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RADIOLOGY DIAGNOSTICS AT THE STAGES OF EXTRACORPORAL RESECTION OF A SINGLE KIDNEY IN TREATMENT OF RENAL CELL CANCER

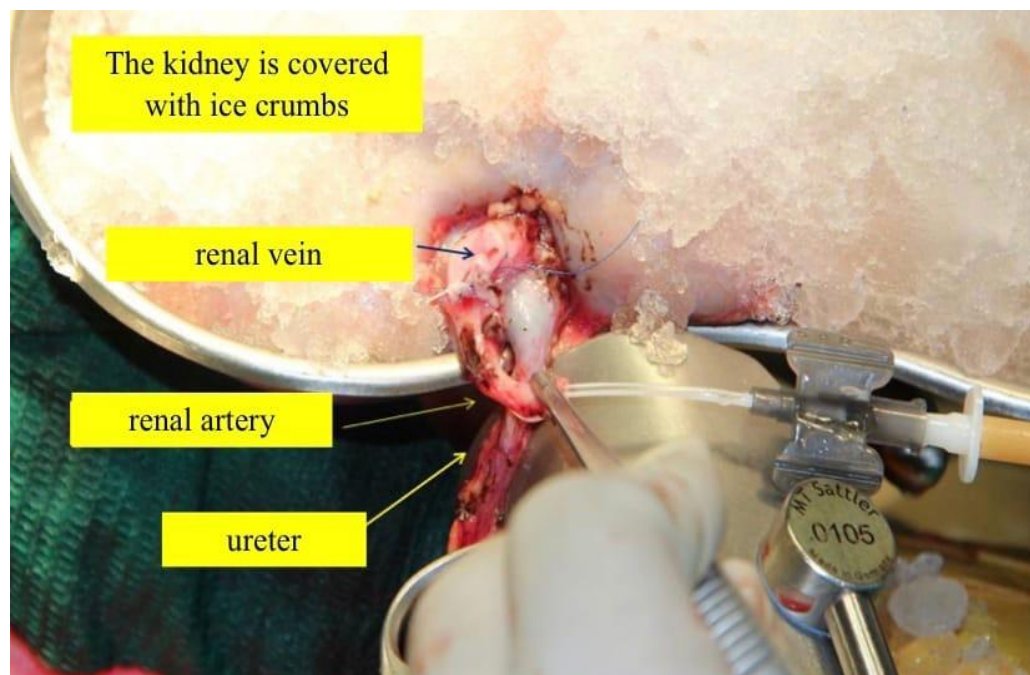
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INTRODUCTION

- ▶ Treatment of patients with cancer of a solitary kidney: an organ-sparing approach is preferable but doesn't always comply with the oncological radicalism.
- ▶ The technique of extracorporeal renal resection (ECRR) followed by autologous transplantation was developed to preserve renal function in patients with obligatory indications for organ-preserving treatment.

EXTRACORPORAL RESECTION OF KIDNEY WITHOUT CROSSING THE URETER WITH ORTHOTOPIC REPLANTATION OF VESSELS IN CONDITIONS OF PHARMACOCOLD ISCHEMIA



It should be noted! Currently, extracorporeal kidney resection is not widespread. One of the reasons is the possible development of a ureteral stricture. At A.V. Vishnevsky National Medical Research Center of Surgery, a technique has been developed for extracorporeal resection of the kidney without crossing the ureter with orthotopic replantation of vessels in conditions of pharmaco-cold ischemia.

PURPOSE

- ▶ to evaluate the results of ECRR with orthotopic reimplantation of renal vessels in conditions of pharmaco-cold ischemia in renal cell carcinoma (RCC);
- ▶ to determine the possibilities and the role of radiology diagnostic at the stages of surgery.

