Early Transplant Renal Artery Stenosis

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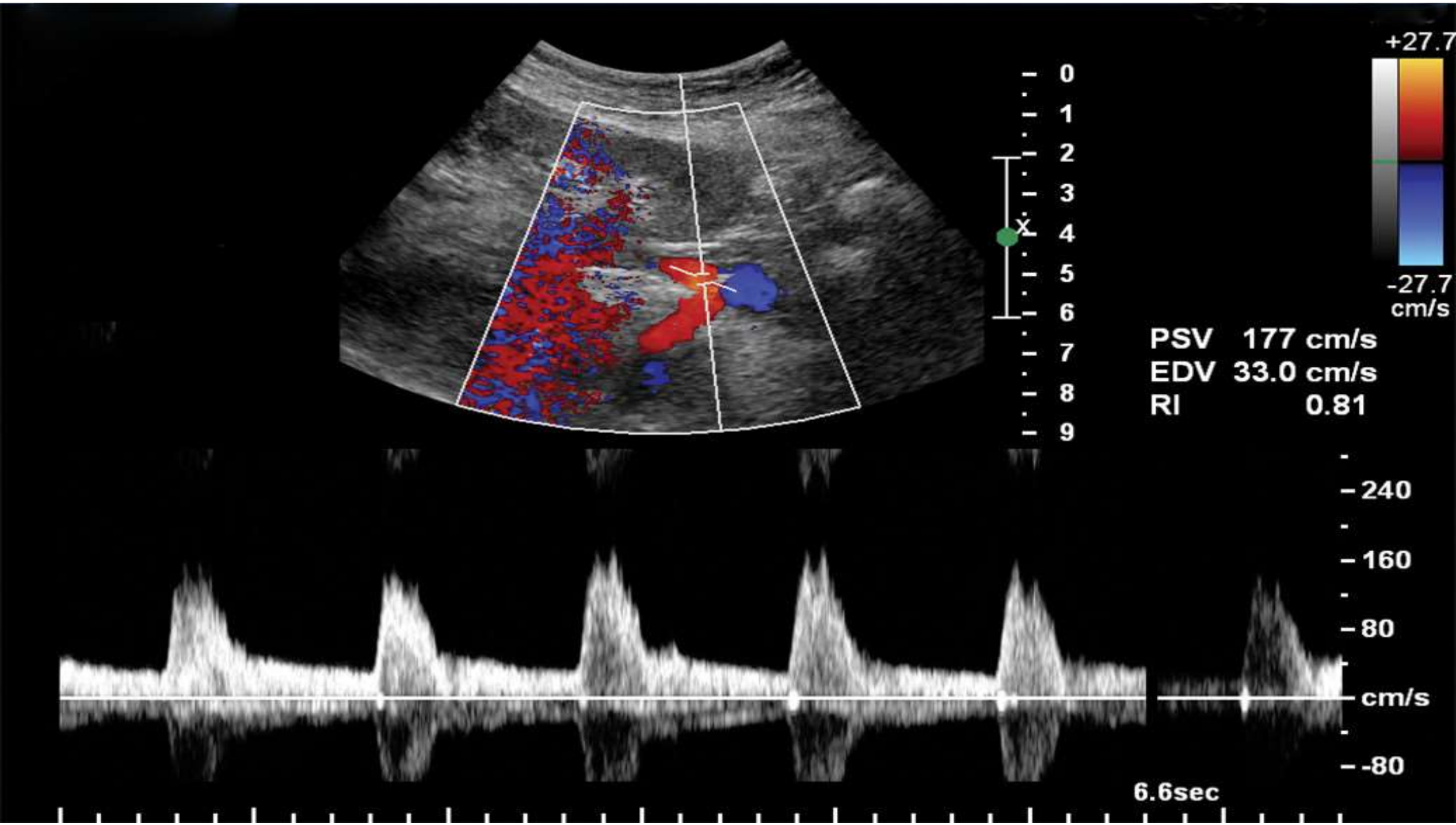
Case Presentation

