

# Stanford Division of Vascular Surgery

Interesting Cases

10/11/10

Vascular Surgery



- HPI:
- 62yoM with h/o CAD, HTN, ETOH abuse. S/P EVAR in 5/08 for 6cm AAA and right CIA aneurysm.
  - Cook 30x96mm Main Body
  - 24 x 71mm contra-lateral limb in the left CIA
  - 24 x 71mm Ipsi-lateral limb in the right CIA just proximal to iliac bifurcation
- Over the past 8 months he developed worsening right buttock and calf claudication which were significantly lifestyle limiting.



- PmHx:

- AAA
- HTN
- CAD
- HLD
- ETOH abuse

- PsHx:

- EVAR

- Meds:

- Atenolol 50mg
- HCTZ 25mg
- Lisinopril 5mg
- Simvastatin 20mg

- SoHx:

- 6-7 Rum & Cokes per night
- TOB: 40ppy quit 3 weeks ago



- PE:

T: 97.1 F [36.2 C] HR: 51 BP: 153/78

GEN: NAD

CV: RRR, no mrg

PULM: CTAB, No crackles, or wheezes

ABD: soft, nt/nd, no palpable or pulsatile mass

PULSES:

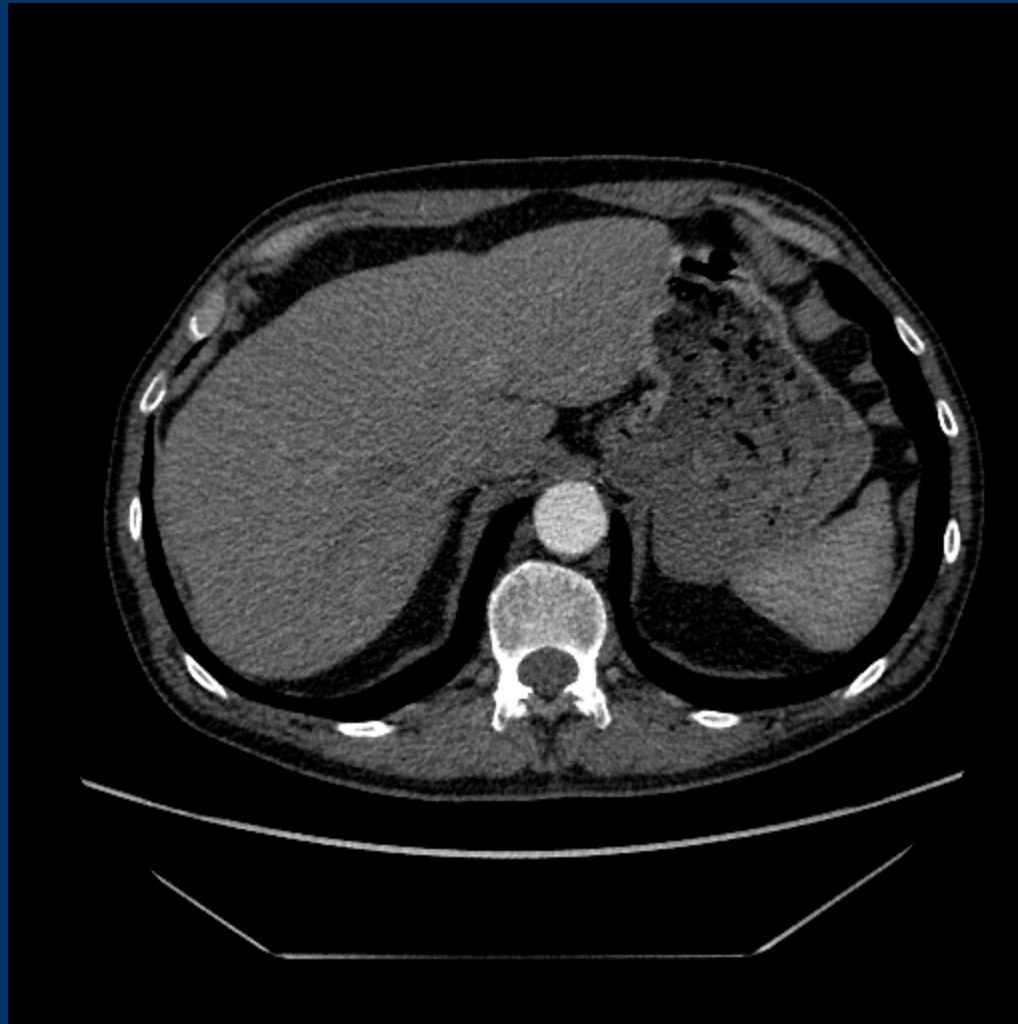
Fem: R: +2 L: +2

TP: R: +1 L: +1

DP: R: +1 L: +1

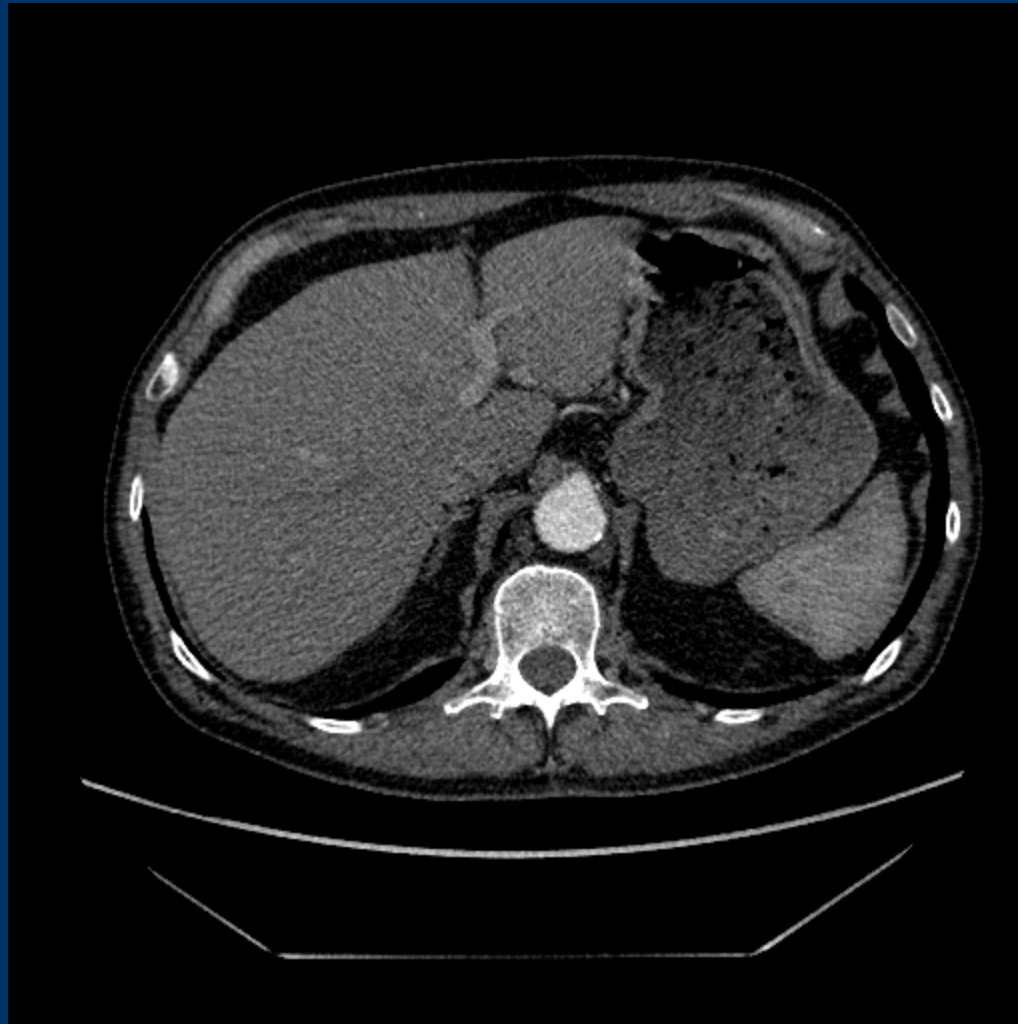
- CTA on 7/20/10 showed a AAA sac size of 7.4 x 6.5cm, a right CIA aneurysm with Type IB endoleak, and the right limb of the endograft retracted into the AAA sac.