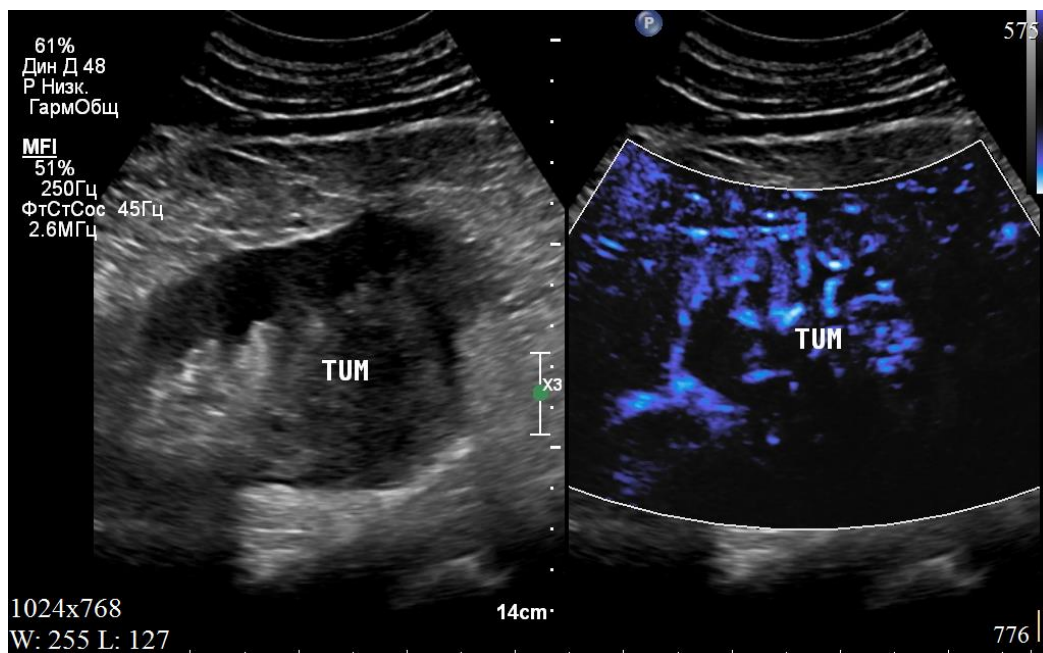
MATERIALS AND METHODS



- ▶ The study included **20 patients** treated with RCC in 2013-20 (average age 59.5 ± 8 years).
- ▶ Men prevailed (70%).
- ▶ Multiple primary metachronous cancer occurred in 14 (70%) cases, multiple primary synchronous cancer – in 2 (10%).
- ▶ Previous nephroureterectomy was performed in connection with benign kidney diseases (primary contracted kidney, hydronephrosis) – in 2 (10%), a congenital single kidney was in 2 (10%) patients.
- ▶ Previously underwent surgery on a single kidney for a malignant neoplasm of the same etiology for which 4 (20%) patients are being treated in this hospitalization.
- ▶ All of the patients underwent US and MSCT at the preoperative stage, in 7 cases MRI.
- ▶ Morphological verification of the lesions:
 - clear cell RCC - 18 (90%) cases;
 - papillary RCC - 1 (5%);
 - B-cell lymphoma - 1 (5%).

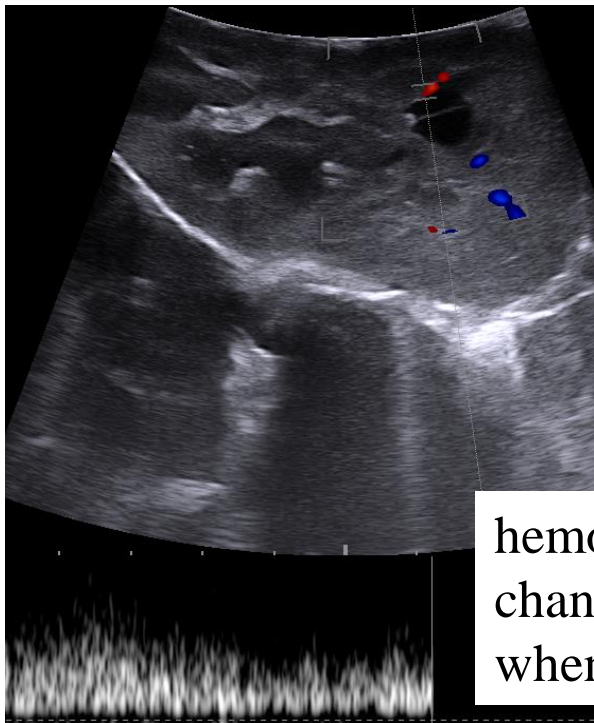
RESULTS

- ▶ Staging according to the TNM system: pT1a-T3vN0-2M0-1G1-3, of which the tumor size exceeded 7 cm in 10 (50%) patients. Distant metastases were in 8 (40%) cases. Reno-caval tumor thrombus was detected in 3 patients.



