Endovascular treatment of solid organ trauma

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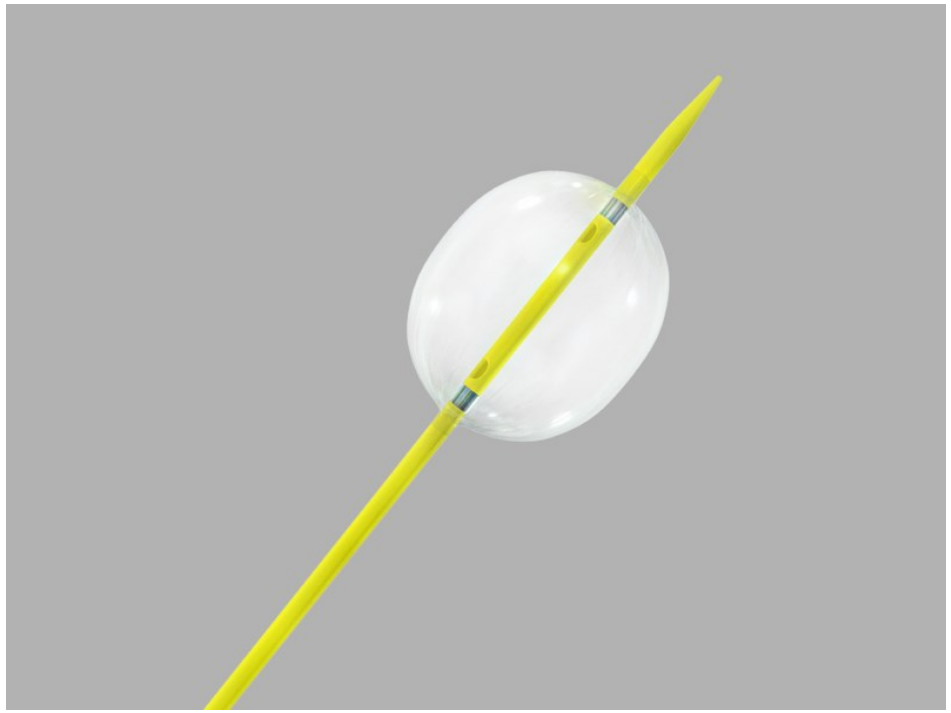
2024-06-12

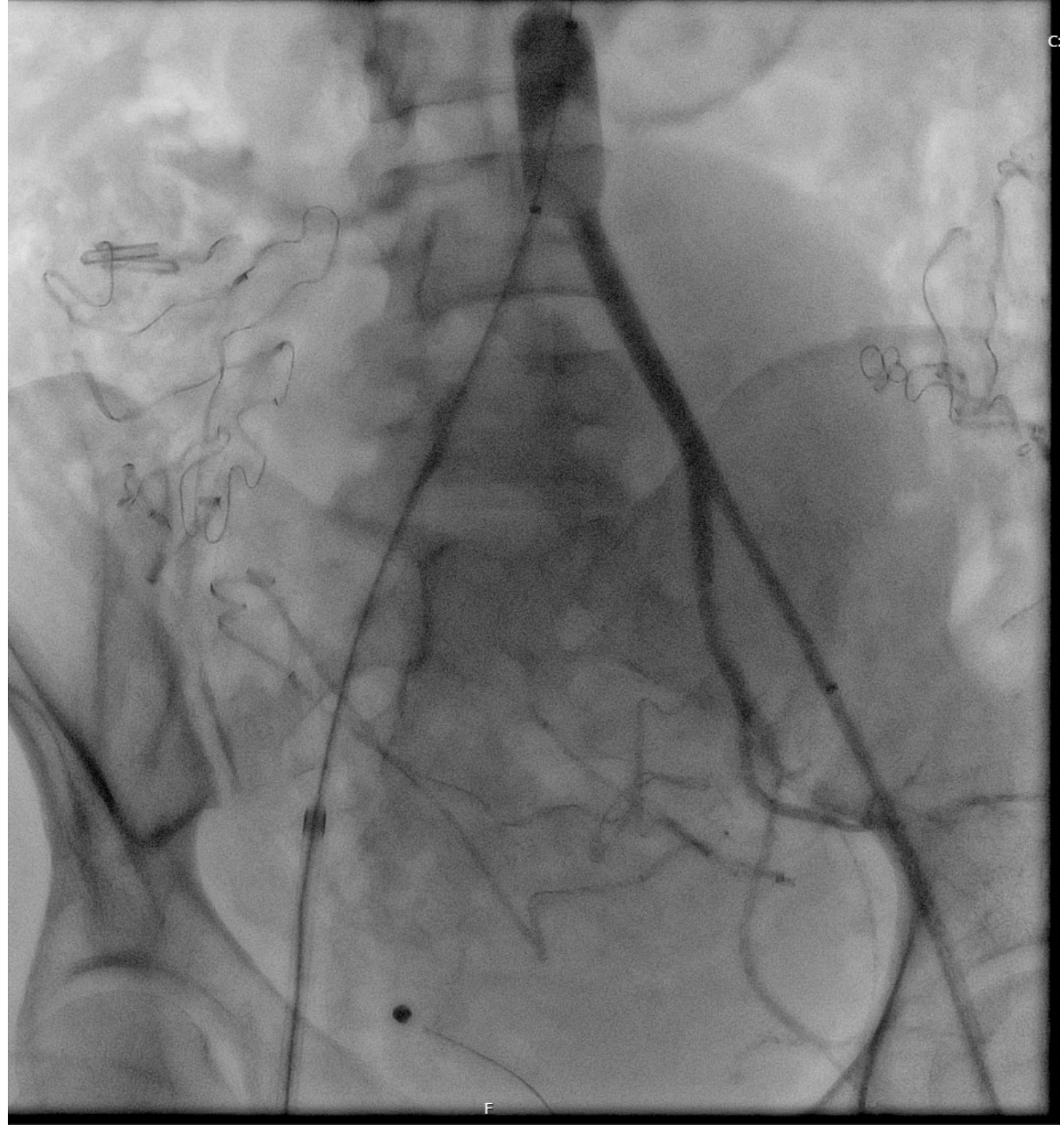
What are our options for embolization/hemostasis?

