

Surgical Treatment of Renal Cancer with Tumor Thrombus of the Inferior Vena Cava in a Patient after Exploratory Laparotomy

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ABSTRACT

Renal cancer accounts for 3% of all solid tumors and is associated with renal or inferior vena cava (IVC) thrombosis in 2-10% of patients, spreading to the right atrium in 1% of cases.

A clinical case of successful surgical treatment of renal cell carcinoma with a tumor thrombus of the inferior vena cava above the level of the diaphragm is given, after an exploratory laparotomy.

The only method aimed at assisting this difficult category of patients and giving a chance for obtaining immediate satisfactory results is.

nephrectomy with a thrombectomy of a tumor thrombus from the IVC
Keywords: renal cell carcinoma, tumor thrombus, inferior vena cava, exploratory laparotomy, thrombectomy

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INTRODUCTION

A specific feature of renal cell carcinoma is the ability of the tumor to spread through the lumen of the renal vein into the inferior vena cava (IVC) up to the right heart chambers. Tumor venous thrombosis (category T3a–c) is diagnosed in approximately 10% of patients [1-3]. The most effective method to cure patients with tumors spreading into the venous channel is surgical. The long-term survival of radically operated patients ranges from 12 to 66% [4,5]. Despite the improvement of thrombectomy techniques, this surgical procedure remains technically complicated and is associated with a high frequency of perioperative complications and mortality [6-7], most of which ends with an exploratory laparotomy. After exploratory and

symptomatic operations, 1-year survival is 3.3%, 3-year and even 2-year survival are absent [8–9]. The identification of risk factors for perioperative complications and mortality will allow for a more objective selection of candidates for thrombectomy [10]. In patients with a high risk of perioperative lethality, targeted therapy may be an alternative to surgical treatment [11, 12]. According to the Mayo Clinic, the classification of tumor thrombi is as follows (Fig. 1): 0 - the thrombus is limited to the renal vein; I - thrombus IVC less than 2 cm above the renal vein; II - thrombus more than 2 cm above the renal vein, but lower than the hepatic veins; III - thrombus at or above the hepatic veins, but below the diaphragm; IV - above the diaphragm.

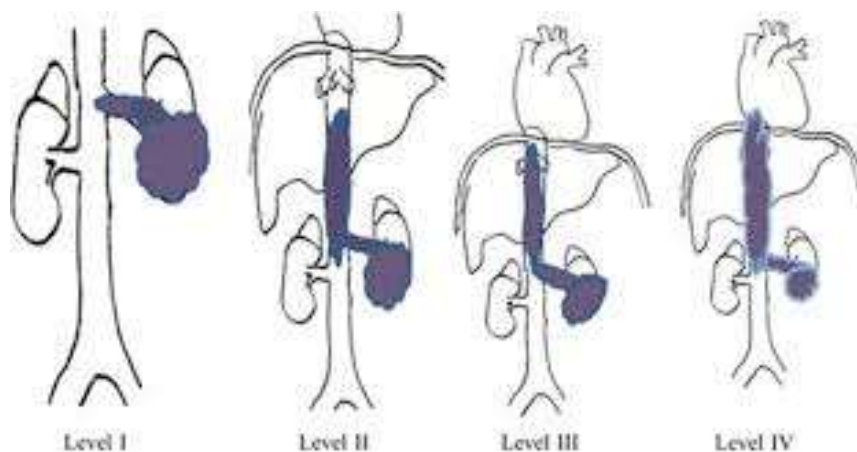


Figure 1: Lesion levels of the inferior vena cava with a tumor thrombus according to the Mayo Clinic.

Depending on the extension and attitude to the hepatic veins, there are 4 types of thrombi in the IVC (Novick): perirenal, subhepatic, intrahepatic (retrohepatic) and suprahepatic. The first three types belong to the group of subphrenic thrombus. The suprahepatic, they are supradiaphragmatic thrombi, are divided into intrapericardial and intraatrial (Fig. 2)

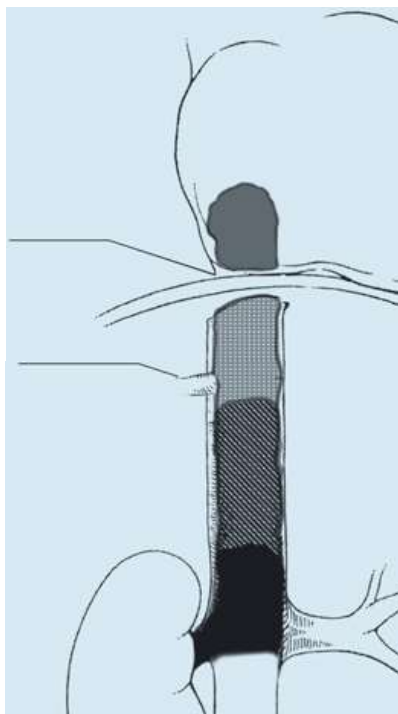


Figure 2: Types of thrombi IVC (Novick)