RESULTS

- ▶ Intraoperative ultrasound monitoring:
 - after nephrectomy - the rate of spread of Custodiol through the arteries of the kidney

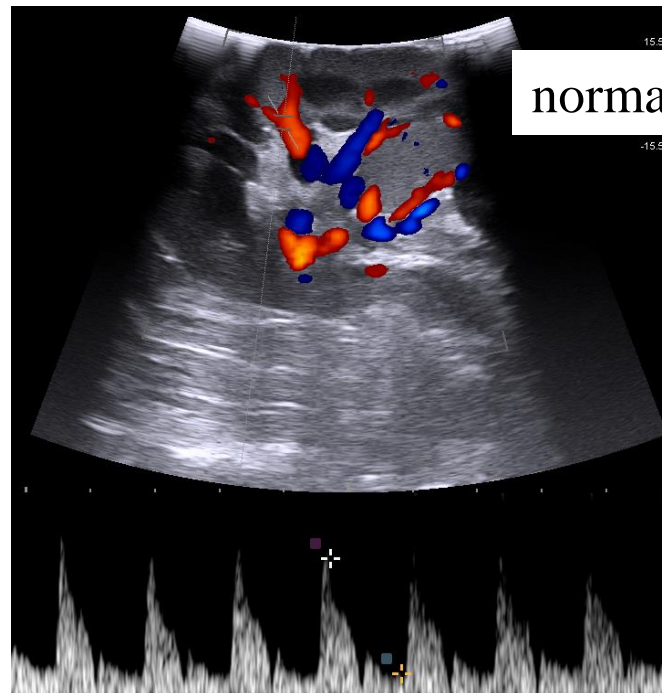


hemodynamically significant
changes in blood flow
when passing Custodiol

Intraoperative assessment of the passage of Custodiol through the intrarenal arteries revealed a low-velocity monophasic spectrum at the level of segmental arteries and the absence of filling at the level of interlobar and arcuate vessels.

RESULTS

- ▶ Intraoperative ultrasound monitoring:
 - after the stage of vascular reconstruction - qualitative and quantitative characteristics of blood flow through the intrarenal arteries.



normalization of blood flow

In 1 case thrombosis of an arterial prosthesis was diagnosed - an arteriotomy with thrombectomy was performed

RESULTS

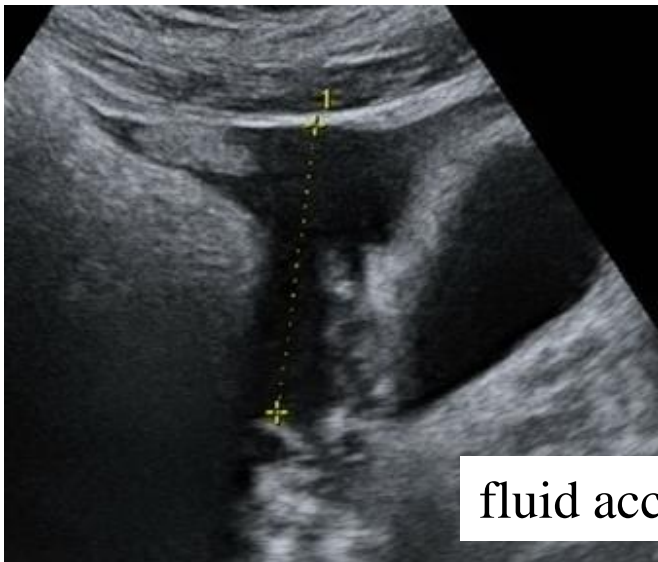
- ▶ The average duration of cold ischemia was 102.6 ± 42.7 min.
Bloodloss - 613 ± 300.1 ml.
- ▶ There were no intraoperative complications.
- ▶ In 3 cases, ECRR was performed simultaneously with thrombectomy and resection of the inferior vena cava for reno-caval tumor thrombus.
- ▶ In 4 cases, renal vessel replacement was performed.