- Occlusion balloon
- Coils
- Plugs
- Gelfoam
- PVA- Plastic particles
- Stentgraft
- Liquid glue/Onyx

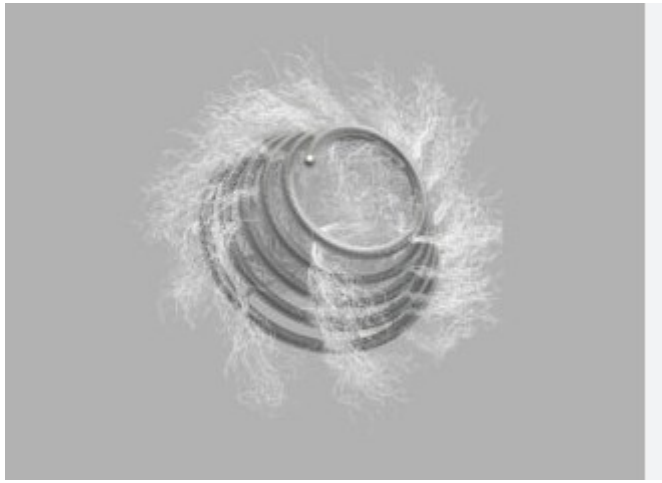
Occlusion balloon

- In major bleedings where quick occlusion of aorta or iliacs is needed. Not so much used in solid organ trauma.

