

CAIR Case of the Month

Case courtesy of Drs L. Bilodeau, V. Caty
& A. Samak

Université 
de Montréal

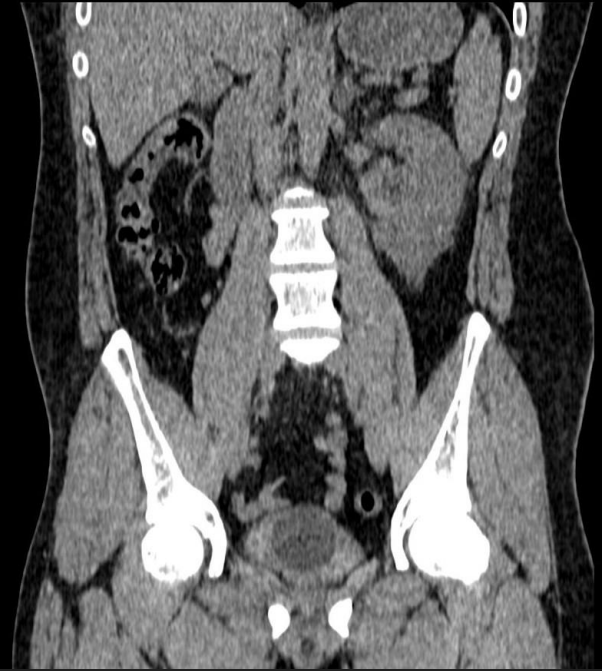
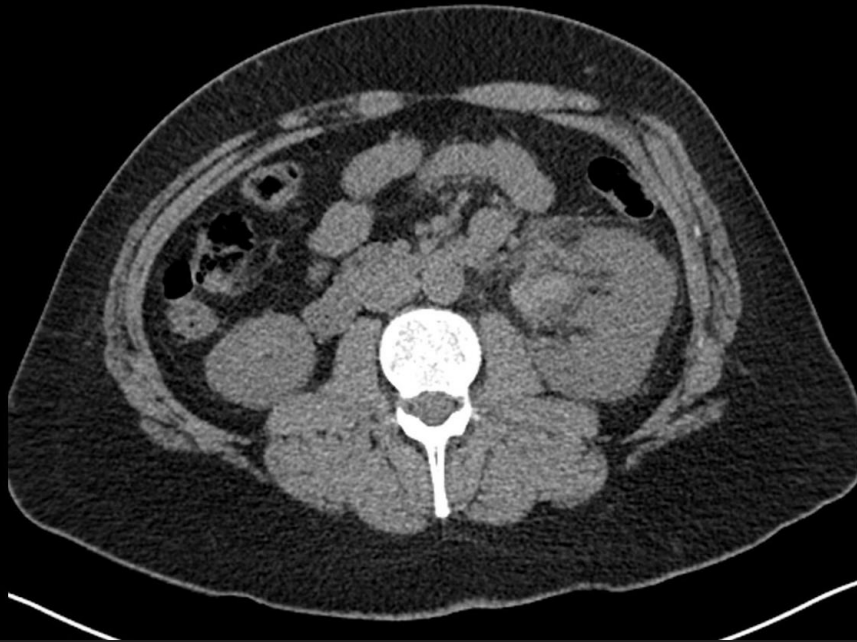