RESULTS

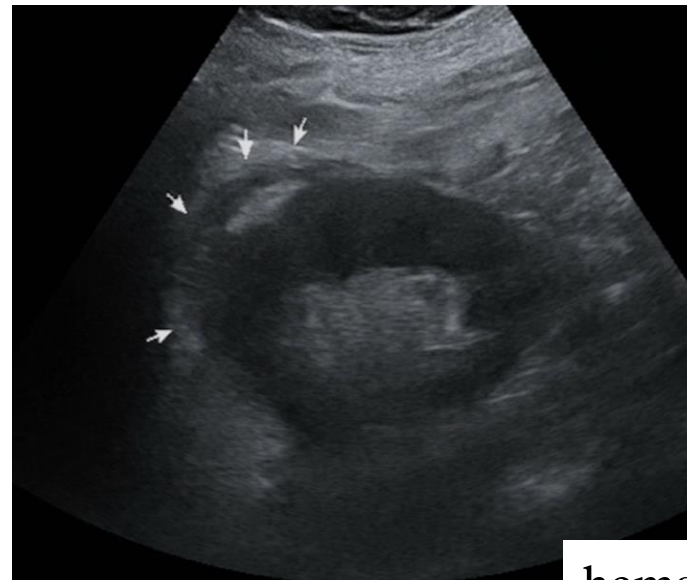
Early postoperative period

► Revealed:

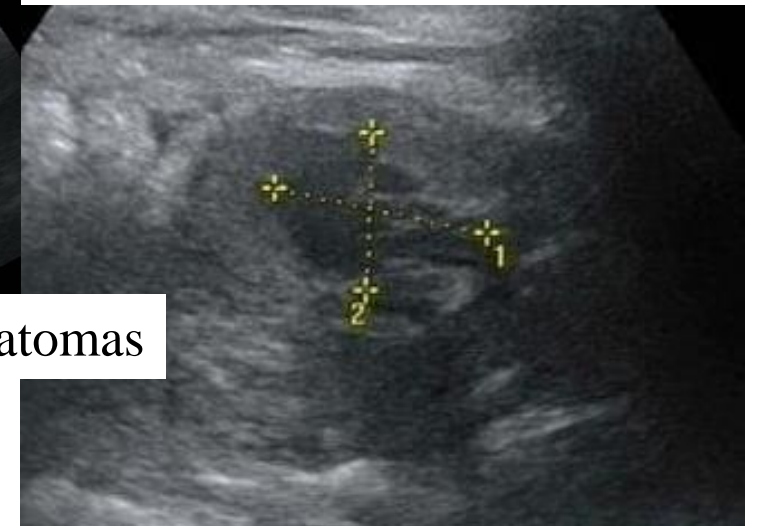
- fluid accumulations of various localization
- hematomas