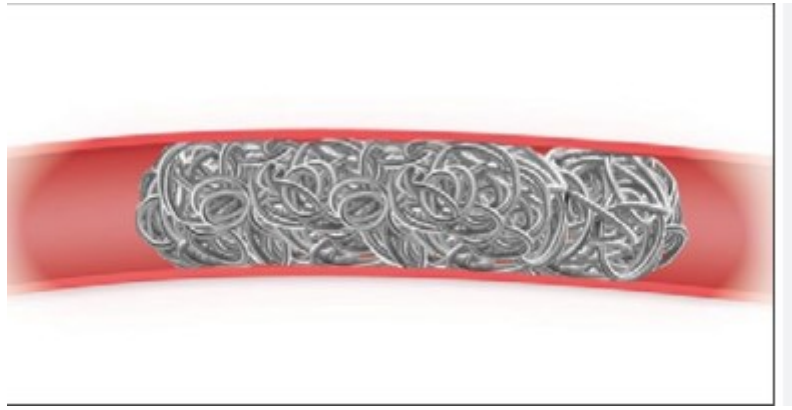




Coils

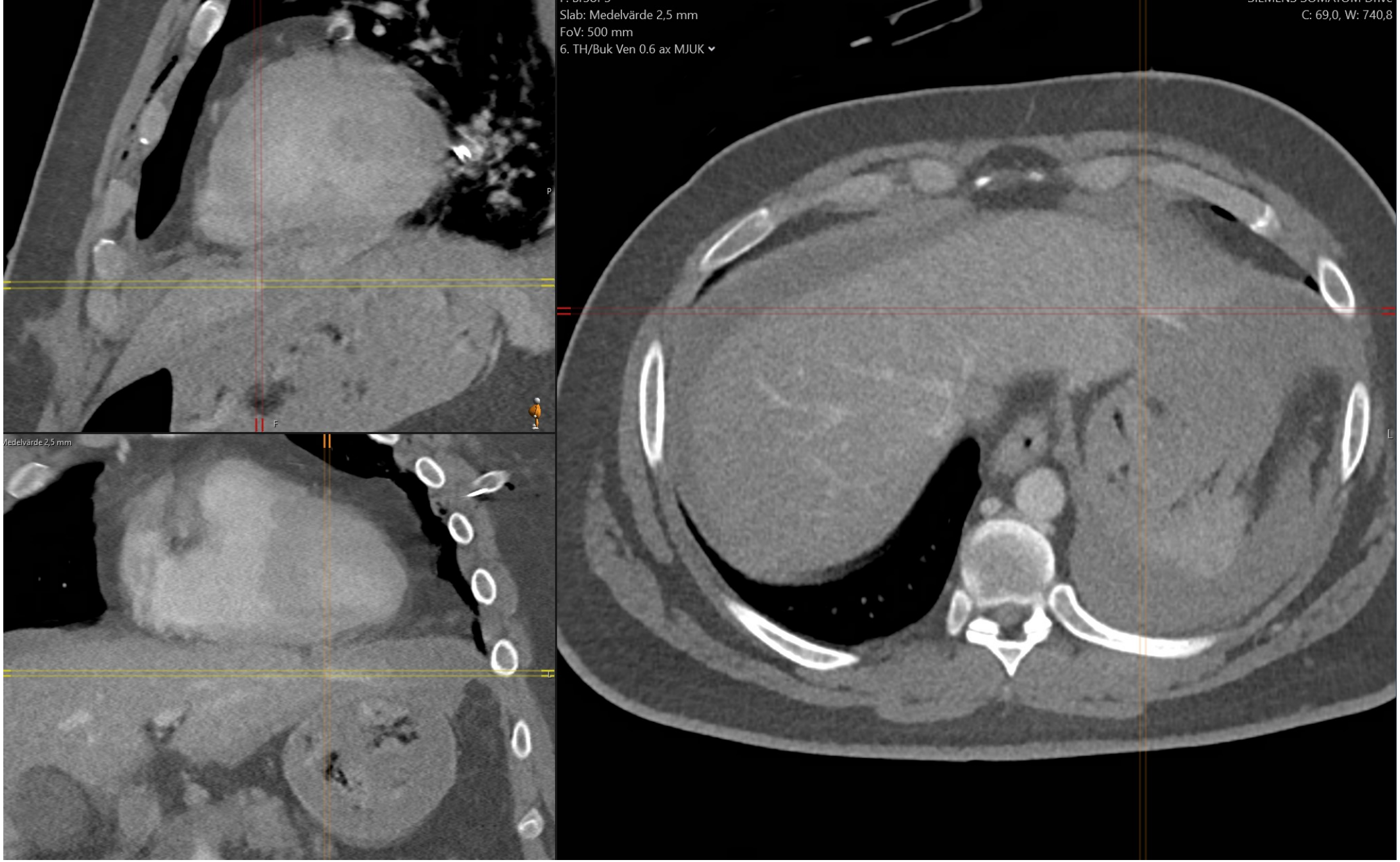


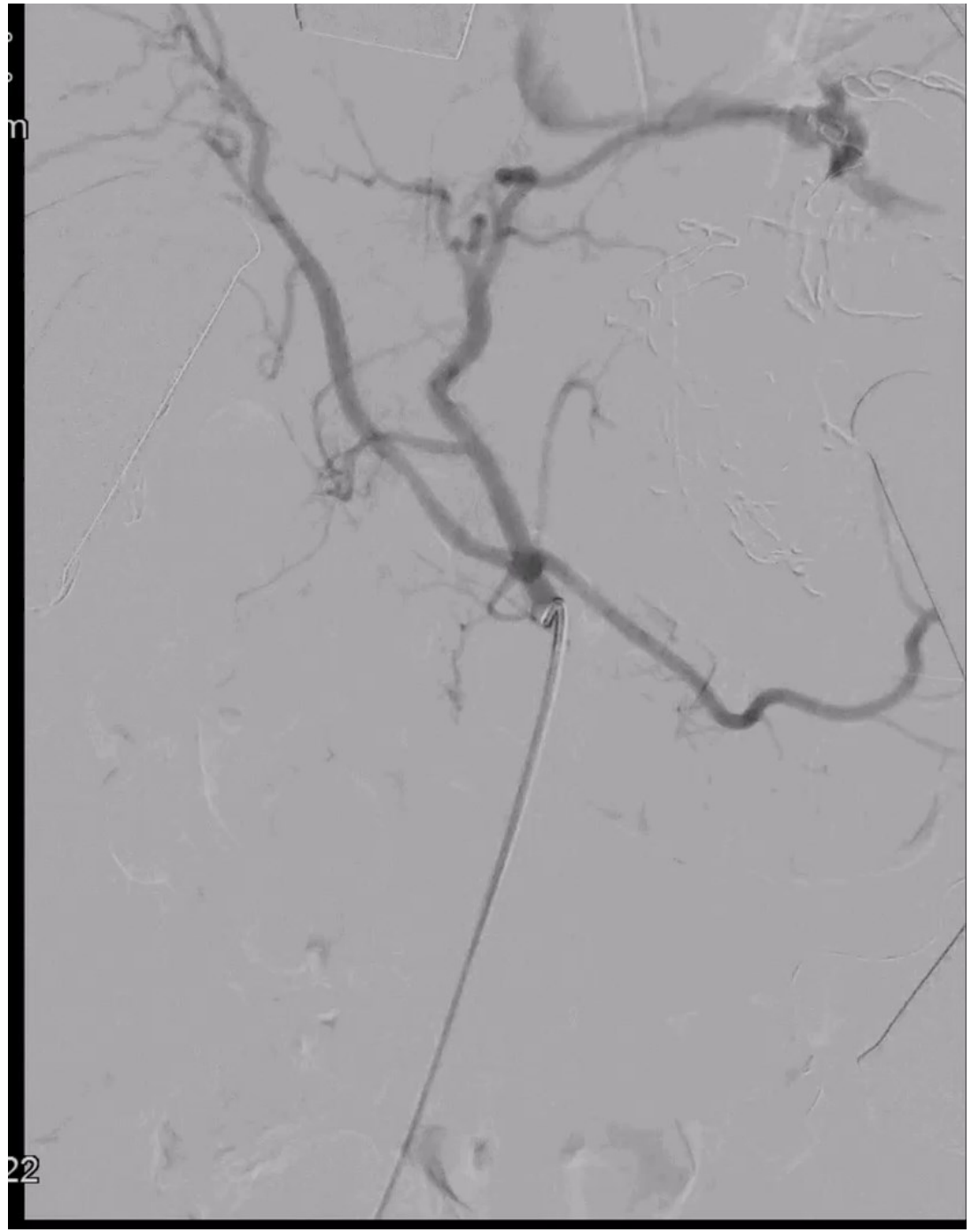
- Most common.
- Platinum threads, often with nylon interwoven
- Comes in different sizes and shapes.
- Detachable or ”push and prey”