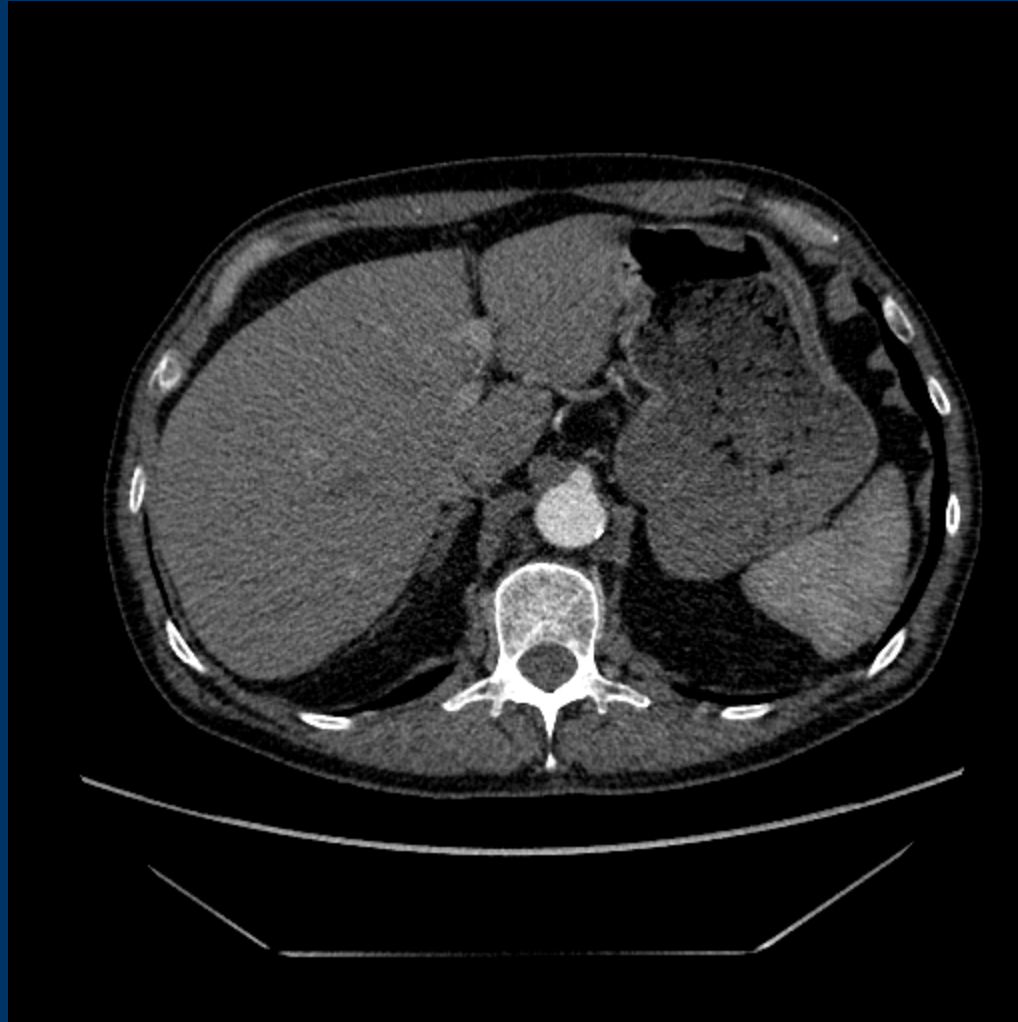
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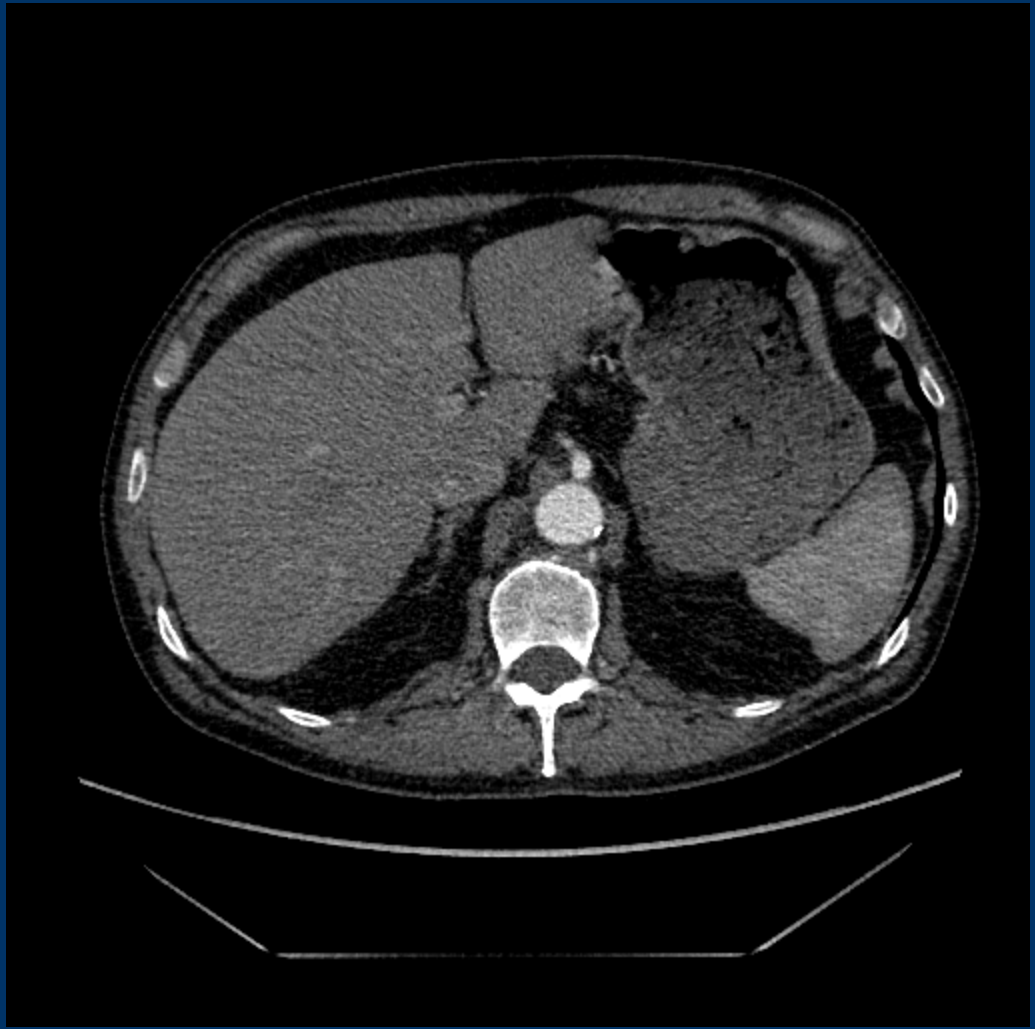
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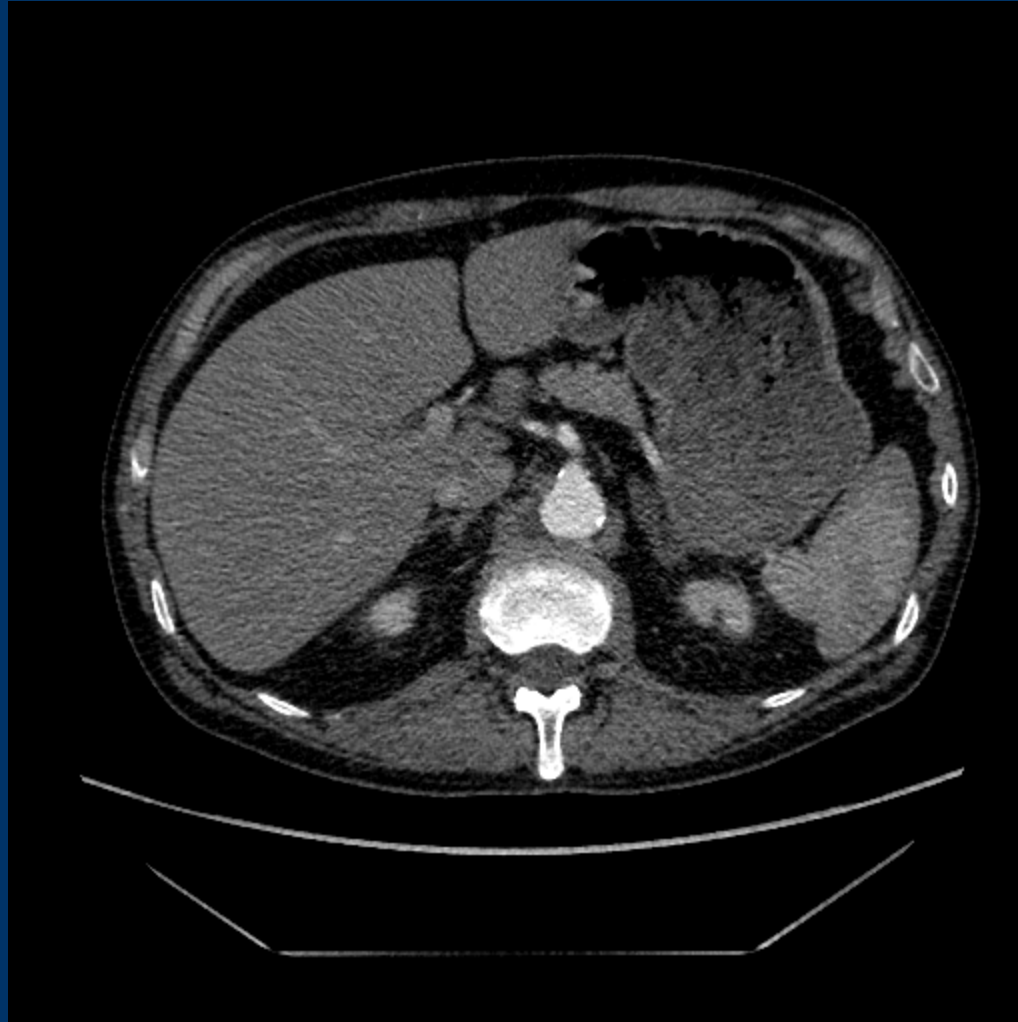