Case Presentation

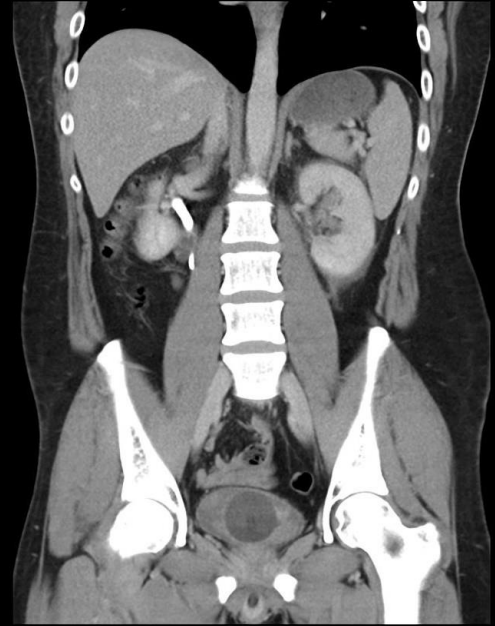
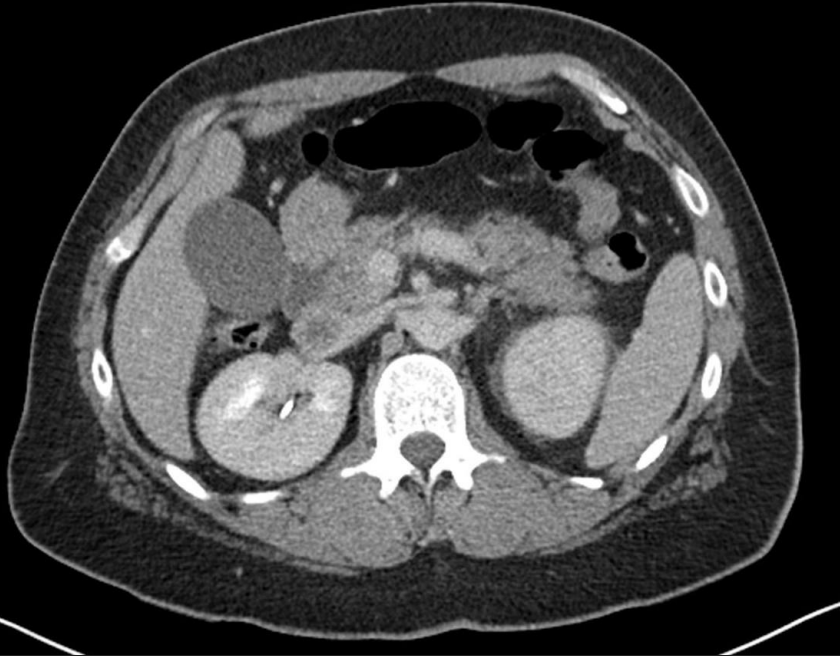
- 38 year-old male presents to the ER with a severe right flank pain and macroscopic hematuria

- No significant past medical history
- Vitals signs are normal
- Unremarkable physical exam
- Labwork:
 - mild leukocytosis (WBC=14)
 - electrolytes and creatinine are normal

NECT + CT Urogram



NECT + CT Urogram





NECT + CT Urogram

- No renal or ureteral stone
- Dense material in the left upper urinary tract and in the bladder compatible with blood
- Moderate hydronephrosis
- No opacification of the left upper urinary tract
- 50% caliber reduction of the left renal vein between the aorta and the SMA

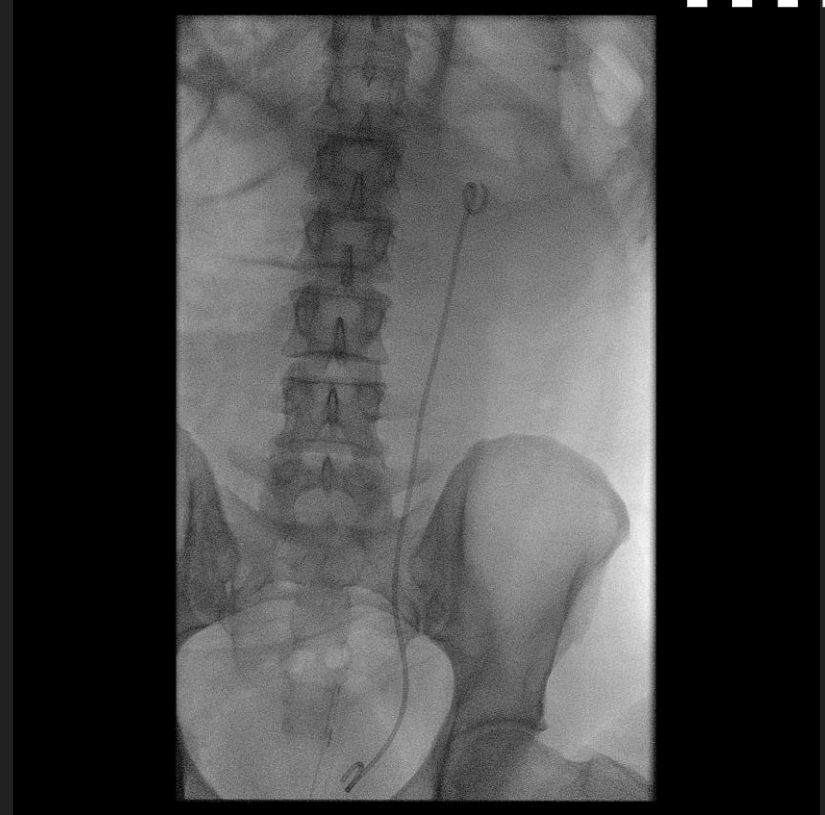




The next day

Patient was scheduled for a Double J stent

- After deployment, there was significant bright red blood flowing from the stent
- On the x-ray, the stent was in good position