The main difference between thrombectomy and simple radical nephrectomy is the need for mobilization, control and resection of the IVC, which turns an ordinary abdominal operation into a vascular one and may present certain technical difficulties. Removal of a thrombus during its spread to the right atrium is especially dangerous in some types of thrombosis, which requires cardiopulmonary shunting, hypothermia with circulatory arrest.

MATERIALS AND METHODS

We present a clinical example dedicated to the radical treatment of renal cancer with extensive thrombosis of the inferior vena cava after an earlier exploratory laparotomy in

another clinic. Patient D., 54 years old, applied to the Oncology Center of Astana with a previously identified mass lesion of the right kidney. From the anamnesis, it is known that the patient considers himself to be sick since June 2014, when he noted the appearance of low back pain and gross hematuria, an ultrasound examination of the abdominal cavity revealed mass lesion of the right kidney. Next, the patient was offered surgical treatment in the conditions of the oncological center at the place of residence, where during the laparotomy, a tumor of the right kidney with a tumor thrombus of the inferior vena cava was detected. The operation was completed on this. 4 weeks after the previous operation in another clinic, the patient independently applied to the Oncology Center of Astana, where, after further examination and consultation, he was hospitalized in the Department of Surgery No. 2 of the Oncology Center of Astana for planned surgical treatment. The hereditary history of the patient is burdened: his father suffered from lung cancer. From concomitant diseases: arterial hypertension of II degree; type 2 diabetes mellitus, subcompensation stage. The results of laboratory and instrumental methods of examination for admission: hemoglobin 156g/l, erythrocytosis - $6.17 \times 10^{12}/l$, leukocytes - $7.0 \times 10^9/l$; ESR - 5 mm/h, thrombocytosis - $381 \times 10^9/l$.

Biochemical analysis of blood: total protein - 74.4 g/l; urea - 4.8 mmol/l; creatinine - 72 mmol/l; total bilirubin - 11.5 $\mu\text{mol}/l$; straight bilirubin - 2.3 $\mu\text{mol}/l$; blood glucose - 7.3 mmol/l; uric acid - 340.0 $\mu\text{mol} / l$; ALT- 0.22 $\mu\text{kat}/l$; AST- 0.27 $\mu\text{kat}/l$.

According to CT data of the retroperitoneal space organs: the size of the right kidney is 12.6 x 8.4 x 7.3 cm. The parenchyma has a heterogeneous structure due to the formation in the middle third of 6.8 x 9.1 x 6.3 cm. Occlusion of the inferior vena cava with a tumor-like formation at the level of Th11-L1, of irregular shape, with even clear contours, 7.4 x 5.4 x 3.8 cm in size, is observed; the formation is traced to the right kidney (Fig. 3).



Figure 3: Occlusion of the inferior vena cava with a tumor thrombus.

Operation from 09/25/14: right radical nephrectomy with thrombectomy of the renal and inferior vena cava. (operator Professor A.K. Makishev) after the upper-middle laparotomy, a large kidney tumor was found, occupying the entire kidney with a diameter of 20x 22 cm with a tumor thrombus of the IVC extending beyond the diaphragm dome. The IVC is typically isolated below the lower edge of

the tumor thrombus, the left renal vein is clamped, the right renal artery is ligated (Fig. 4). The diaphragm is opened and the pericardiotomy is performed. IVP clamped at the site of the confluence of the right atrium. Nephrectomy with resection of IVC was performed. The thrombus is extracted completely (Fig. 5, 6).



Figure 4: The IVC is typically isolated below the lower edge of the tumor thrombus, the left renal vein is clamped, the right renal artery is ligated.