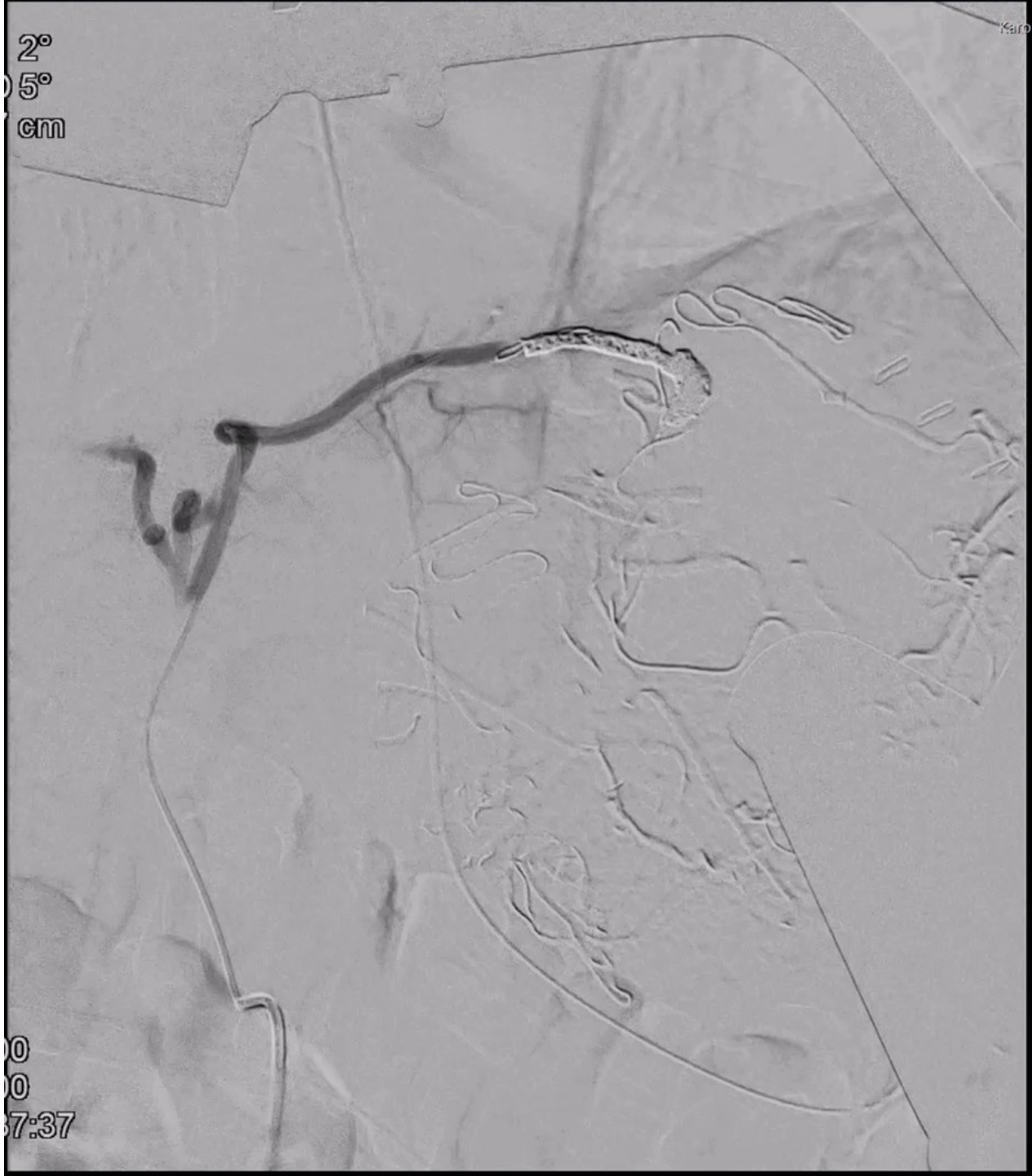
Coils

- 40 yo male. Stabbed through upper abdomen with profuse liver bleeding segment 2.
- ”Impossible” to reach from abdominal approach
- Packing unsuccessfully with ongoing bleeding
- Temporary Pringle manoeuvre (clamping of hepatoduodenal ligament) with reduced bleeding
- Total blood loss 15 liter

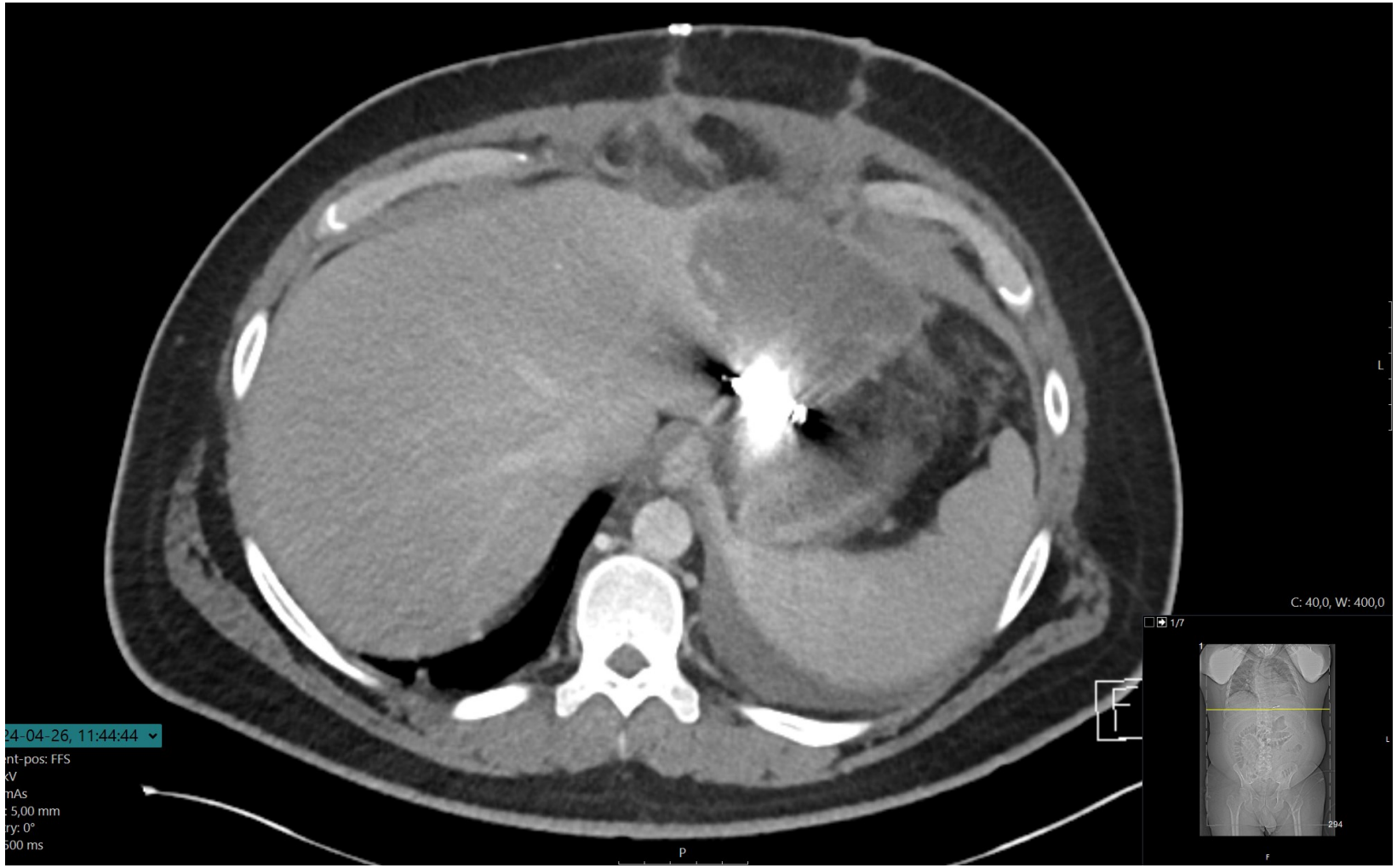

Slab: Medelvärde 2,5 mm
FoV: 500 mm
6. TH/Buk Ven 0.6 ax MJUK
C: 69,0, W: 740,8
Medelvärde 2,5 mm



Dens packing with multiple coils. 17 minutes from puncture to closure.



