Sources of bleeding during IVC tumour thrombi removal: MDCT examination

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INTRODUCTION & OBJECTIVES: The purpose of this study was to investigate the sources of bleeding from the lumen of the inferior vena cava (IVC) during removal of the tumour thrombus. We have studied the MDCT anatomy of the posterior tributaries of the IVC, including variant lumbar veins and lumbar veins of the infrarenal IVC.

MATERIAL & METHODS: The retrospective study included 302 patients who underwent the bolus contrast-enhanced MDCT of the abdomen for various indications. MDCT was performed using CT scanner Toshiba Aquilion S16. We analyzed the anatomy of the lumbar veins draining across the posterior side of the IVC at the level of its retrohepatic, subhepatic, cavarenal and infrarenal segments. The variant lumbar veins were defined as venous vessels draining across the posterior side of the suprarenal IVC, which were neither adrenal nor lower diaphragmatic veins.

RESULTS: Variant lumbar veins were detected in 50% patients (151 out of 302). The diameter of these vessels ranged from 1 to 5mm and averaged 2.5 mm. In 71% of cases the variant veins entered the subhepatic IVC, in 26.3% of cases it drained at the level of the upper edge of the renal vein mouths (cavarenal segment) and only in 2.0% of cases – to the retrohepatic IVC. Considering the problem of bleeding from the lumbar veins during thrombectomy, we have identified a conditional “risk zone” where the upper lumbar veins of the infrarenal IVC enter the area of vascular thrombus isolation. This “risk zone” included a section of 10 mm long below the mouth of the ipsilateral renal vein. Draining of lumbar veins in the “risk zone” on the right side was recorded in 116 (38.4%) patients. The average distance from the right renal vein to the right upper lumbar vein did not exceed 4.3 mm. Lumbar veins entered the IVC immediately next to the lower edge of the right renal vein mouth in 35 (11.6%) cases. Their average diameter was 4.7 mm. On the left side of the "risk zone" the lumbar veins drained only in 2 (0.7%) patients at a distance of 7 mm and 8 mm from the mouth of the left renal vein.

CONCLUSIONS: The variant lumbar veins rarely are the main source of bleeding during thrombectomy. The right upper lumbar veins of the infrarenal IVC draining into the inferior vena cava in close proximity to the mouths of the renal veins played the leading role in this matter. Before the operation a surgeon must carefully plan the stage of vascular thrombus isolation and evaluate the anatomy of the upper lumbar veins with the use of the data of medical imaging.