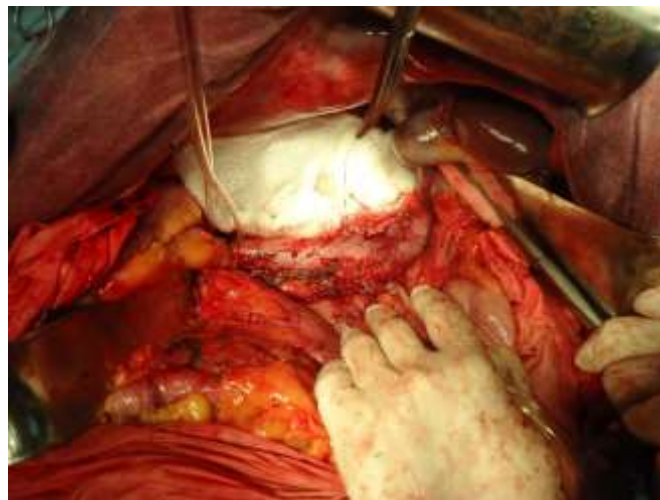


Figure 5: Nephrectomy with resection of IVC was performed. Thrombus is extracted completely.

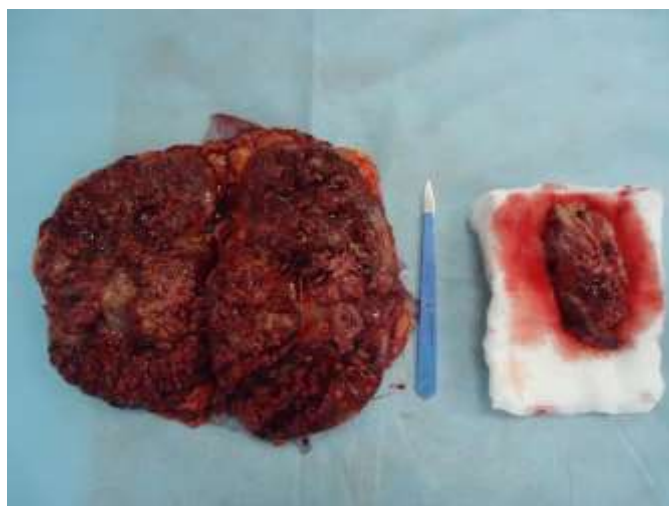


Figure 6: Macro specimen: kidney tumor with intracaval suprarenic thrombus.

Blood loss was 3.5 liters, 900 ml of autoerythrocytes were reinfused using the autoLog1 apparatus. Blood transfusion was required only in a volume of 350 ml. The time of compression of the IVC is 15 minutes. After restoration of blood flow through the IVC, hemodynamics stabilized.

The histological conclusion No. 3567/42573-42600: of primary tumor and thrombotic masses: Renal cell carcinoma, clear cell type, 3 tbsp. Differentiation according to Furman with invasion of the perirenal cellulose and the wall of the renal pelvis. The final diagnosis is renal cell carcinoma T3cN0M0.

The data of laboratory and instrumental methods of research at the time of discharge:

hemoglobin - 159 g/l, erythrocytes - $5.68 \times 10^{12}/l$, platelets - $318 \times 10^9/l$ leukocytes - $4.7 \times 10^9/l$;

Biochemical analysis of blood: total protein - 69 g/l; urea - 3.2; creatinine - 60 $\mu\text{mol}/l$; total bilirubin - 11.6 $\mu\text{mol}/l$; blood glucose - 4.0 mmol/l; sodium - 146 mmol/l; potassium - 5.3 mmol/l.

Coagulogram: prothrombin sample time - 14.9; prothrombin control time - 16.5; prothrombin ratio - 1.9; INR - 1.13; fibrinogen - 3.99 g/l.

The postoperative period was uneventful, the patient was discharged 12 days after surgery in a satisfactory condition.

The postoperative period proceeded without complications, the patient was discharged 12 days after surgery in a satisfactory condition.

DISCUSSION

Thrombectomy - a technically difficult operation, that requires the mobilization of the main veins thrombosed by a tumor, opening their lumen in a full or partial block of blood flow along the affected part of the vessels and subsequent reconstruction of the vascular wall while maintaining the normal anatomy of the venous bed. Performing such operations presents a high risk due to the development of massive bleeding and the risk of thromboembolism. But, thanks to the improvement of the surgical and anesthesiological techniques, the possibilities of assisting patients with different extension of tumor thrombus were expanded, which resulted in good

immediate results of the surgical treatment of the patient after the previous exploratory laparotomy.

CONCLUSIONS

The only method aimed at assisting this complex category of patients, who are considered to be incurable and giving a chance for obtaining immediate satisfactory results is a one-step combined surgical intervention. Despite the high risk, well-planned and conducted highly specialized surgical care can achieve a favorable outcome in almost hopeless patients.

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