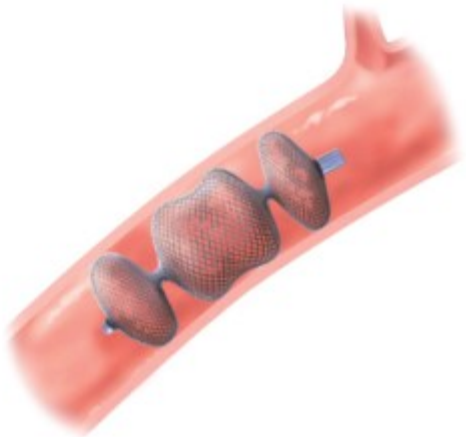
2 days follow up CT



- Hepatic necrosis was treated conservatively
- Admitted from ICU 4 days later
- Back home after two more weeks.

Plugs

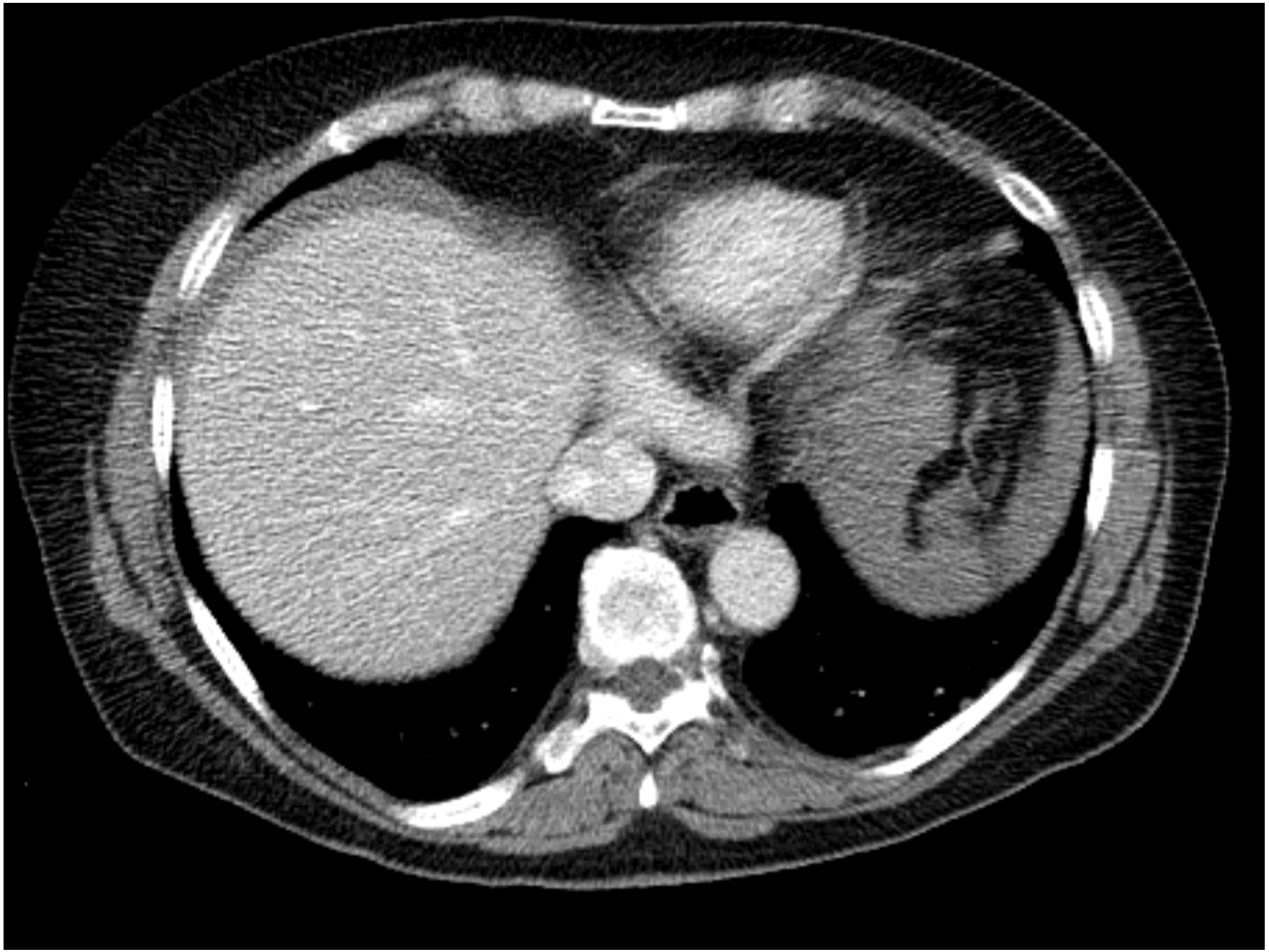
- Nitinol wire mesch occlusion device.
- Possible to occlude 2,5-17 mm arteries
- Through a catheter or sheeth depending on size