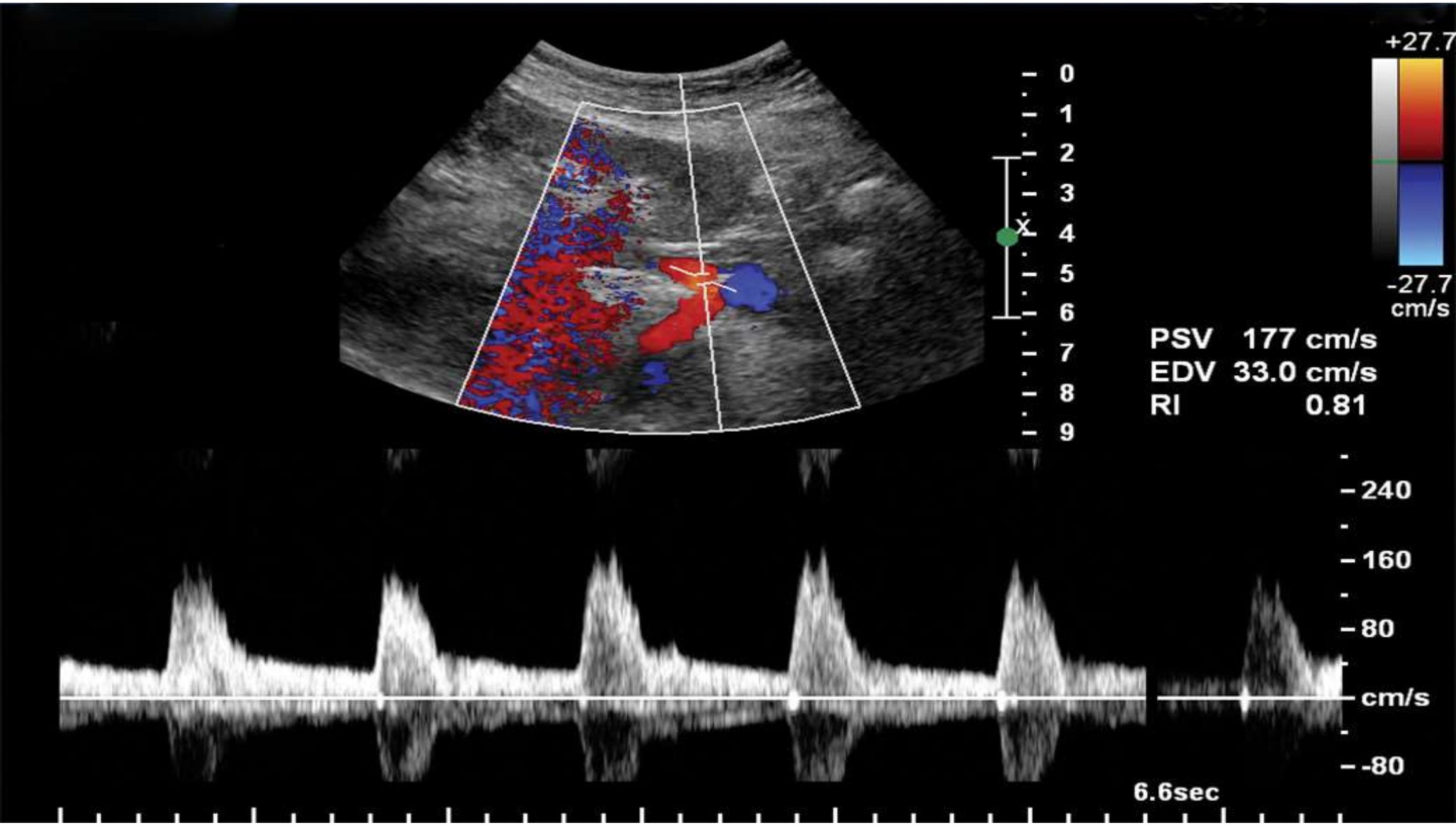
- 38 years old, male,
- Diagnosis: Chronic interstitial nephritis
  - Unspecified cause, biopsy-proven
- CKD stage 5, Hemodialysis since 2021
- Living related KTx (sibling) - 15.03.23
- Pretransplant crossmatching - Nonsensitized
- Induction immunosuppression - basiliximab
- Maintenance immunosuppression: Tacrolimus, MMF, methylprednisolone
- Early postoperative period – without complicactions
- Discharged – 06.04.2023


+27.7
-27.7
cm/s
PSV 177 cm/s
EDV 33.0 cm/s
RI 0.81
0
1
2
3
4
5
6
7
8
9
240
160
80
cm/s
-80
6.6sec

