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PUSHING BOUNDARIES IN EXTRACORPOREAL ROBOT-ASSISTED KIDNEY AUTOTRANSPLANTATION (eRAKAT): BENCH SURGERY FOR AN ONCOLOGIC PARTIAL NEPHRECTOMY IN A PATIENT WITH A SOLITARY KIDNEY

Introduction

- Renal cell carcinoma (RCC) accounts for 2-3% adult malignant tumors
- Solitary kidney → golden standard = partial nephrectomy
- Generates higher quality of life and survival compared to hemodialysis
- In cases where in situ resection is deemed impossible, kidney extraction, extracorporeal tumor excision and re-implantation can be considered
- Minimal invasive surgery is preferred when technically feasible without compromising oncological outcomes

Objective

We aim to demonstrate the feasibility of extracorporeal robot-assisted kidney autotransplantation (eRAKAT) with tumor excision on the bench in an oncological setting.

Methods

The case:

- 59 year old woman, solitary left kidney
- Routine CT scan for uncontrolled hypertension
- Incidental diagnosis of RCC

Work up

- Biopsy: Fuhrman grade 2 clear cell RCC
- CT: cT2aN0M0 Ø 88mm
- Lab: eGFR 63 mL/min
- Four phasic CT with digital 3D modelling for preoperative planning

Treatment

- Neo-adjuvant axitinib-pembrolizumab for 6 months
- Partial nephrectomy: given the size and need for prolonged cold ischemia → eRAKAT with extracorporeal tumor enucleation