Plugs

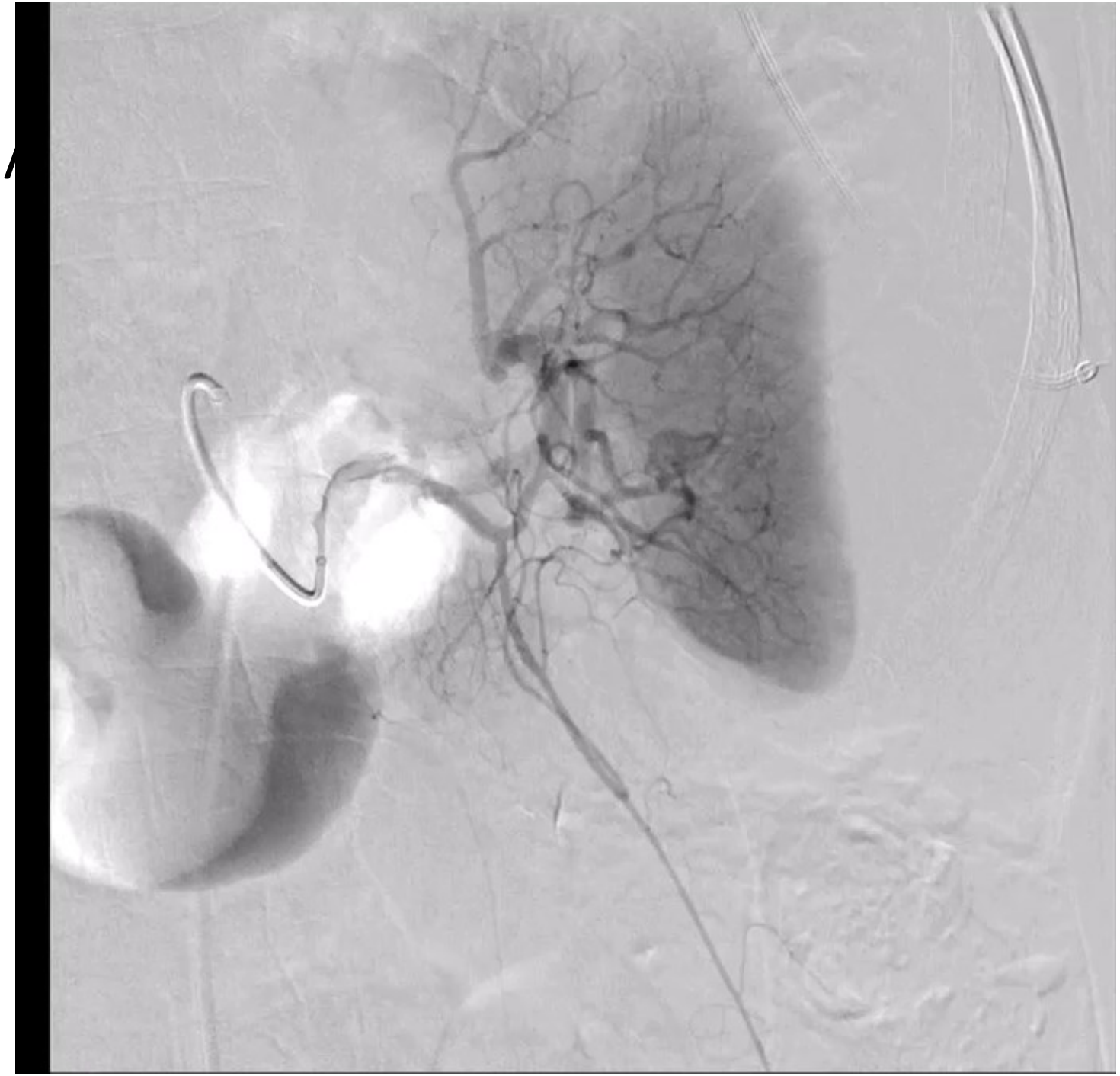
- 60 yo female
- Hit by a car when walking
- Pain under left costal arch
- FAST with suspicious splenic bleeding.
- BP 130/90, Pulse 90/min

Grade 2-3 AAST splenic trauma with ongoing subcapsular bleeding



Proximal splenic artery embolization

- Reduces splenic artery blood pressure by app 50%
- Stops bleeding with preserved splenic function



Spleen

Box 1. American Association for the Surgery of Trauma (AAST) guidelines for organ injury scaling for the spleen

AAST grade*	Type	Description of injury
I	Hematoma	Subcapsular, < 10% of surface area
	Laceration	Capsular tear, < 1 cm of parenchymal depth
II	Hematoma	Subcapsular, 10%–50% of surface area Intraparenchymal hematoma, < 5 cm in diameter
	Laceration	1–3 cm in parenchymal depth not involving a parenchymal vessel
III	Hematoma	Subcapsular, > 50% of surface area or expanding; ruptured subcapsular or parenchymal hematoma Intraparenchymal hematoma, > 5 cm in diameter
	Laceration	> 3 cm parenchymal depth or involving trabecular vessels
IV	Laceration	Laceration of segmental or hilar vessels producing major devascularization (> 25% of spleen)
V	Laceration	Completely shattered spleen Vascular hilar injury that devascularized the spleen

*Advance 1 grade for multiple injuries to the same organ, up to grade III.

Indications for Splenic Artery embolization

CT findings:

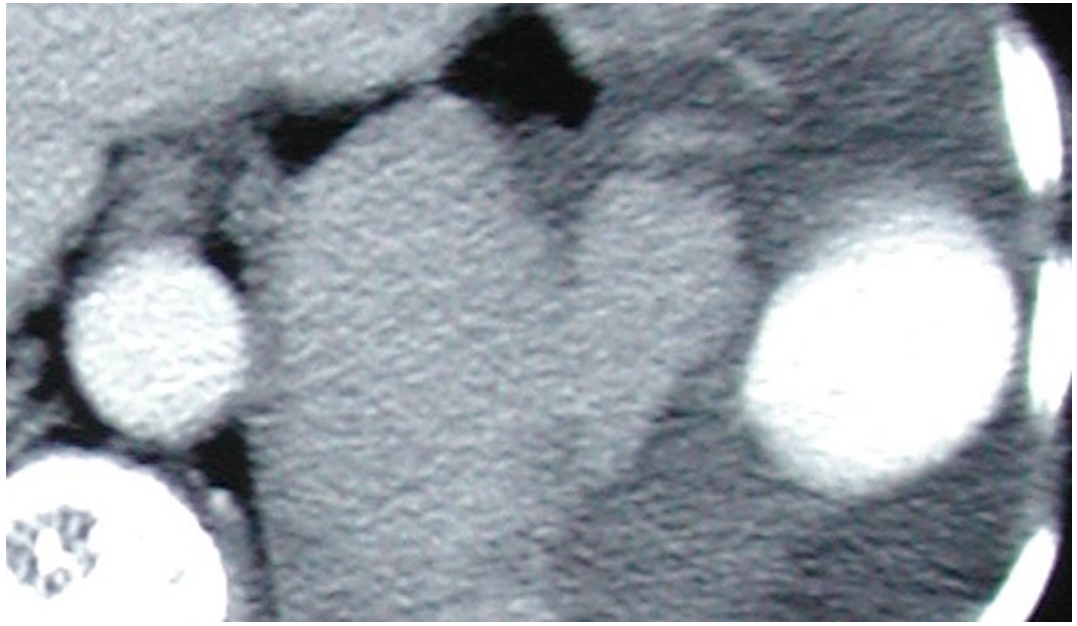
Contrast extravasation

pseudoaneurysm

AV-fistula

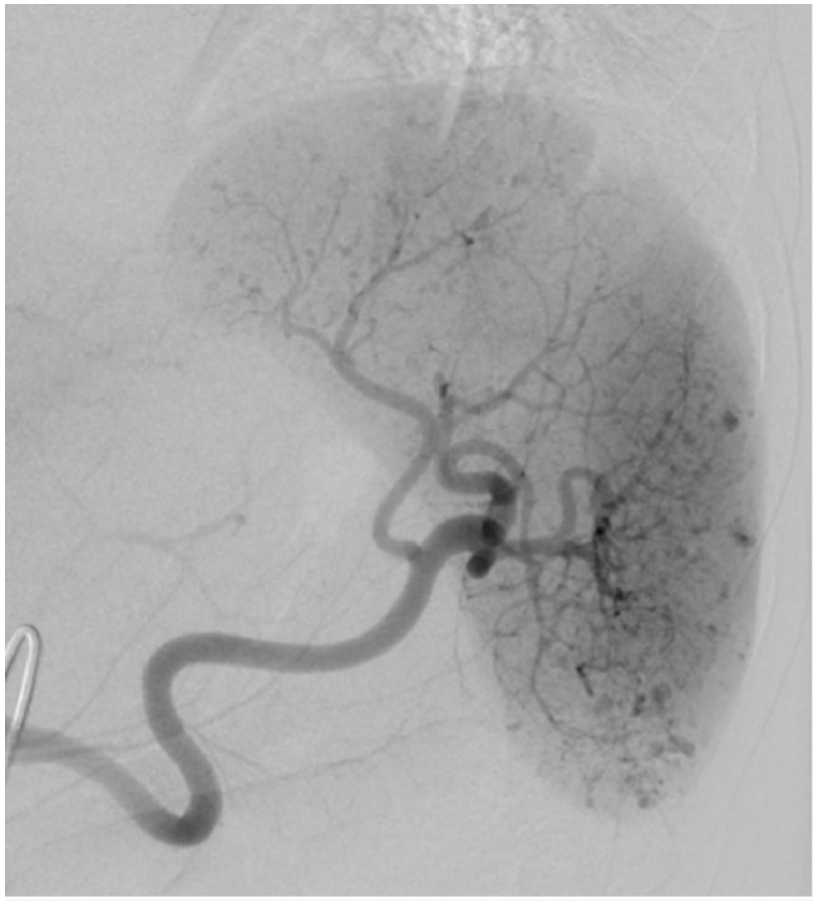
Large hemoperitoneum

High grade injury (3-5)



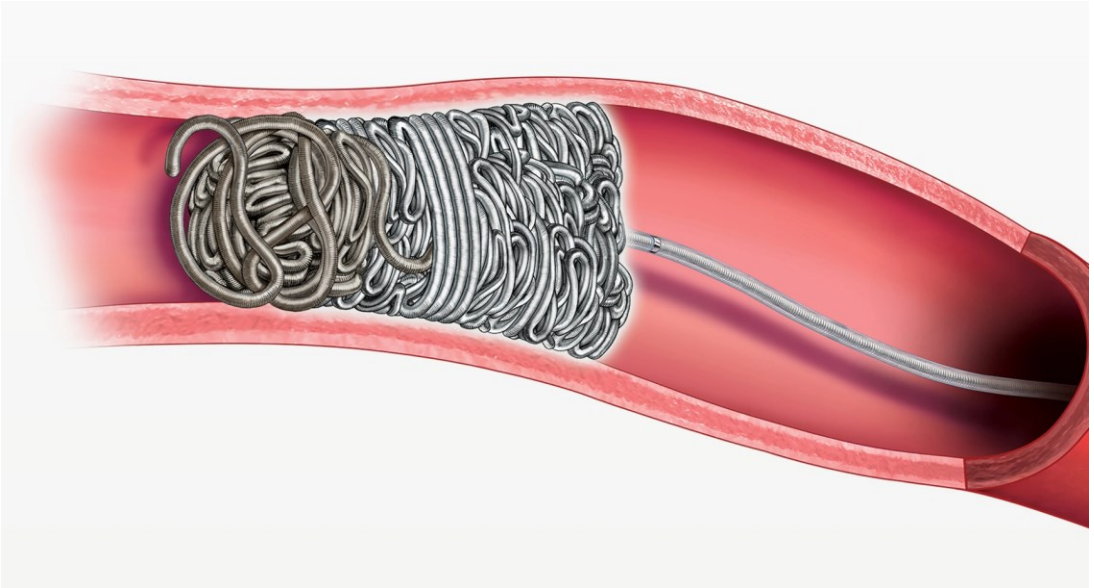
Cardiovasc Intervent radiol (2012).

