Case Study of the Month

Nephrectomy, Work Bench Surgery, and Autotransplantation: A Case of a Solitary Left Kidney with an Extensive Centrally Located Renal Cell Carcinoma and a Tumour Thrombus Entering the Vena Cava

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1. Case report

Renal cell carcinomas in patients with imperative indications are usually excised by partial nephrectomy. Unfortunately, nephron-sparing surgery in situ is feasible only for peripherally located tumours that can be excised [1]. The use of extracorporeal partial nephrectomy and autotransplantation allows nephron-sparing surgery in patients with ominous, centrally located tumours. To our knowledge, we...
present the first case of an extensive centrally located renal cell carcinoma with a large tumour thrombus entering the inferior vena cava in a solitary left kidney, where nephron-sparing surgery as an imperative indication was performed on the work bench.

In April 2005, a 49-yr-old women was admitted to our hospital with an asymptomatic renal cell carcinoma in her left solitary kidney, which was detected incidentally by abdominal ultrasound. She was obese (120 kg, 178 cm) and had hypothyreosis, insulin-dependent diabetes mellitus, multiple sclerosis, cardiac insufficiency, arterial hypertension, and chronic obstructive pulmonary disease with acute exacerbation at the time of admission. Serum creatinine concentration was slightly raised at 1.1 mg/dl. Her urologic history was notable for an akinia of the right kidney.

Magnetic resonance imaging (MRI) and magnetic resonance angiography revealed a cystic mass, 8 × 6 × 6 cm in diameter, in the center part of the left kidney, which was highly susceptible for renal cell carcinoma (Fig. 1A). A tumour thrombus in the left renal vein, entering the inferior vena cava, was detected (Fig. 1B). No evidence of metastatic disease or infiltration of adjacent organs was seen.

Fig. 1 – (A) MRI: cystic mass in the center part of the left kidney (8 × 6 × 6 cm), highly susceptible for renal cell carcinoma. (B) MRI: tumour thrombus in the renal vein, entering the inferior vena cava.

Fig. 2 – (A) Work bench surgery: kidney with perirenal adipose tissue and a thrombus in the renal vein. (B) Follow-up 17 mo after autotransplantation.
Due to the central localisation and the extension of the tumour, an intracorporal partial kidney resection was not feasible. To prevent the patient from requiring haemodialysis, a left-side nephrectomy with cavotomy and complete thrombectomy (Fig. 2A), ex vivo tumour excision, and autotransplantation to the right iliac fossa was performed.

The kidney was placed in ice slush and perfused as described by Steffens et al [2]. The examination revealed that the whole lumen of the renal vein was filled out with tumour. The tumour infiltrated the hilum and the lower part of the kidney. After tumour excision, the renal vein was completely opened and the thrombus removed. No evidence of infiltration into the venous wall was observable. Further tumour thrombus in different side arms of the renal vein could be removed easily. One side arm had to be excised due to presumptive infiltration. The kidney pelvis was reconstructed to be watertight with Monocryl. Retrograde perfusion of the renal vein showed sufficient closing of the venous system. Intraoperatively, all frozen sections were negative.

After the flank incision was closed, the obese patient was placed into the supine position, the right iliac fossa was approached through a standard right lower quadrant kidney transplant incision [2], and the autotransplantation was performed.

In total, the cold ischaemic time was 4 h and the warm ischaemic time 60 min. Pathology revealed a grade 2 clear-cell renal cell carcinoma in stage pT3b, pN0, R0.

After a postoperative rise of the serum creatinine concentration up to 4.3 mg/dl, a decrease to the normal range occurred.

At follow-up 17 mo after surgery, the patient remained completely asymptomatic with no complications. Renal flow was regular on Doppler flow evaluation and serum creatinine level was 1.6 mg/dl. No evidence of local recurrence or metastatic disease in was detectable by MRI (Fig. 2B).

**Conflicts of interest**

The authors have nothing to disclose.

**EU-ACME question**

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**Question:**

Centrally located renal cell carcinomas:

A. Can only be treated by radical nephrectomy because of oncologic reasons.
B. Should be excised in nephron-sparing surgery when they are <4 cm in diameter.
C. In imperative situations can be treated with nephrectomy, work bench surgery and autotransplantation.
D. Should only be excised in nephron-sparing surgery when there is no evidence of a tumour thrombus.

**References**