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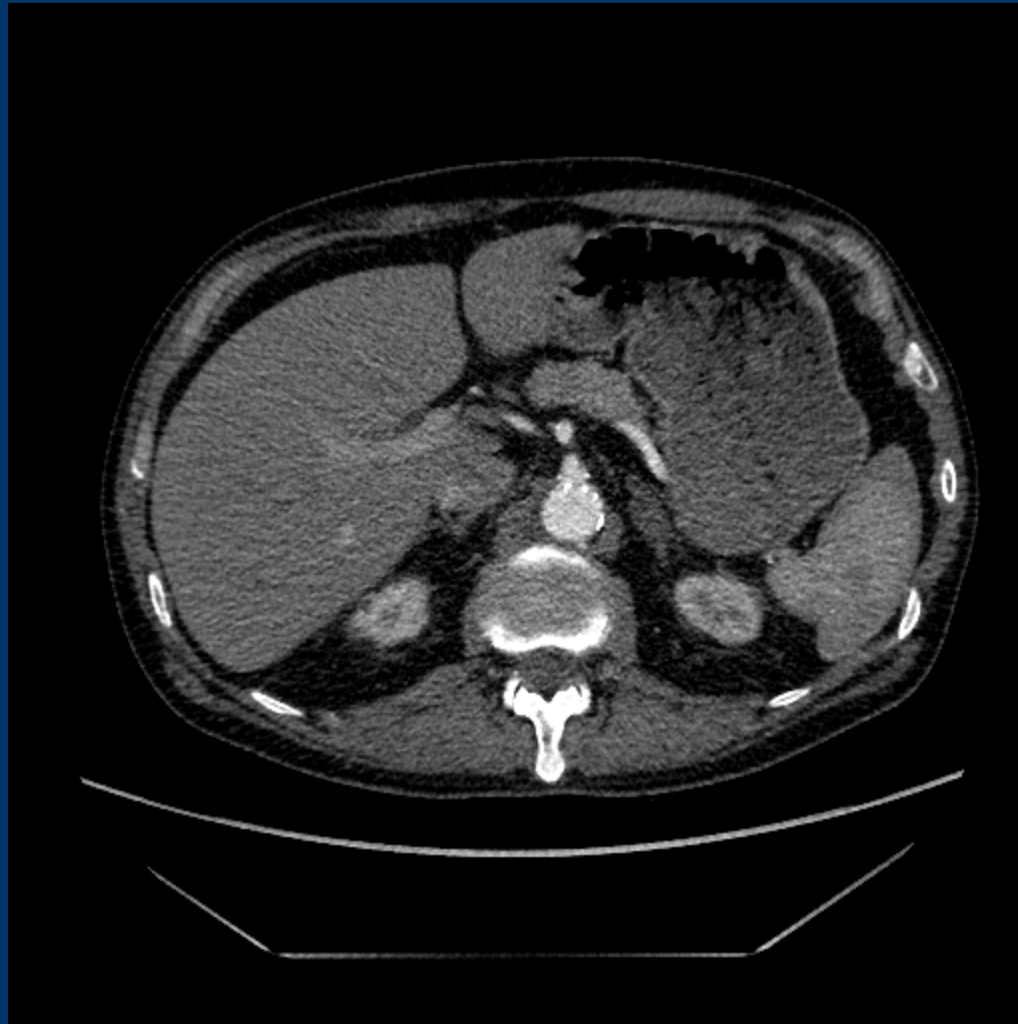