Creatinine level in the early post KTx period

Follow up visits

Date	Brief Description
24 APR 23	No complaints, feels good BP – 120/76 mm Hg Crea – 95 umol/l
15 MAY 23	BP – 146/92 mm Hg Crea – 95 umol/l Tacrolimus (Blood level - 6 ng/ml) Lercanidipine was prescribed for hypertension
25 MAY 23	Creatinine – 115 umol/l BP – 150/90 mm Hg Lercanidipine and Moxonidine was prescribed for hypertension
06 JUN 23	Creatinine – 108 umol/l BP – 160/95 mm Hg Lercanidipine and Moxonidine was prescribed for hypertension
22 JUN 23	Worsening of arterial hypertension Perindopril was added


+27.7
-27.7
cm/s
PSV 177 cm/s
EDV 33.0 cm/s
RI 0.81
0
1
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3
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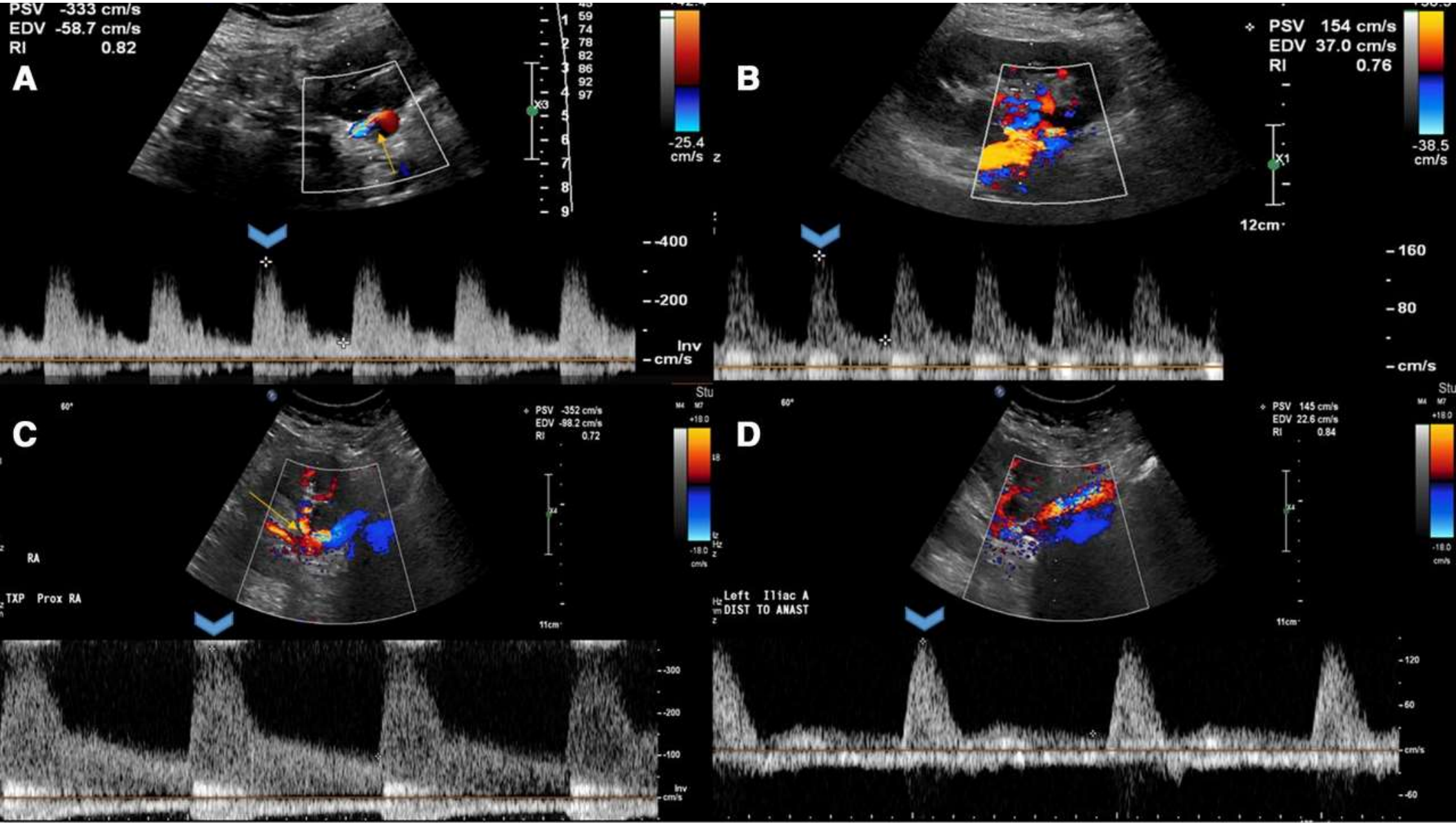
7
8
9
240
160
80
cm/s
-80
6.6sec