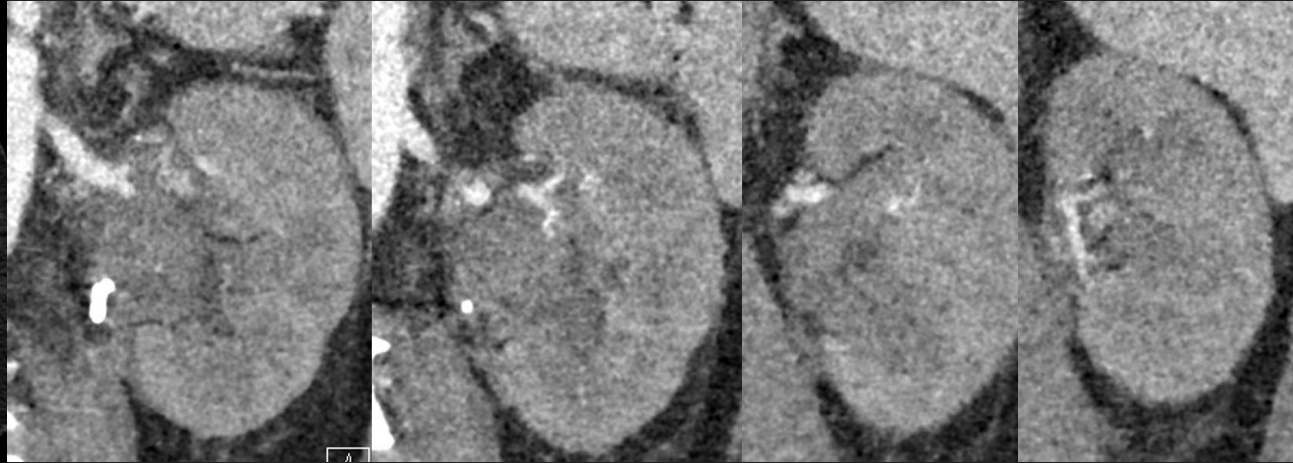




After the Double J Stent

- The patient was still in pain and bleeding
- His Hgb level dropped from 130 → 100 → 90 → 80 → 72
- **Supplemental evaluation by arterial CT for persistent hematuria**

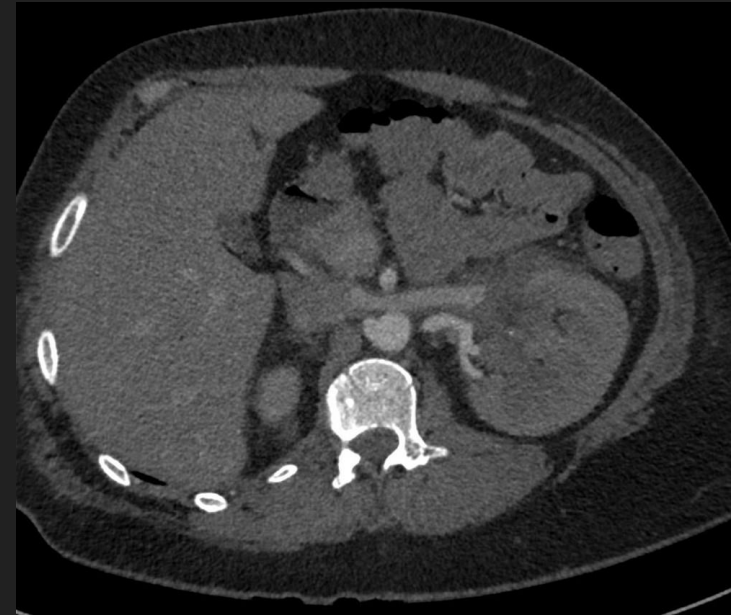
Arterial CT





Arterial CT

- Ureteral stent in good position
- Persistent blood clots with moderate hydronephrosis
- No contrast extravasation
- No aneurysm or arterial dissection
- Opacification of the left renal vein without compression by the SMA
 - no Nutcracker syndrome