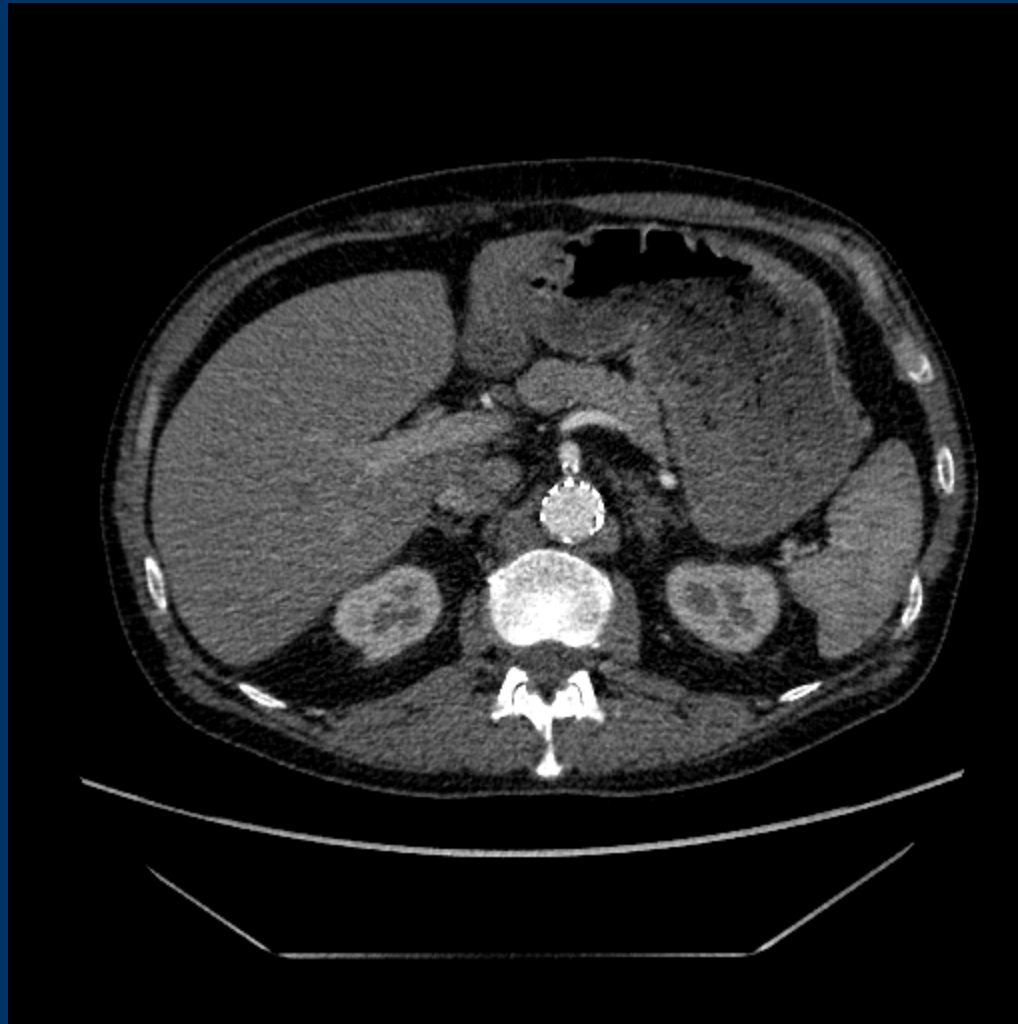
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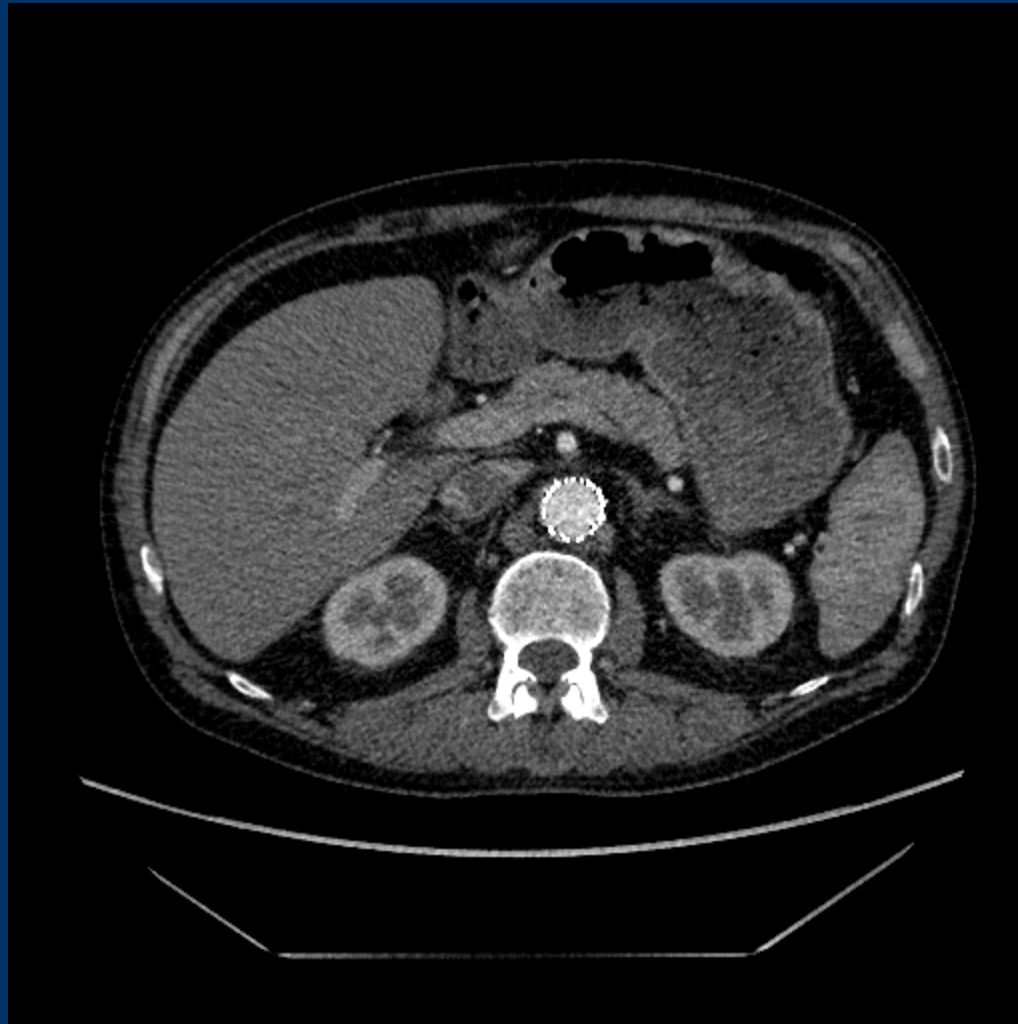
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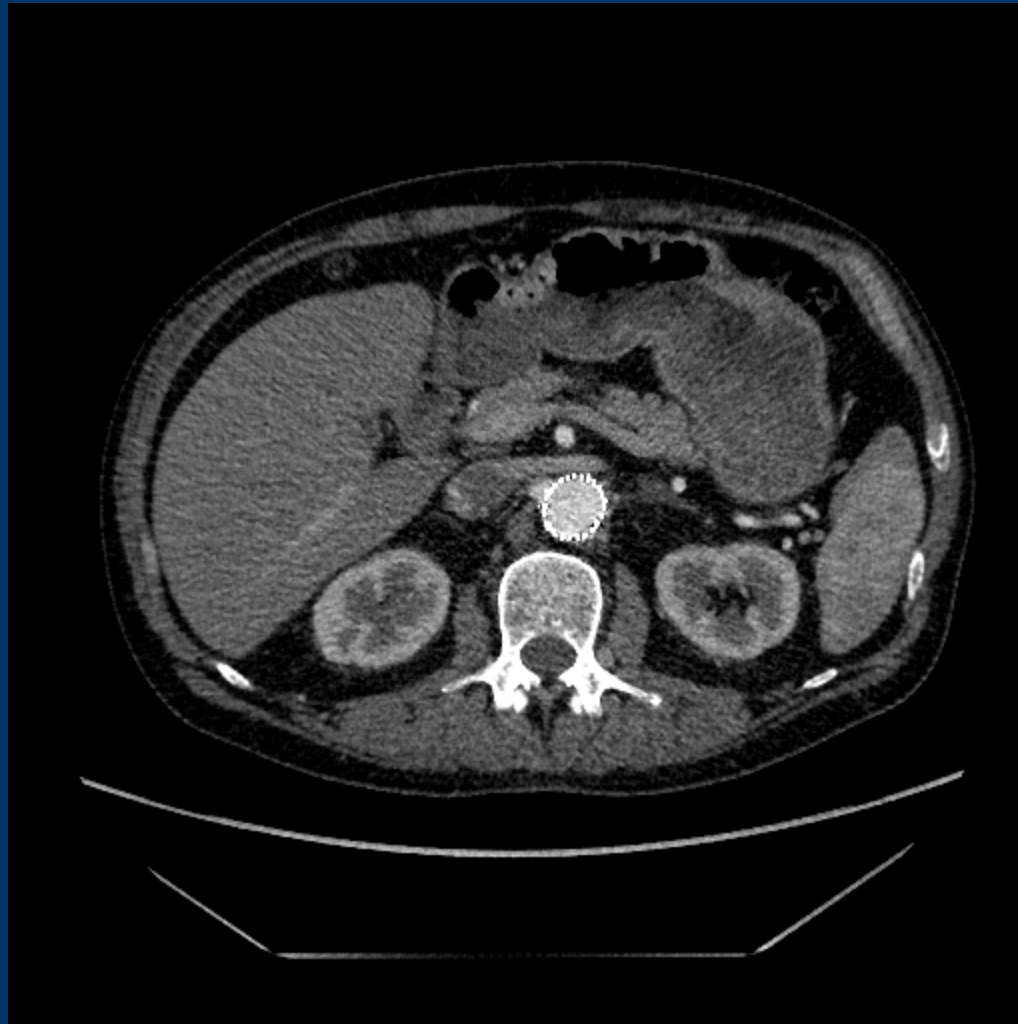
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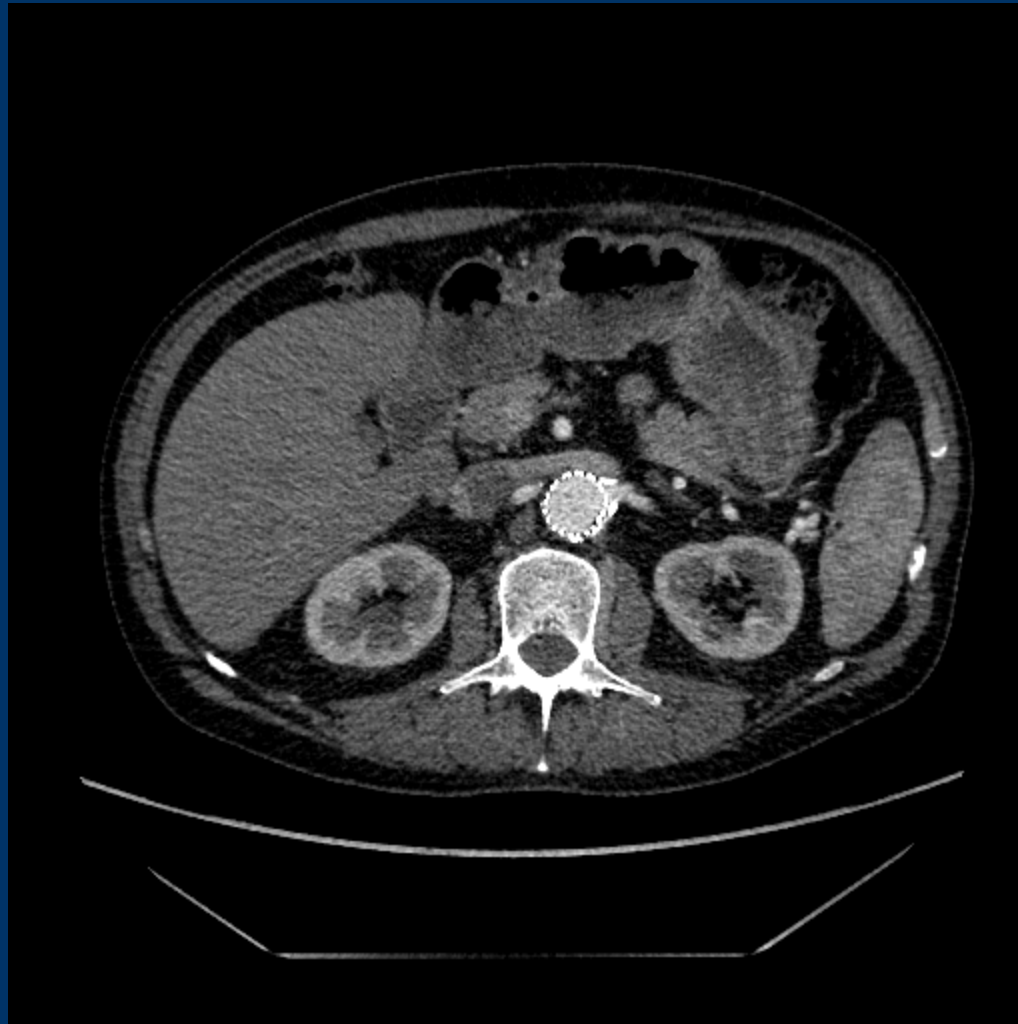
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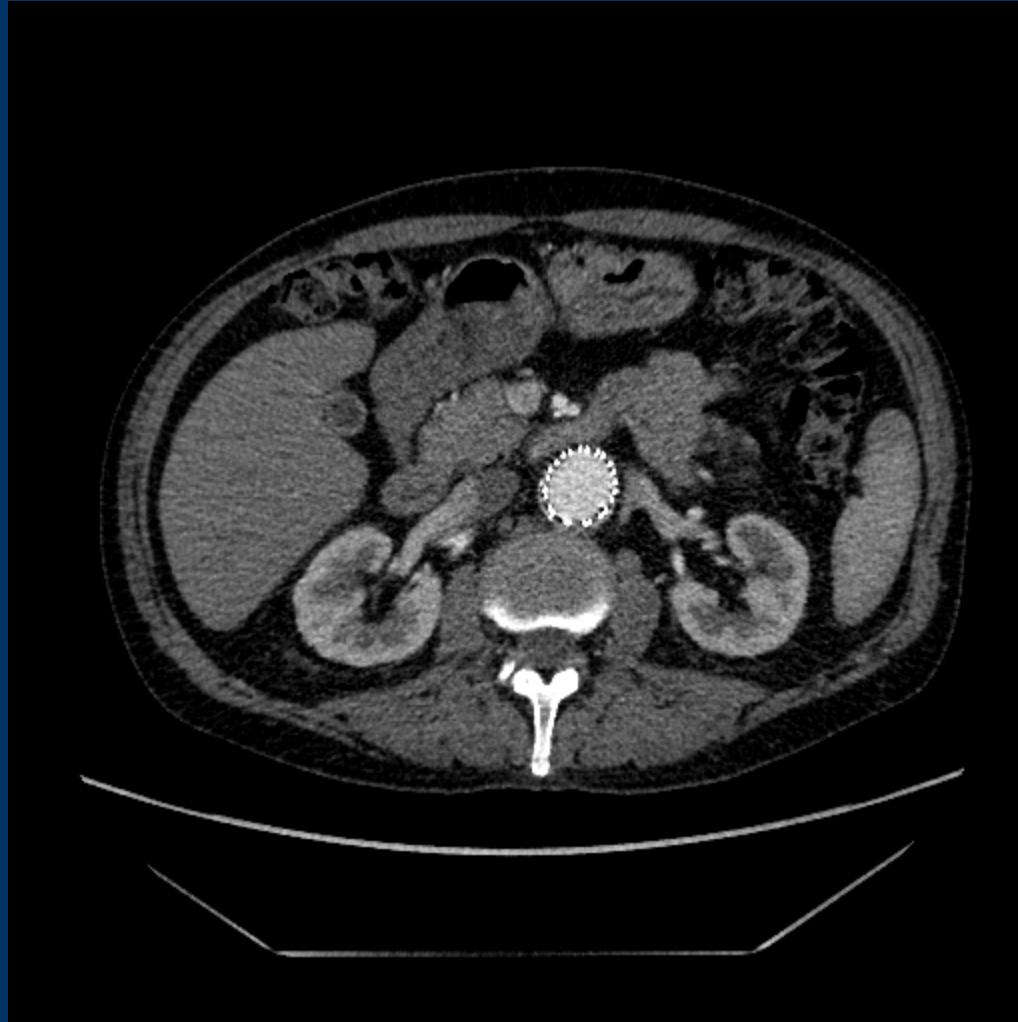
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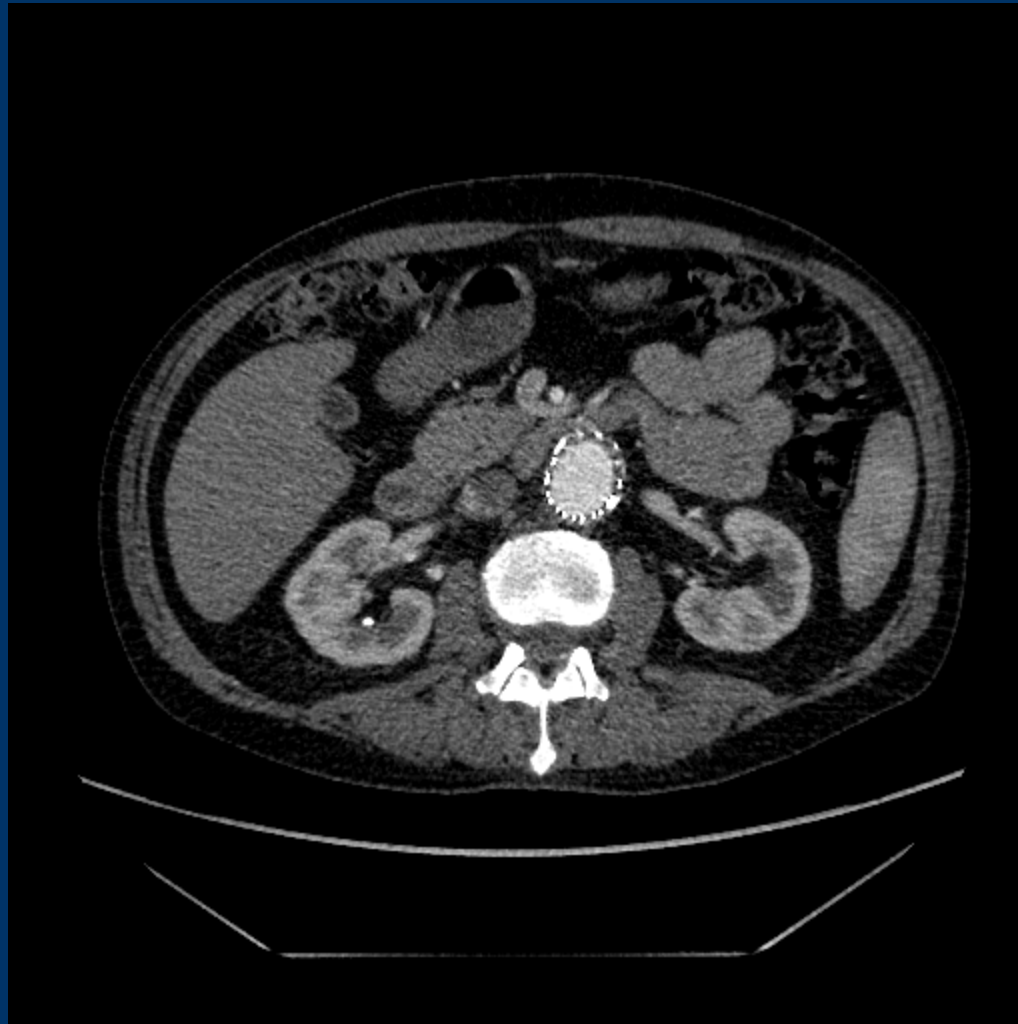