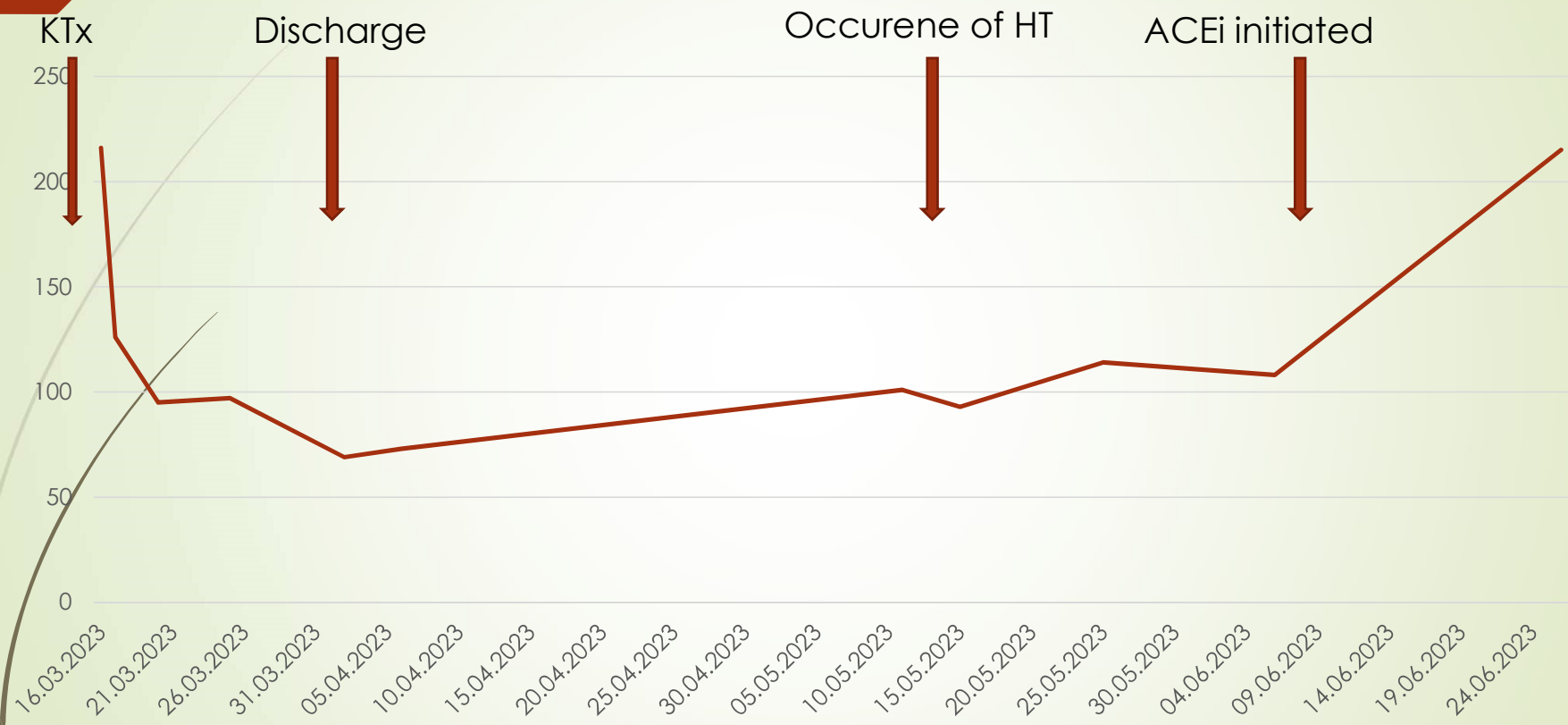
0n 26.06.23 after starting of ACF

- T/A180/100 mmHg
- Crea-191 ummol/l
- RI-0.30-0.37
- Antihipertensive Therapy: Lercanidipine 10 mg , Moxonidine 0.4 mg , Perindoprile 5.0 mg- for hypertension

