Acute Renal Artery Occlusions: Causes; How to Treat and How Long after an acute occlusion Can Kidneys be Salvaged With Good Function.

Samy S. Nitecki, MD
Department of Vascular Surgery and Transplantation
Rambam Health Care Campus.

BACKGROUND

- Acute renal artery occlusion is an uncommon finding leading to renal ischemia and infarction.
- The major types:
  - Embolic Occlusion
    - Caused by: Atrial fibrillation, MI, Plaque Rupture, Bacterial Endocarditis or a Cardiac Myxoma
  - Dissection
    - Spontaneous, following trauma, iatrogenic injury
  - Thrombosis
    - Thrombophilia, Atherosclerosis, Arteritis, Aneurysm, Fibromuscular Dysplasia

Presentation

- Nonspecific
- Abdominal, back or flank pain
- Nausea, vomiting
- Hypertension
- Hematuria, anuria
- elevated WBC, CRP, LDH. Proteinuria.

Ischemic Time

- Renal arteries are END arteries
- Occlusion → infarction.
- ischemic time is of paramount importance.

When harvested for transplantation kidneys are washed and stored in cold preservation solution (cold ischemia)

Treatment

- Medical:
  - Anticoagulants
- Interventional:
  - Nephrectomy
  - Open Surgery
  - Endovascular Treatment
Open surgery has dismal results: successful in 25-35%. There is a 65% risk for nephrectomy. 57% will have hypertension. (Lopera JE et. al. J. Vasc Interv 2011)

In patients operated after trauma, renal function did not occur, despite reperfusion within 6 hours (David et. al. JVS 1987)

Warm Ischemia

Animal studies have shown that a renal unit can fully recover from warm ischemic time up to 120 minutes. (Laven BA et. al. J. Urol 2004)

The effect of warm ischemic time on glomerular filtration was studied during laparoscopic partial nephrectomy. A warm ischemic time of 40 minutes was found as cutoff for renal function recovery. (Godoy G et. al. J. Urol 2009)

Our Data

In the last 5 years, 12 patients were treated by endovascular technique for acute renal artery occlusion.

There were 8 males and 4 females with a mean age of 23 years (range 8-48).

1 hemorrhage, 2 thrombosis, 2 dissections, 7 intimal flaps.

Warm ischemic time averaged 3.8 hours (range 2-8 hours).
Renogram: 47% function

Traumatic Rt. Renal Occlusion, 16 year-old male

A large hematoma

Bleeding -> embolization

Blood vessels distal to occlusion

6 hrs.
A 14 year-old child with blunt trauma and flank pain

Reconstitution of the right renal artery 4 hrs. after trauma

Good angiographic result but only 11% function in renogram

Renal artery thrombosis in a 48 year-old male with PVD and flank pain

A 52 year-old male with PVD
CONCLUSIONS

• Complete acute renal artery occlusion results in renal infarction. Warm ischemia of approximately 40 minutes is the cutoff for renal function recovery after revascularization.

• Conservative treatment is warranted for acute unilateral complete renal artery occlusion.

• Aggressive expeditious interventional renal revascularization is advised for bilateral renal artery occlusion or a unilateral occlusion in a solitary kidney.

• Incomplete occlusion, accessory arteries and collateral flow allow for longer warm ischemic time for renal function recovery.

• Endovascular treatment is feasible in most cases. However, good renal function can be achieved only in a selected group of patients.

• Following treatment 30% need a delayed nephrectomy for uncontrolled hypertension.

Thank you!