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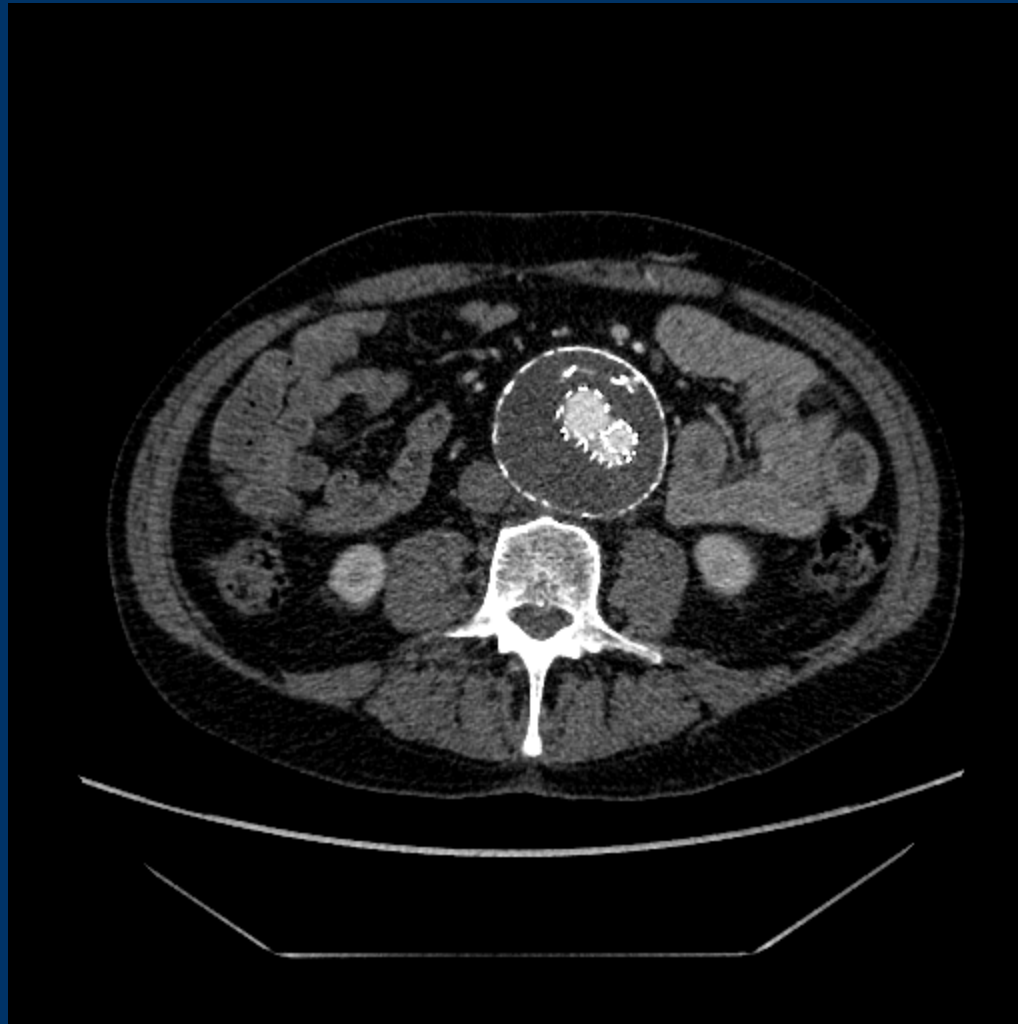
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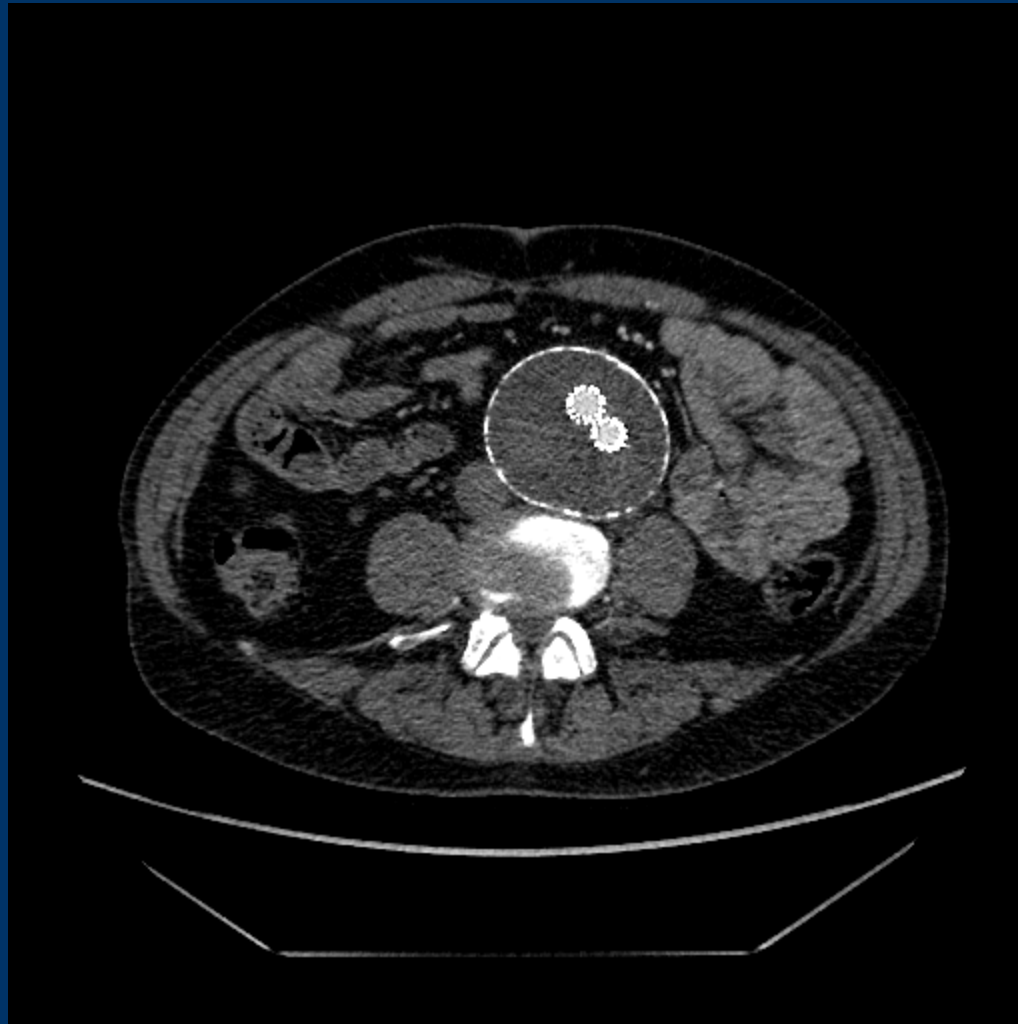