The Seurat Spleen



Renal embolization

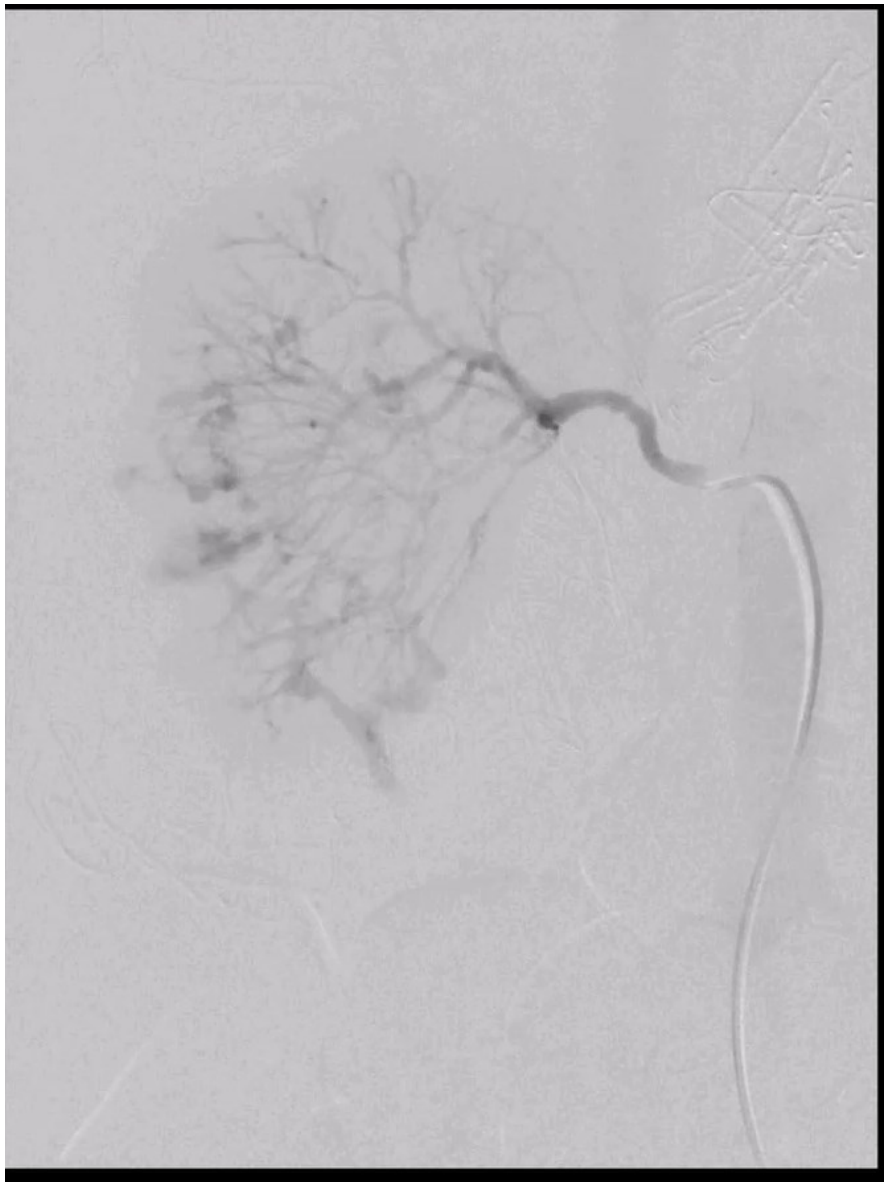
- No collateral circulation like the spleen
- Either selective embo or total occlusion of renal artery.
- Coils, gelfoam, plugs



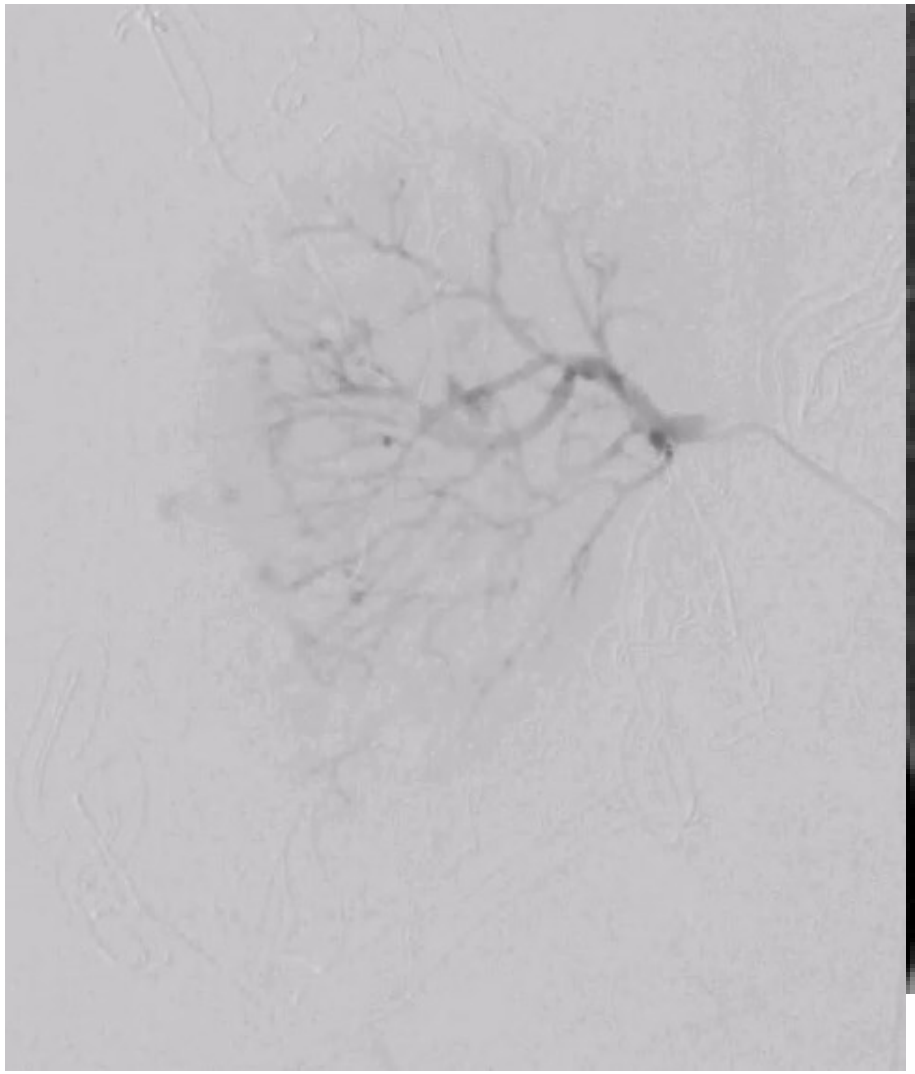
Renal embolization

- 40 yo female hit by a car when bicycling
- Acute packing of abdomen
- Continued bleeding- CT

Renal trauma



Renal trauma



The End