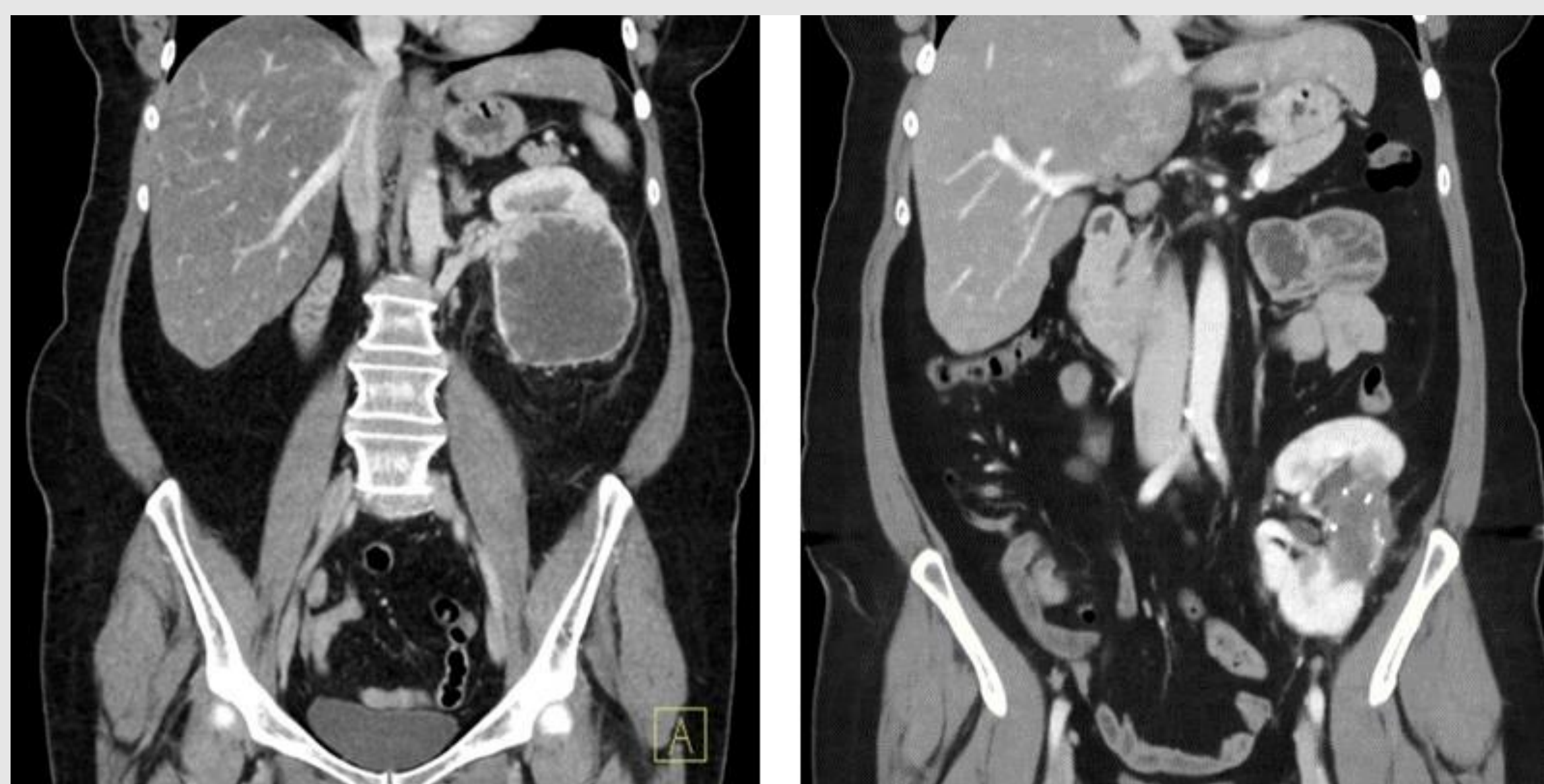


Fig. 2 Pre- and post-operative CT, venous phase

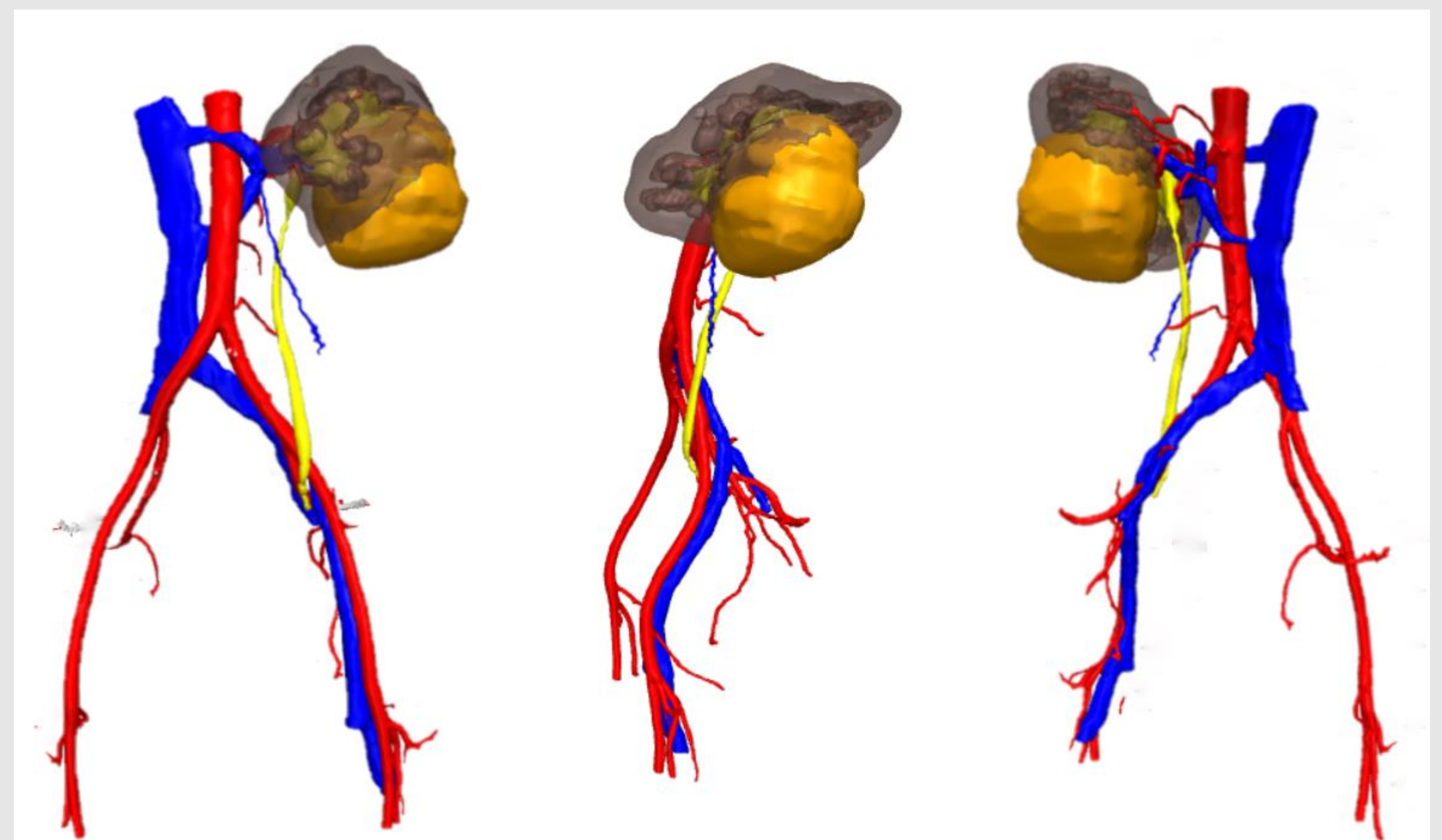


Fig. 1 3D model of the left kidney and RCC (yellow) in anterior, lateral and posterior view

Results

- Tumor Ø 88mm at diagnosis
- Reduced to Ø 74mm pre-operatively after neo-adjuvant therapy
- Total surgery time: 11 hours 20 minutes
- Warm ischemia time: 7 minutes
- Cold ischemia time: 3 hours 53 minutes
- Rewarming ischemia time: 48 minutes
- Clavien-Dindo grade II post-operative complication: 2 units packed cells
- Total hospital stay: 12 days
- Creatinine peak at day 2 (3,40 mg/dL)
- Spontaneous decrease after 3 weeks to normal preoperative range
- Pathology: clear cell ypT2b N0

Up to date

- 7 months postoperative
- Preserved kidney function
- No recurrence on imaging
- Continued arterial and venous renal flow
- High risk follow up schedule for RCC
- Regular imaging, clinical and biochemical check ups

Conclusion

- ✓ First case of eRAKAT in an oncological setting
- ✓ Complete tumor resection
- ✓ Preserved quality of life and kidney function
- ✓ Dialysis and allograft kidney transplantation was avoided

This technique is only recommend in very select RCC cases by experienced surgeons in a adequate center

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