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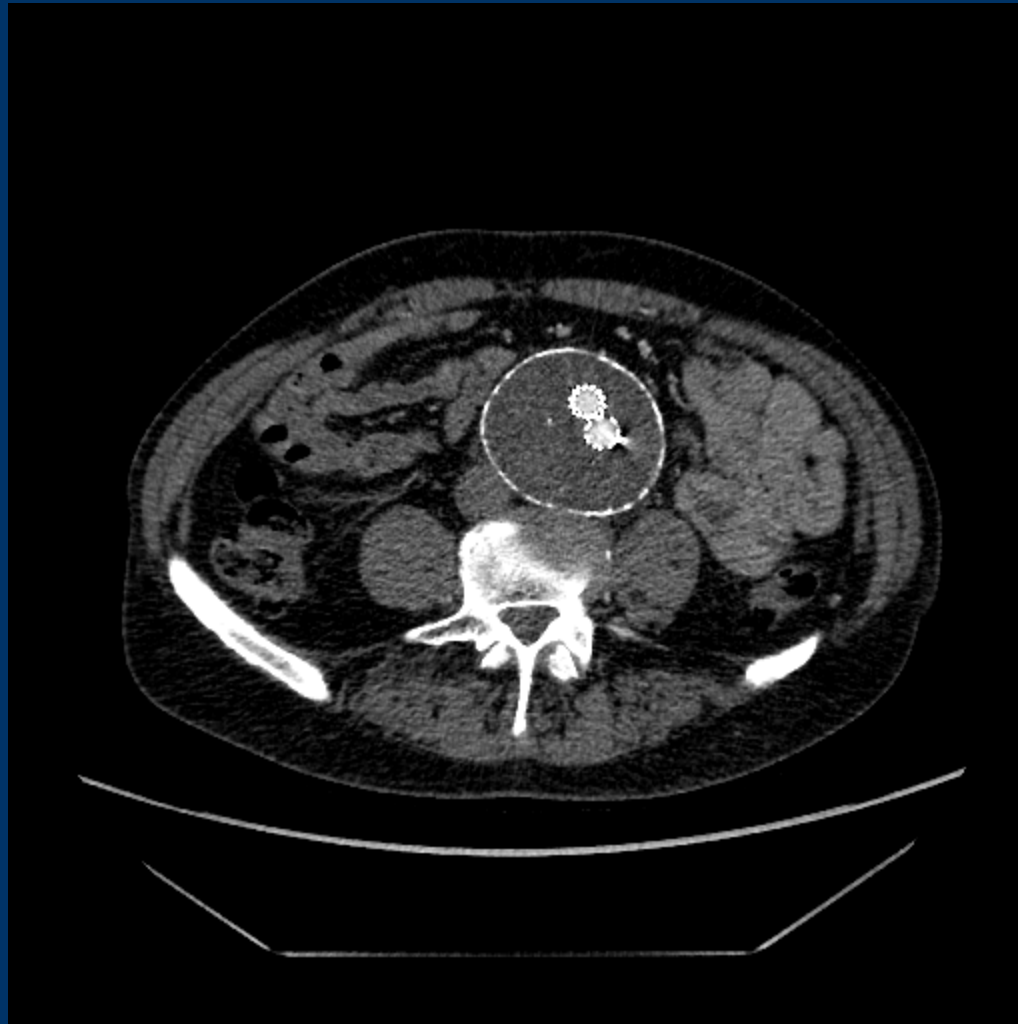






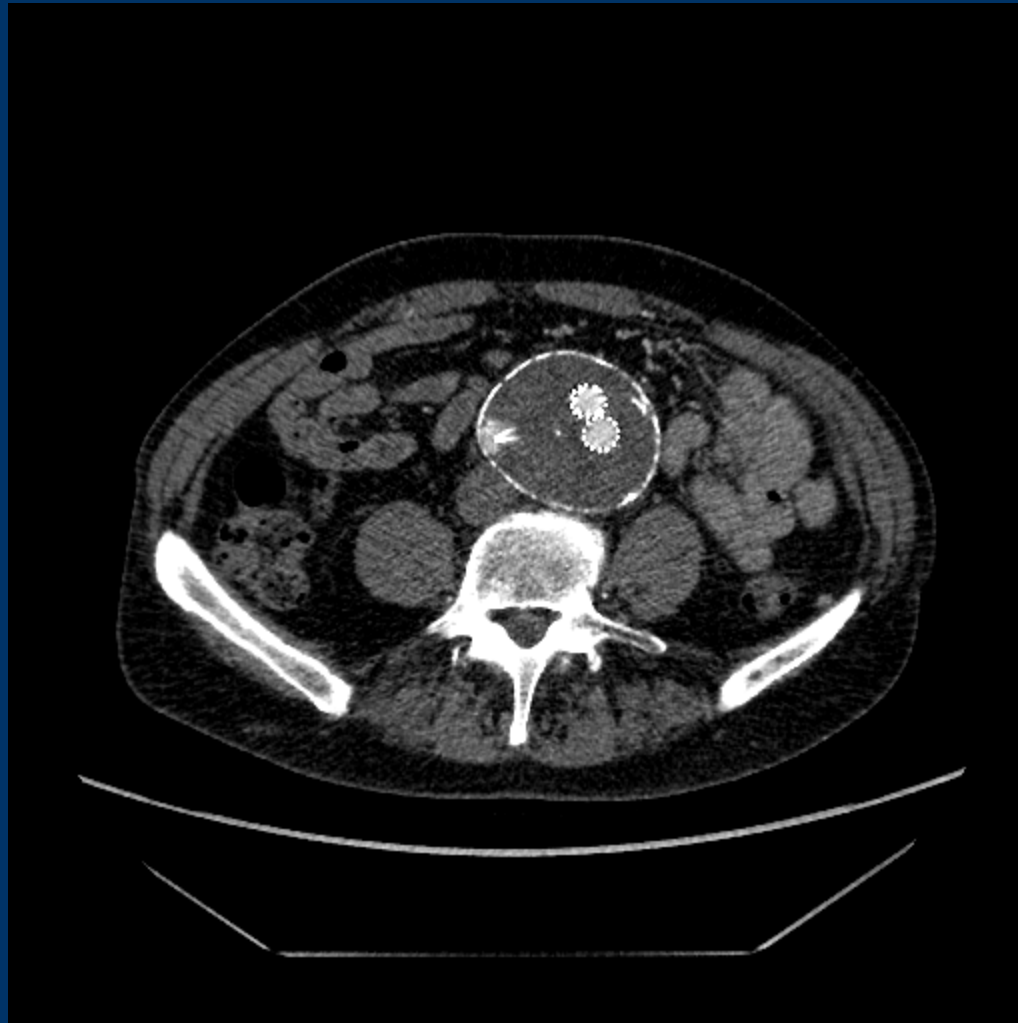
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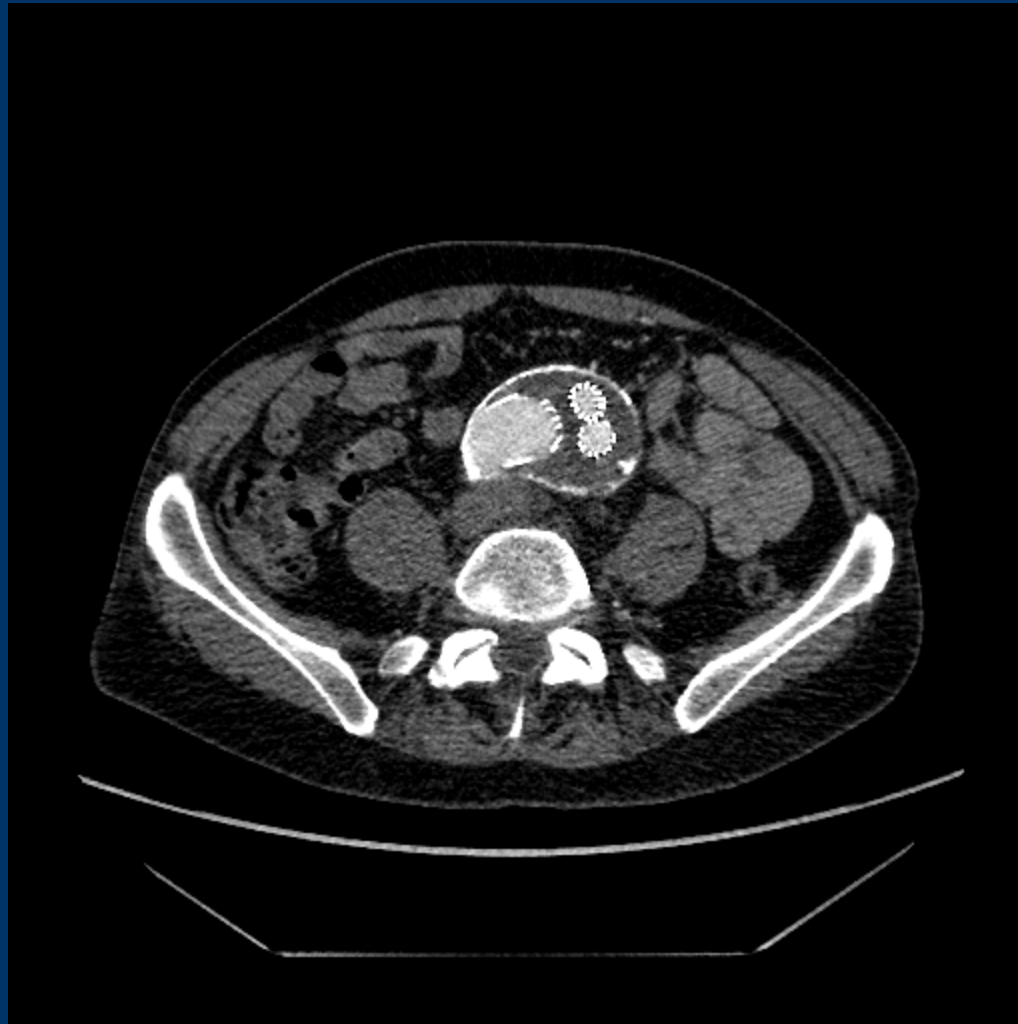
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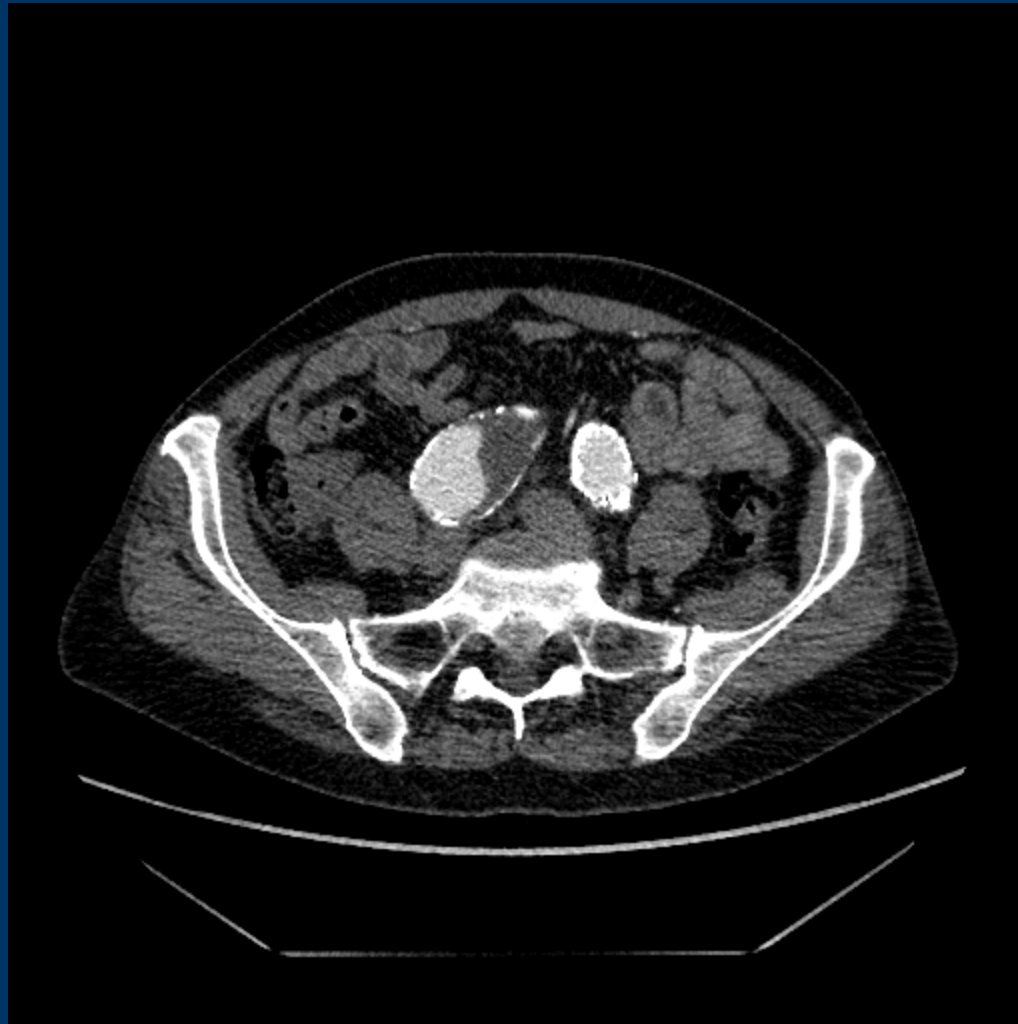




