermic liver resections.<sup>2,3</sup> In this video, virtual planning of the operation allowed a parenchyma-sparing radical resection in a patient with limited liver reserve.

**Methods.** A 12-cm LMS of RHVC invading the entire segment 1 (i.e., Spiegel's lobe, paracaval portion, and caudate process) was diagnosed in a man with metabolic steato-hepatitis (BMI: 34). He had no response to previous chemotherapy. Major hepatectomy was excluded considering the high risk of postoperative liver failure. 3D-reconstruction of regional anatomy allowed planning of a parenchyma-sparing, en bloc resection of tumor, RHVC, and caudate lobe while avoiding hilar and suprahepatic venous clamping.

**Results.** The operation strategy relied on the en bloc separation of caudate lobe, RHVC, and tumor from the hepatic veins confluence and the posterior segments after complete mobilization of the liver. Vessel loop-assisted

hanging maneuver, encircling tumor, and RHVC with superimposed 3D-reconstructions guided the parenchymal transection, while preserving the middle hepatic vein outflow. RHVC was replaced with prosthetic material.

**Conclusions.** Complex resection of primary tumor of the IVC en bloc with caudate lobe and RHVC can be attempted in chronic liver diseases at-risk of postoperative failure. Preservations of transhepatic flow and liver function depends on tumor size and preservation of noninvaded hepatic-veins confluence. Preoperative virtual 3D reconstruction is crucial in surgical planning.

**Keywords** Augmented reality · 3D virtual reconstruction · Transplant surgery · Sarcoma surgery · Inferior vena cava

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