fluid accumulations



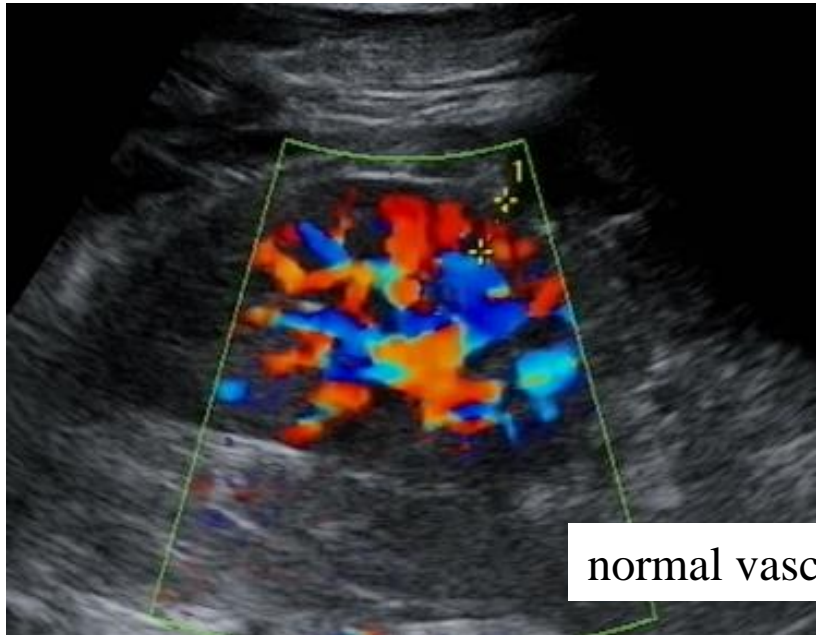
hematomas



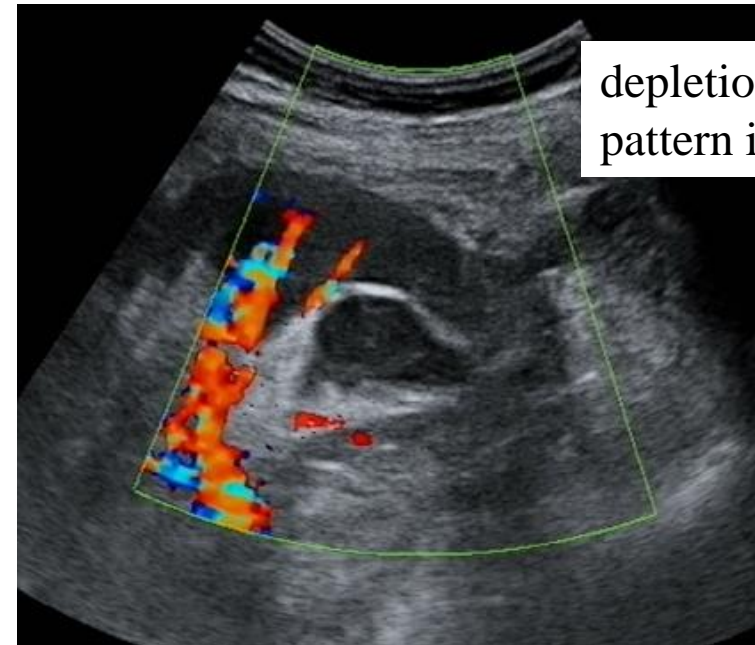
RESULTS

Early postoperative period

► Dynamic assessment of intraorgan blood flow



normal vascular pattern



depletion of the vascular pattern in the resection area

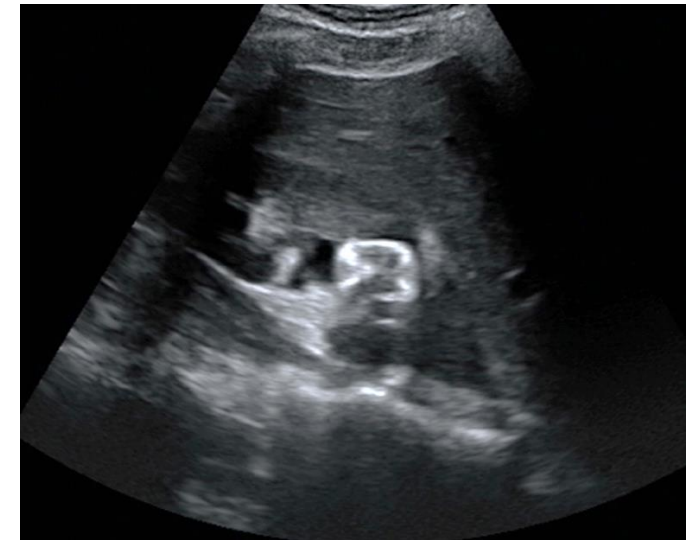
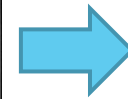
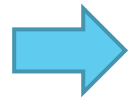
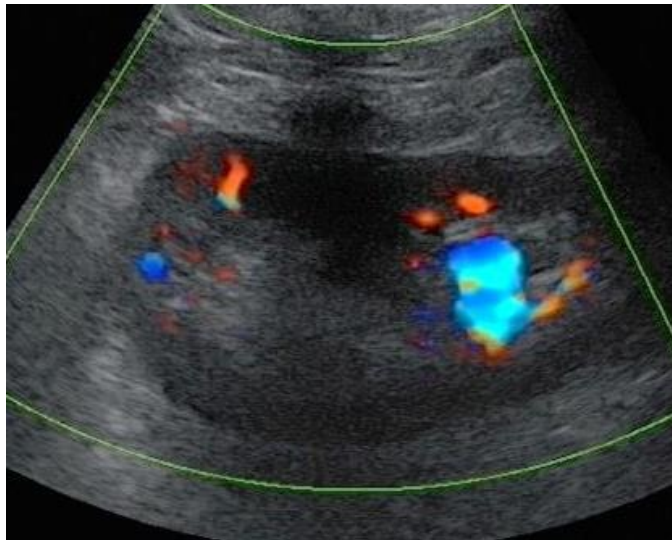
- In 8 cases, no hemodynamically significant changes in intrarenal blood flow were revealed.
- In 12 cases on the first day, a decrease in linear blood flow velocities and a decrease in acceleration time were noted, which indicated the presence of peripheral spasm.
- In 4 cases, normalization of blood flow didn't occur on its own, which was regarded as acute renal failure.

