American Journal of Surgery Case Reports

Case Report

Management of Renal Cell Carcinoma with Level III IVC Thrombus: Radical Nephrectomy with IVC Thrombectomy

Rohit Kumar Singh[1], Soumya Khanna[2], Tiwary SK[1], Puneet[1] and Ajay K Khanna[1]*

[1]*Departments of General Surgery, Institute of Medical Sciences, Banaras Hindu University, India*

[2]*Department of Anatomy, Institute of Medical Sciences, Banaras Hindu University, India*

Abstract

Renal Cell Carcinoma (RCC) is a prevalent type of kidney cancer that may exhibit extension into the renal vein or Inferior Vena Cava (IVC) in some instances. A Level III Thrombus in RCC is a rare, yet highly aggressive form of the disease that requires prompt diagnosis and treatment. In this case report, we present a patient diagnosed with RCC and Level III Thrombus who underwent a technically challenging surgical intervention, specifically nephrectomy, followed by careful follow-up care. Our aim is to discuss the clinical presentation, diagnostic evaluation, treatment options, and prognosis for this challenging clinical scenario. The report highlights the significance of a multidisciplinary approach and careful patient selection in achieving successful outcomes in RCC cases with Level III Thrombus. Renal Cell Carcinoma (RCC), a type of kidney cancer, has the potential to metastasize from the kidney into the Inferior Vena Cava (IVC), which is a large vein that carries blood from the lower body to the heart . However, it is uncommon for the cancer to spread to the right atrium of the heart. Tumor thrombus invasion, which is the presence of a blood clot within a vein caused by the cancer, occurs in 4%-10% of RCC patients. The most effective treatment for this condition is aggressive surgical removal of the tumor, although this can be challenging depending on how far the tumor thrombus has spread in the vein.

Case Presentation

A 40-year-old man came in with a history of hematuria, which is the presence of blood in the urine, for one month. The patient did not experience any pain, clots, or swelling in the abdomen. Upon physical examination, a lump was detected on the right flank, and a right-sided varicocele, which is the swelling of the veins in the scrotum, was observed but could not be reduced. The initial laboratory tests showed a low hemoglobin level of 11 g/dL, while the liver and kidney function tests were normal. The urinalysis revealed 15-20 red blood cells per high-power field.

During an ultrasound examination, a mass of 9 cm × 8 cm was discovered in the lower pole of the patient's right kidney. The mass had multiple calcified areas, and increased blood supply was observed, along with a tumor thrombus, which is a blood clot formed by the cancer, in the Inferior Vena Cava (IVC). A CT scan with angiography revealed that the mass was endophytic, which means that it grew inside the kidney, and measured 9 cm × 9 cm × 9 cm. The mass had infiltrated the right renal vein and extended the tumor thrombus into the intrahepatic IVC. The lesion was being supplied by multiple arterial feeders from the right renal artery. An MR abdomen confirmed these findings, and it was noted that the IVC was dilated; measuring 4.6 cm, but there was no evidence of tumor thrombus extension in the supra-diaphragmatic IVC. A few retrocaval, aortocaval, and paraaortic lymph nodes were present, all measuring less than a centimeter and no other areas of pathology or metastasis were found. The clinical stage of the cancer was cT3N0M0. The patient's case was managed by a multidisciplinary team consisting of experts from various fields such as urology, cardiothoracic surgery, hepatobiliary surgery, and interventional radiology. The first step of the treatment involved using DSA to guide the angioembolization of the right renal artery. After this, the patient underwent a surgical procedure that included a right radical nephrectomy with thrombectomy. During the surgery, a mass of 10 cm × 8 cm was found in the lower pole of the right kidney, and a venous thrombus was discovered to have spread to the right renal vein and IVC up to 5 cm. The surgical approach involved making a chevron incision that extended slightly to the xiphisternum, followed by reflecting the colon halfway and kocherizing the duodenum. The right kidney was then mobilized by dividing its attachments and performing hilar dissection. The right renal artery was clamped, ligated, and divided. The IVC was mobilized up to the suprahepatic region and clamped, starting with the infrarenal IVC, followed by the left renal vein, and then the suprahepatic IVC. A vertical cavotomy was used to evacuate the thrombus, and hemostasis was maintained. The cavotomy incision was closed using two layers of 4-0 polypropylene continuous suture, and hemostasis was ensured using gelfoam. The patient was discharged on the 10th postoperative day. The analysis of the right kidney removal sample revealed a single clear-cell tumor measuring 7 cm × 6 cm in size, located in the lower pole, and encroaching upon the capsule. However, there was no evidence of the tumor spreading to the perinephric fat or Gerota's fascia (Figures 1-3).

Discussion

Renal Cell Carcinoma (RCC) is a type of cancer that affects both men and women, but is more frequently diagnosed in men. Unlike other cancers, there is no screening test for RCC and it is often found

Citation: Singh RK, Khanna S, Tiwary SK, Puneet, Khanna AK. Management of Renal Cell Carcinoma with Level III IVC Thrombus: Radical Nephrectomy with IVC Thrombectomy. Am J Surg Case Rep. 2023;4(5):1072.