On the basis of available anamnesis and studies, the presence of stenosis of the graft artery was suspected


A
PSV -333 cm/s
EDV -58.7 cm/s
RI 0.82
-25.4 cm/s
-400
-200
Inv cm/s
B
PSV 154 cm/s
EDV 37.0 cm/s
RI 0.76
-38.5 cm/s
12cm
160
80
cm/s
C
PSV -352 cm/s
EDV -98.2 cm/s
RI 0.72
RA
TXP Prox RA
11cm
-300
-200
-100
Inv cm/s
D
PSV 145 cm/s
EDV 22.6 cm/s
RI 0.84
Left Iliac A
DIST TO ANAST
11cm
120
60
cm/s
-60

Creatinine level changes – cont'd

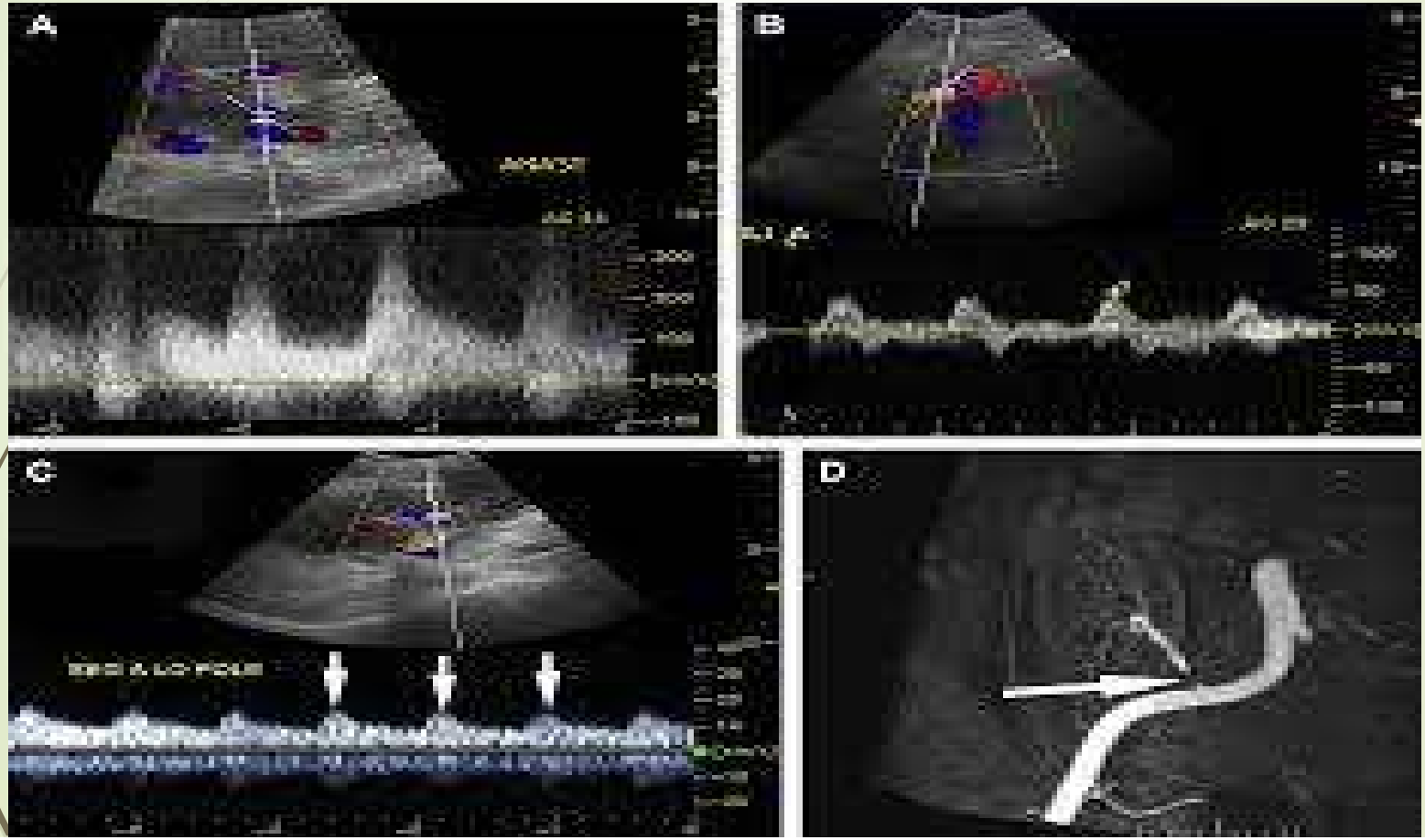


27.06.23

The patient was consulted by an angiologist, underwent Doppler imaging - a hemodynamically significant stenosis of the transplanted kidney was detected.

Crea- 215 ummol/l, **GFR- 34 ml/min/1.73 m^2**

RTAS



On 30.06.23 renal artery stenting was performed

after surgery **T/A 140 /80 mmHg**

On 01.07.23

Creatinine – 97 ummol/l GFR-88 ml/min/1,73m^2 (CKD-EPI 2021),

Laboratory results before and after after surgery

Before

- Creatinine -215 ummol/l GFR-34 ml/min/1,73m^2 (CKD-EPI 2021),
- T/A210/110 mmHg

After

- Creatinine – 97 ummol/l GFR-88 ml/min/1,73m^2 (CKD-EPI 2021),
- T/A 125/80 mmHg (without antihypertensive therapy

- **IS: Tacrolimus (Blood level - 6 ng/ml), MMF (500 mg b.i.d since transplant), methylprednisolone 4mg,**

Creatinine level changes – cont'd

Transplant renal artery stenosis

CLINICAL FEATURES

- Renal artery stenosis symptoms don't often appear early and can be difficult to distinguish, even as the condition progresses. In some cases, a patient has no symptoms. Common symptoms of renal artery stenosis include:
- Sudden onset of hypertension
- Hypertension not responsive to three or more blood pressure medications
- Increased urea (waste product excreted by the kidneys) in the blood
- Unexplained kidney failure or worsening kidney function during treatment for high blood pressure
- Sudden kidney failure upon first taking an angiotensin-converting enzyme (ACE) inhibitor medication
- Recurrence of flash pulmonary edema (FPE), a build-up of fluid in the lungs

