Images in Cardiovascular Medicine

Renal Cell Carcinoma Extending into the Retrohepatic Inferior Vena Cava

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A 69-year-old woman presented with hematuria. Magnetic resonance imaging revealed a left renal mass extending into the retrohepatic inferior vena cava (IVC) (Figs. 1 and 2). Both magnetic resonance imaging of the brain and a bone scan were negative for distant metastases. Intraoperatively, the IVC was cross-clamped below the level of the hepatic veins to prevent dissemination of the intracaval part of the tumor. Left radical nephrectomy and resection of the intracaval part of the tumor mass were successfully performed. The IVC was repaired primarily. The patient tolerated the procedure well and was discharged from the hospital on the 9th postoperative day. The histopathologic report showed papillary renal cell carcinoma, Fuhrman nuclear grade 3 (Figs. 3 and 4).

Fig. 1 *Magnetic resonance image of the abdomen shows a large tumor mass (arrows) originating from the left kidney and extending into the retrohepatic portion of the inferior vena cava.*

Fig. 2 *Magnetic resonance image of the abdomen shows the intracaval part (arrow) of the tumor mass.*

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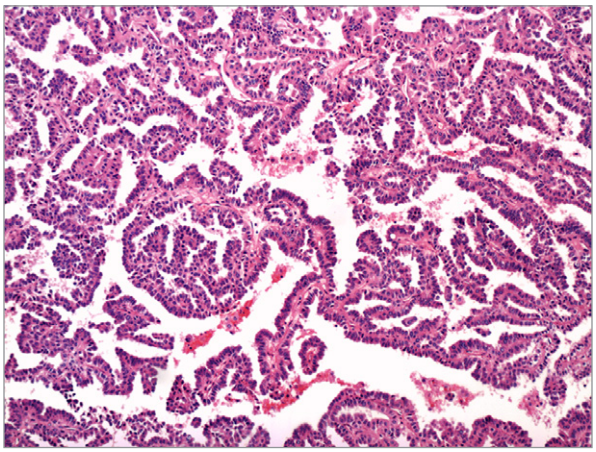

Fig. 3 *Photomicrograph of the resected specimen shows the complex papillary formation of the tumor cells. Note that the fibrovascular papillary stalks are lined by a single layer of cuboidal/columnar cells characterized by low-grade nuclear cytology and eosinophilic cytoplasm lines (H & E, orig. ×200).*

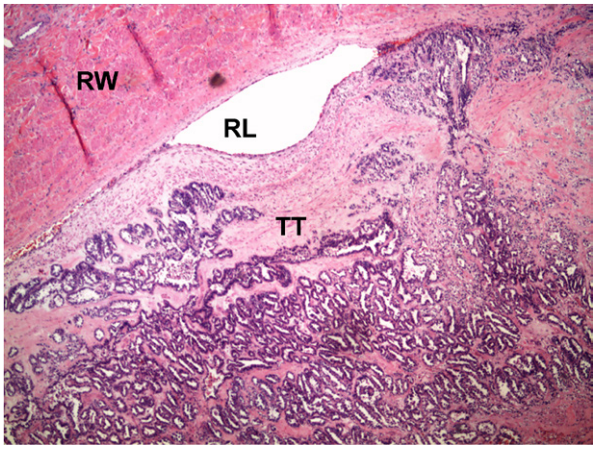

Fig. 4 *Photomicrograph of the resected specimen shows tumor thrombus (TT), renal vein lumen (RL), and renal vein wall (RW) (H & E, orig. ×100).*

Comment

Renal cell carcinoma is a common urologic tumor, comprising 1% to 3% of all visceral cancers and 85% to 90% of all malignant kidney tumors. The extension of tumor thrombus into the IVC in renal cell carcinoma is a relatively uncommon event, which occurs in 4% to 25% of all cases.[1] In approximately 2% to 10% of these patients, tumor thrombus extends into the right atrium.[1-3] Improvements in imaging techniques, the introduction of dynamic monitoring by means of transesophageal echocardiography, and the adoption of bypass techniques such as cardiopulmonary bypass and hypothermic circulatory arrest (HCA) have all improved the safety and completeness of resecting renal cell carcinoma that involves the inferior vena cava.[4]

In our patient, the procedure was successfully achieved without cardiopulmonary bypass or HCA, even though the retrohepatic portion of the IVC was involved. This achievement can be attributed to the adequacy of exposure of the IVC provided by a Chevron incision and to the technique of "milking down" the IVC to displace the mass more caudally, thereby creating room to cross-clamp the IVC below the level of the hepatic veins. Cross-clamping the IVC did not result in hemodynamic instability, because the obstruction of the IVC by the tumor had been gradual enough to enable the development of collateral vessels.

This report highlights the importance of adequate exposure in such complex procedures and of taking steps to avoid tumor dissemination during surgery.

References

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