Publisher Name: Medtext Publications LLC

Manuscript compiled: May 18th, 2023

***Corresponding author:** Ajay K Khanna, Departments of General Surgery, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India, E-mail: akhannabhu@gmail.com

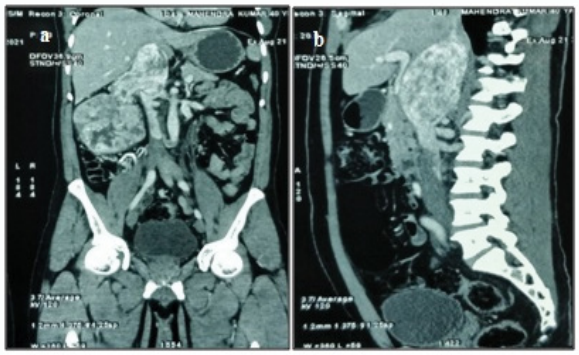

Figure 1: A and B) Right Renal Cell carcinoma with large thrombus in inferior vena cava.

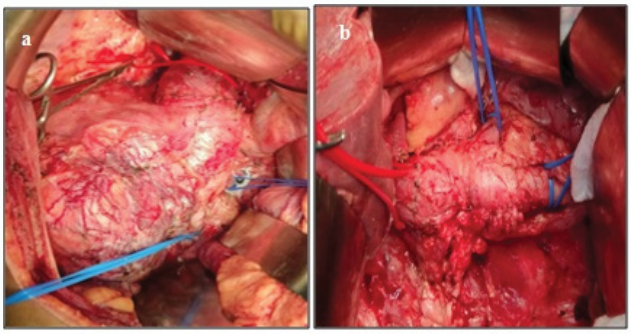

Figure 2: A and B) RCC with dilated IVC.

Figure 3: Specimen: RCC with IVC thrombus.

incidentally through imaging [1-5]. Hematuria is the most common symptom of RCC, but early signs can also include flank pain, a mass in the flank, and an increase in red blood cells, hypercalcemia, and the sudden onset of varicocele in men. Unfortunately, in some cases, the cancer may have already spread to other parts of the body by the time it is diagnosed. RCC is also associated with venous thrombosis and up to 10% of patients may present with an IVC thrombus at the time of diagnosis, with less than 20% of these cases having the thrombus extend into the right atrium [6]. The surgical approach for RCC with a thrombus that has extended into the IVC depends on various factors, including the location of the disease, the extent of the thrombus, and the level of IVC blockage. Before surgery, tumors can be classified into four categories based on the height of the tumor thrombus in the IVC. Level I refer to a tumor thrombus that extends from the renal vein to the lower part of the IVC and only requires local control for extraction. Level II refers to a tumor thrombus that does not go beyond the subhepatic IVC [7,8]. Level III refers to a tumor thrombus that reaches the intrahepatic IVC or extends to the suprahepatic IVC but not the atrium. Finally, Level IV refers to a tumor thrombus that reaches the atrium, which is the most severe form [9].

Conclusion

The effective management of Renal Cell Carcinoma (RCC) with venous tumor thrombus extension requires a multidisciplinary approach. Proper assessment of the thrombus level and degree of Inferior Vena Cava (IVC) obstruction is essential. CT scans or MRI can be used to determine the features and extent of the tumor. Interventional radiologists may perform a renal artery embolization procedure to treat renal tumors and reduce the risk of hemorrhaging during surgery. Collaboration among various medical specialists is crucial for effective preoperative, intraoperative, and postoperative management of RCC with IVC thrombus. This includes urologists, interventional radiologists, medical oncologists, anesthesiologists, and critical care physicians. The goal of this multidisciplinary approach is to ensure that the patient receives the best possible care and achieves the best possible outcome. By working together, medical professionals can develop an individualized treatment plan tailored to the specific needs of each patient.

References

1. Surveillance, Epidemiology, and end Results Program. SEER Stat Fact Sheets: Kidney and Renal Pelvis Cancer. Bethesda, MD: National Cancer Institute.
2. Welz A, Schmeller N, Schmitz C, Reichart B, Hofstetter A. Resection of hypernephromas with vena caval or right atrial tumor extension using extracorporeal circulation and approach. Eur J Cardiothorac Surg. 1997;12(1):127-32.
3. Gaudino M, Lau C, Cammertoni F, Vargiu V, Gambardella I, Massetti M, et al. Surgical treatment of renal cell carcinoma with cavoatrial involvement: a systematic review of the literature. Ann Thorac Surg. 2016;101(3):1213-21.
4. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2015. CA Cancer J Clin. 2015;65(1): 5-29.
5. Muglia VF, Prando A. Renal cell carcinoma: Histological classification and correlation with imaging findings. Radiol Bras. 2015;48(3):166-74.
6. Skinner DG, Colvin RB, Vermillion CD, Pfister RC, Leadbetter WF. Diagnosis and management of renal cell carcinoma. A clinical and pathologic study of 309 cases. Cancer. 1971;28(5):1165-77.
7. Woodruff DY, van Veldhuizen P, Muehlebach G, Johnson P, Williamson T, Holzbeierlein JM. The perioperative management of an inferior vena cavaltumor thrombus in patients with renal cell carcinoma. Urol Oncol. 2013;31(5):517-21.
8. Neves RJ, Zincke H. Surgical treatment of renal cancer with vena cava extension. Br J Urol. 1987;59(5):390-5.
9. Wagner B, Patard JJ, Me´jean A, Bensalah K, Verhoest G, Zigeuner R, et al. Prognostic value of renal vein and inferior vena cava involvement in renal cell carcinoma. Eur Urol. 2009;55(2):452-9.