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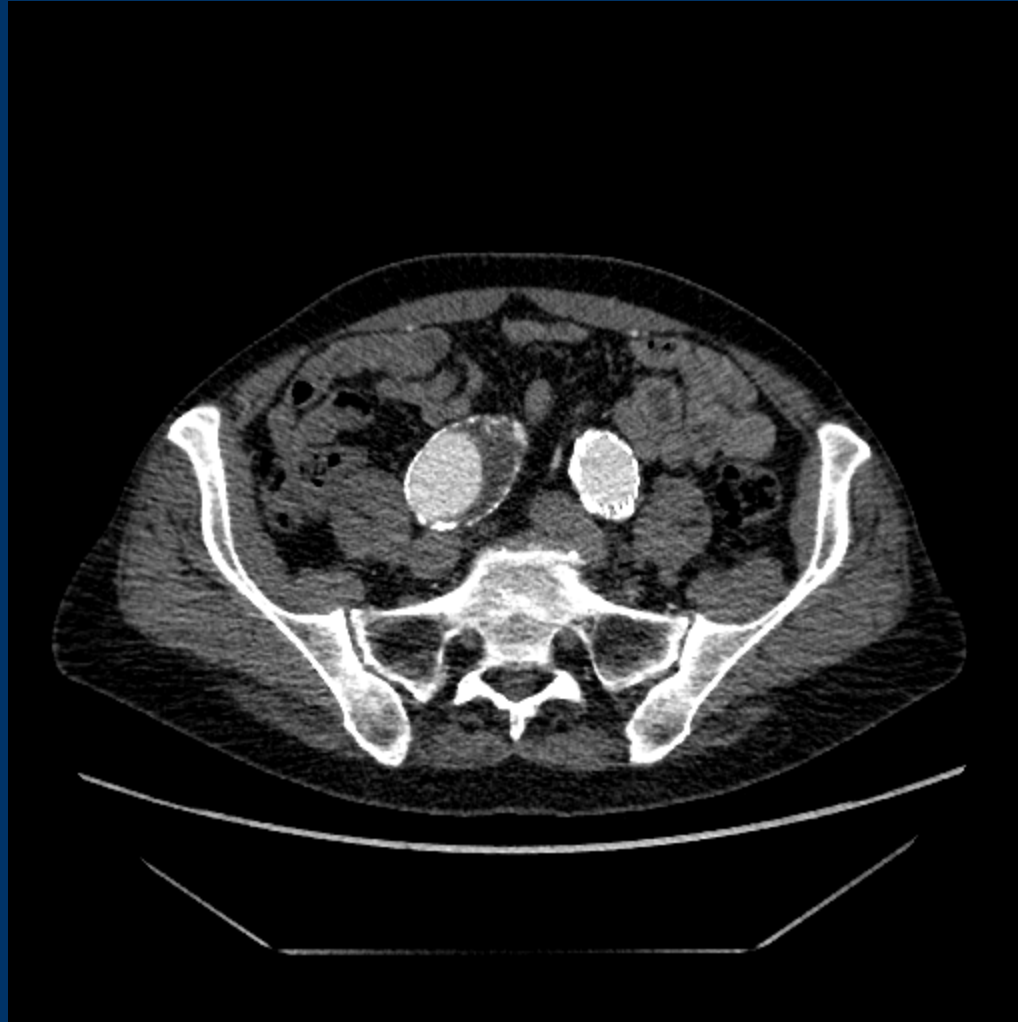