RESULTS

Early postoperative period

► Single observation:

- formation of arterio-venous-pelvic fistula - 1 (endovascular occluder installation)



RESULTS

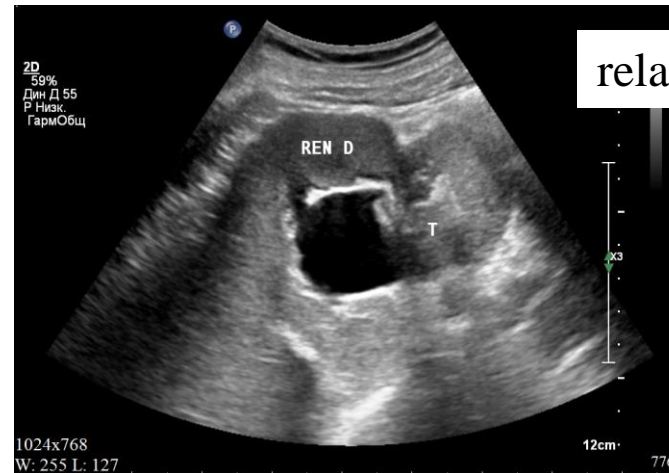
- ▶ Postoperative complications \geq grade II according to Clavien-Dindo classification were observed in 9 (45%) patients:
 - II - 1 (5%);
 - IIIa - 4 (20%);
 - IVa - 4 (20%).
- Complications of IVa degree were characterized by the development of acute renal injury (laboratory confirmed), which required renal replacement therapy.

RESULTS

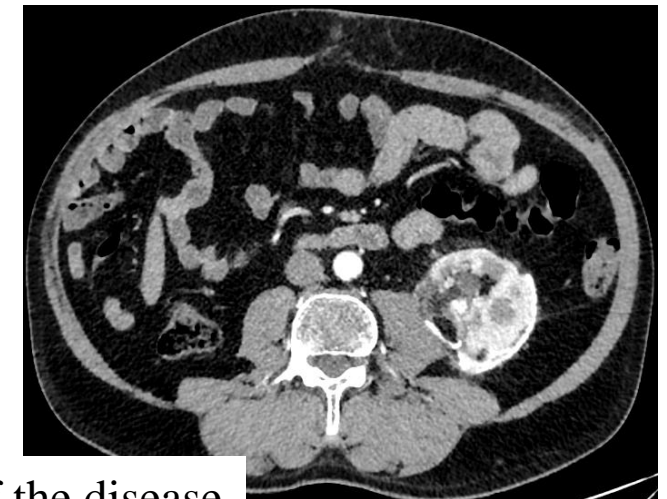
The follow-up period

- **The follow-up period** (US, MSCT) was 19-85 months (53.3 ± 17.2). Tumor progression occurred in 3 (15%) cases.

One patient died due to the progression of the tumor process 20 months after the operation.



relapse of the disease



relapse of the disease

CONCLUSION

- ▶ Radiology diagnostic methods make it possible to control all the stages of ECRR of a single kidney under conditions of pharmaco-cold ischemia with orthotopic replantation of renal vessels.
- ▶ Ultrasound examination comes to the fore in intraoperative monitoring and observation of patients in the early postoperative period, since it allows multiple examinations without the need for a nephrotoxic contrast agent.
- ▶ The results of ECRR in our modification obtained are satisfactory, which indicates the advisability of further development of organ-saving treatment.