Causes for RTAS

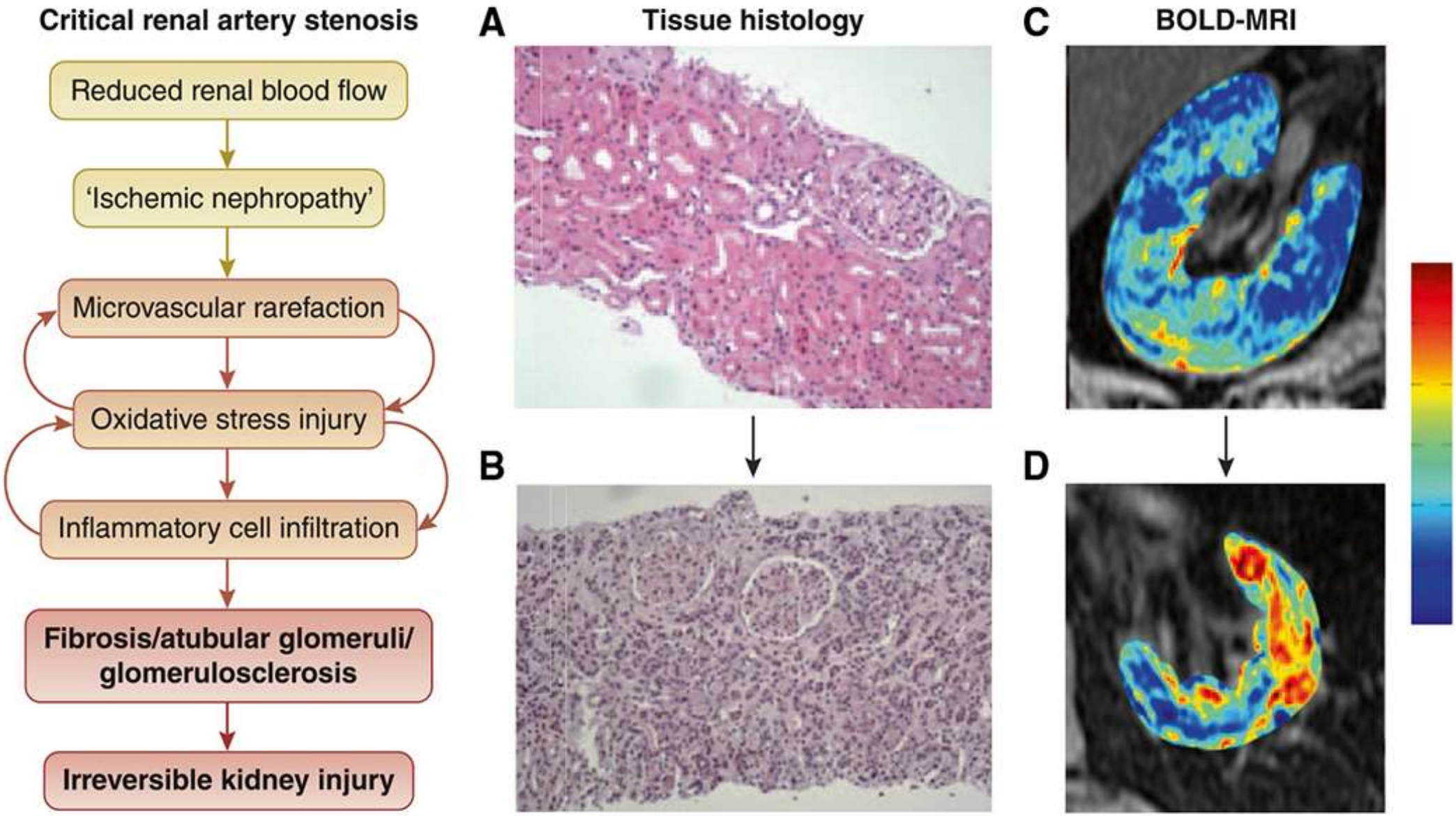
- The first one is atherosclerosis in the donor or recipient artery
- The second one is incorrect suture technique,, which causes localized stenosis confined to the suture line.
- The third one is traumatic reasons which include damage to donor artery
- The other predisposing factors include increased cold ischemia time
- cyclosporine toxicity
- an immunologic cause
- cytomegalovirus infection

Risk factors of transplant renal artery stenosis in kidney transplant recipients

- Delayed graft function increases more than 3 times the chance of developing TRAS.

- Diabetes mellitus

  Diabetes mellitus and DGF(**Delayed graft function**) are independent risk factors for post-anastomotic TRAS.


Critical renal artery stenosis
Reduced renal blood flow
'Ischemic nephropathy'
Microvascular rarefaction
Oxidative stress injury
Inflammatory cell infiltration
Fibrosis/atubular glomeruli/ glomerulosclerosis
Irreversible kidney injury
A
Tissue histology
B
C
BOLD-MRI
D

Kidney transplant recipients suffering from 1 or more of the following 3 symptoms should be suspected of TRAS:

- 1.Increase in serum creatinine (Scr) level and decline in renal allograft function for unknown reason.
- 2.Refractory hypertension for unknown reason.
- 3.Decrease in urine volume or fluid retention for unknown reason.

Transplant renal artery stenosis caused by the stretch of an artey branch: a case report and literature review

•Xiaohang Li, Jialin Zhang, Yiman Meng, Lei Yang, Fengshan Wang, Baifeng Li & Xitong Zhang
BMC Nephrology **volume 19**, Article number: 56 (2018) Cite this article

Published: 09 March 2018

conclusion

- When refractory hypertension and allograft dysfunction are presented posttransplantation, TRAS should be suspected.
- Color Doppler ultrasonography as a non-invasive examination may provide some valuable information, threedimention CT can be useful for further diagnosis, but is seldom necessary.
- Arteriography provides the definitive diagnosis of TRAS.
- Percutaneous transluminal stent implantation treatment of TRAS has high success rate with minimal invasion and complications.
- When an artery branch situated on the stenosis, a bare stent rather than covered stent is the preferred choice.

Question