Angiography



- Right femoral approach
- A 4 French Cobra catheter was positioned in the left renal artery
- Angiogram demonstrated a nidus of tortuous vessels in the middle third of the left kidney, with early opacification of the renal vein
- A renal arteriovenous malformation was suspected



Microcatheterization



The catheter was exchanged for a HeadHunter catheter and we used a Renegade HiFlo microcatheter to catheterize the segmental renal artery



Microcoils



Through the microcatheter, two 4 mm Concerto microcoils were detached in the nidus



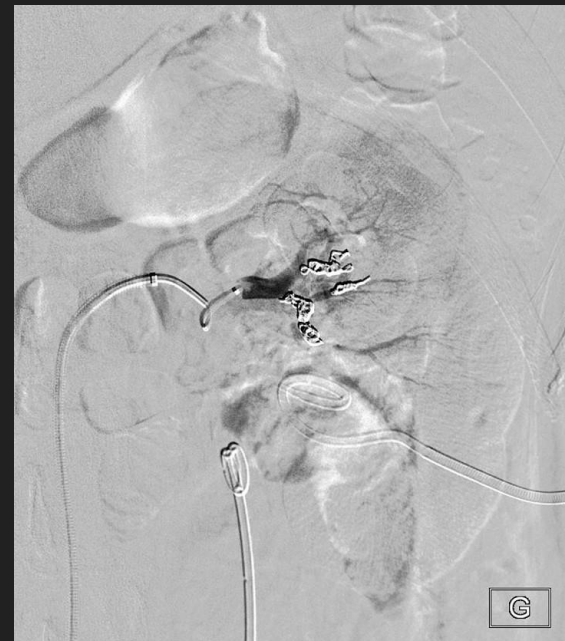


We exchanged the sheath for a 6 French RDC for optimal stability and used the HeadHunter with the Renegade HiFlo to catheterize inferior segmental arteries, which demonstrated other branches contributing to the AVM nidus





More Concerto microcoils
were used to coil the other
branches of the AVM
nidus





Post-Embolization Angiogram

Post-embolization angiogram demonstrates decreased early opacification of the renal vein, with exclusion of most of the AVM nidus

Deliberate partial embolization was performed to limit the amount of renal infarction, knowing that we could embolize more branches afterwards, if necessary





Outcome

The patient stopped bleeding for a few days and then the bleeding resumed, so repeat embolization was performed to treat the remaining branches of the nidus.

A few more arterial branches were embolized, but the more we coiled, the more we discovered additional arterial feeders. We decided to call a friend, Dr. Gilles Soulez, and he suggested that we embolize with Onyx and a neuro balloon.

This part of the procedure is still pending.



Natural History of Renal AVMs

- Congenital renal AVMs are rare, with reported incidence of 0.04% at autopsy
 - Acquired AVMs are more frequent, usually iatrogenic (renal biopsy)
- More frequent in women (3:1)
- 75% of the cases present with hematuria \pm flank pain due to urinary obstruction
 - May present with hypertension or heart failure



Other Possible Treatments

Interventional embolization with:

- Absolute ethanol embolization
- Onyx
- Polyvinyl alcohol
- NBCA glue

Surgical:

- Total or partial nephrectomy (mainly for AVMs due to malignancy)



References

- Dyer, R. B., Chen, M. Y., Zagoria, R. J., Regan, J. D., Hood, C. G., & Kavanagh, P. V. (2002). Complications of ureteral stent placement. *Radiographics*, 22(5), 1005-1022
- Hwang, J. H., Do, Y. S., Park, K. B., Chung, H. H., Park, H. S., & Hyun, D. (2017). Embolization of Congenital Renal Arteriovenous Malformations Using Ethanol and Coil Depending on Angiographic Types. *Journal of Vascular and Interventional Radiology*, 28(1), 64–70.
doi:10.1016/j.jvir.2016.09.004
- Hatzidakis, A., Rossi, M., Mamoulakis, C., Kehagias, E., Orgera, G., Krokidis, M., & Karantanias, A. (2014). Management of renal arteriovenous malformations: a pictorial review. *Insights into imaging*, 5(4), 523-530.