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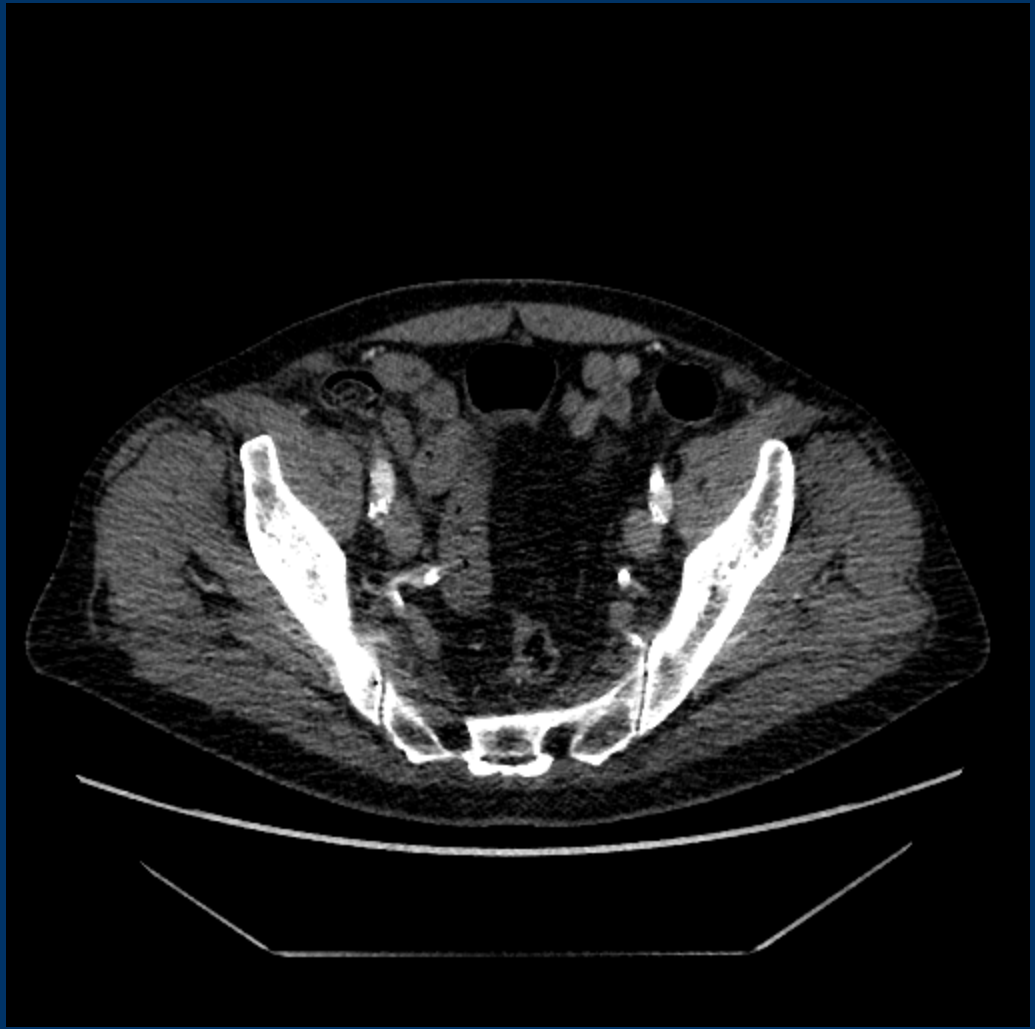
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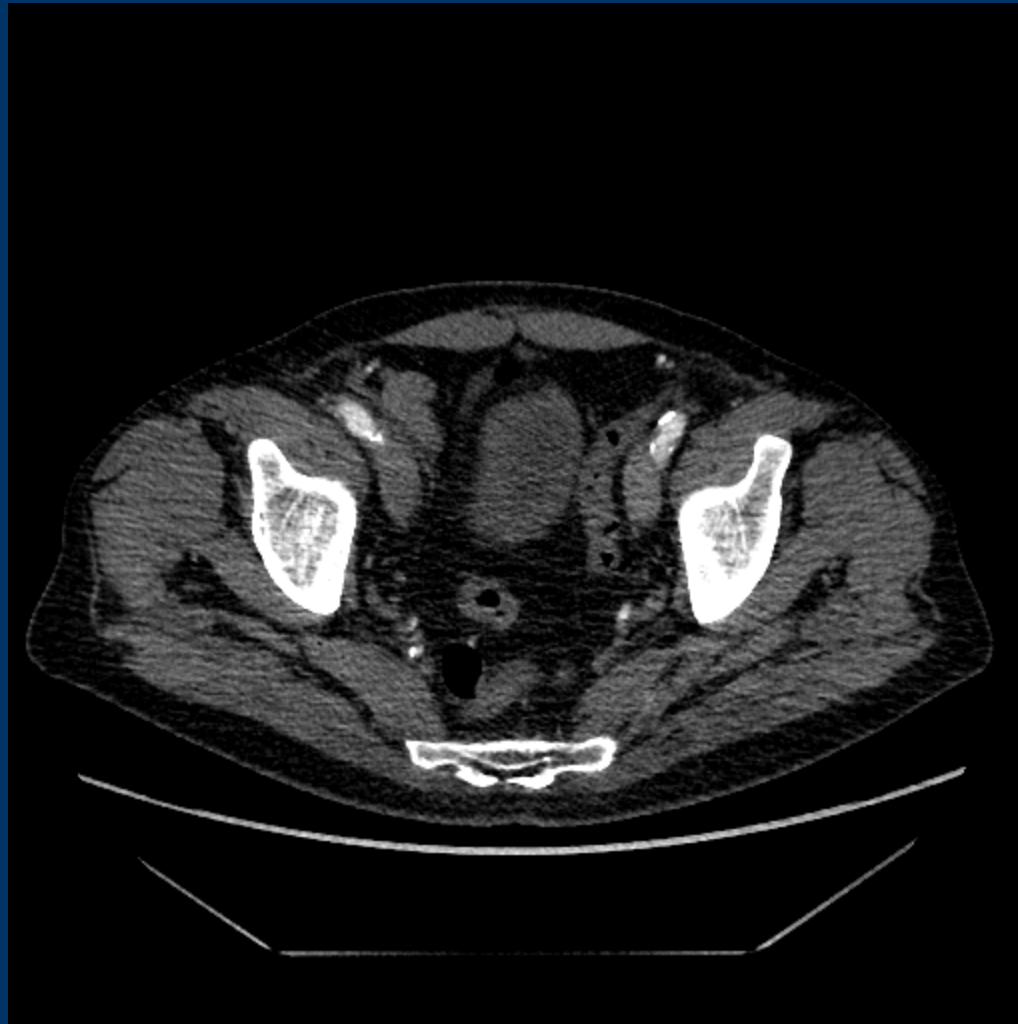
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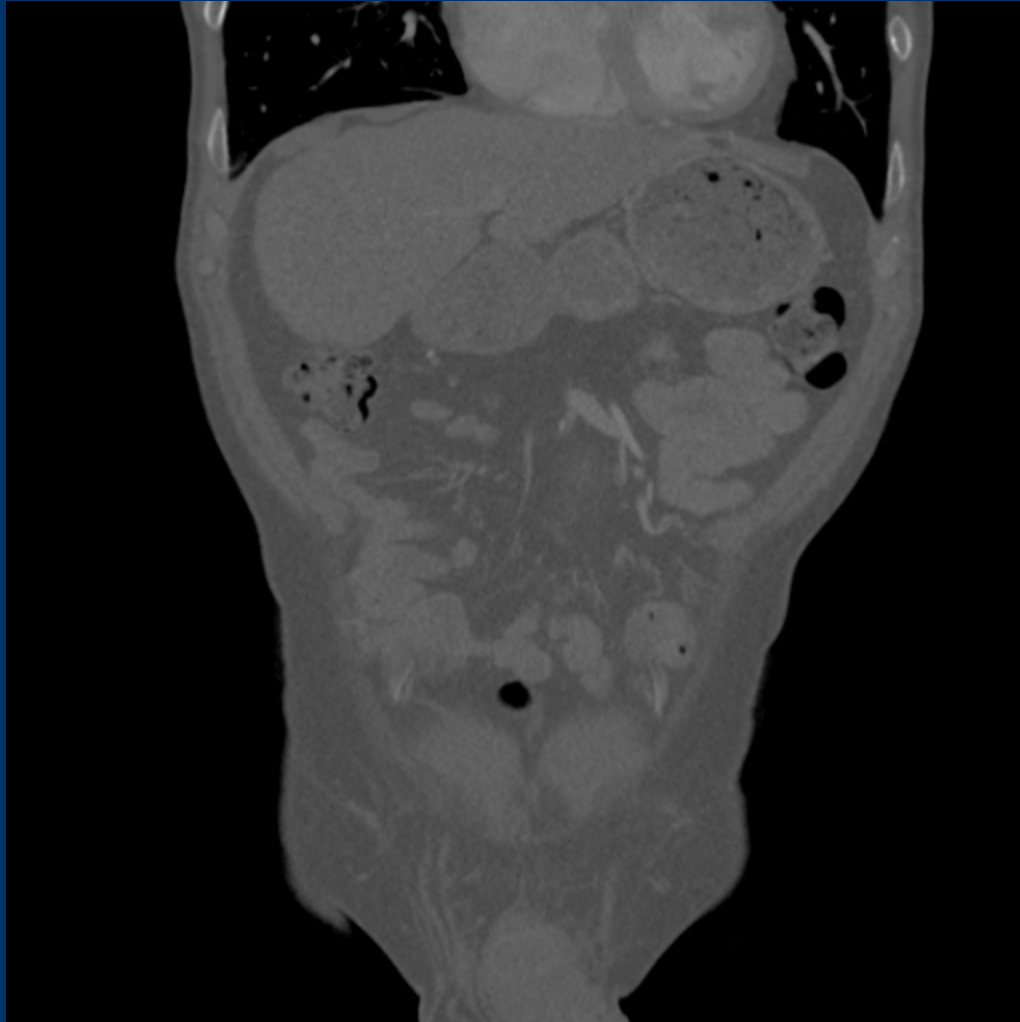
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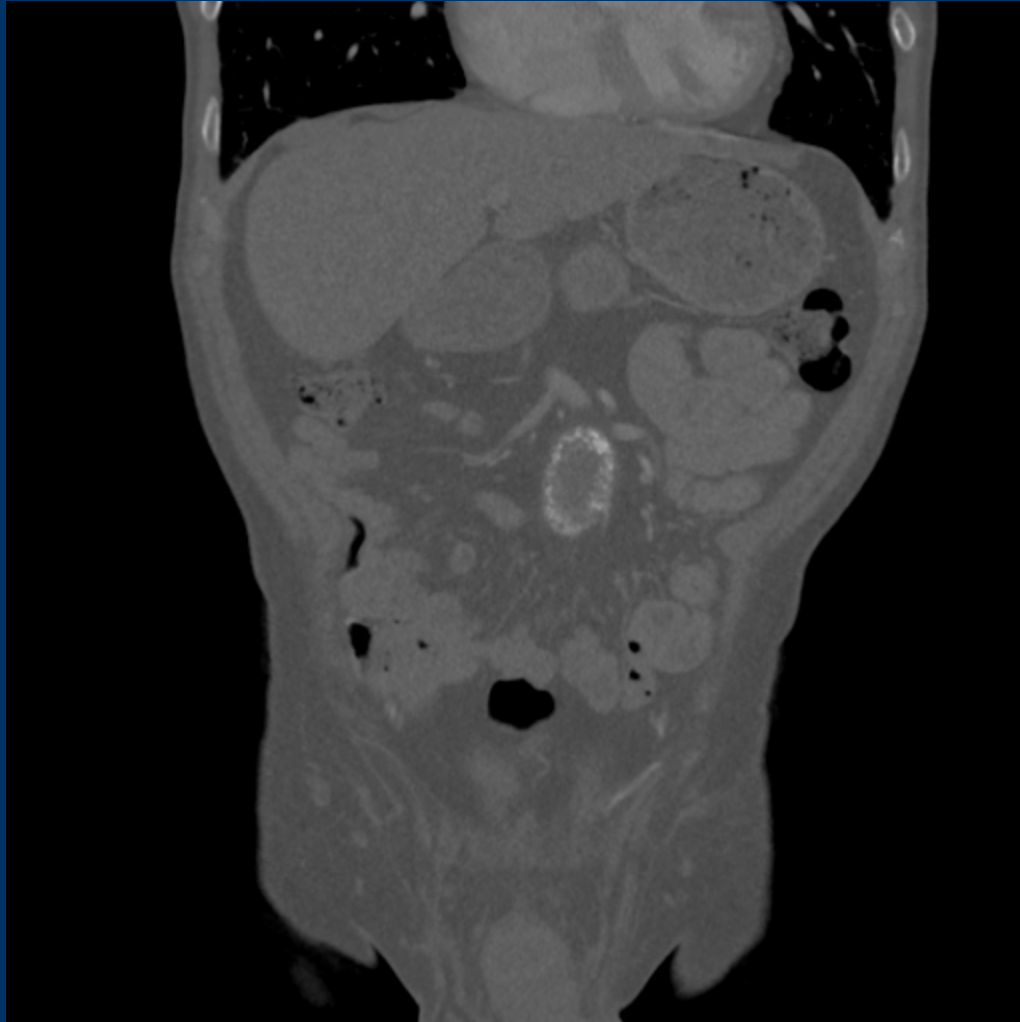
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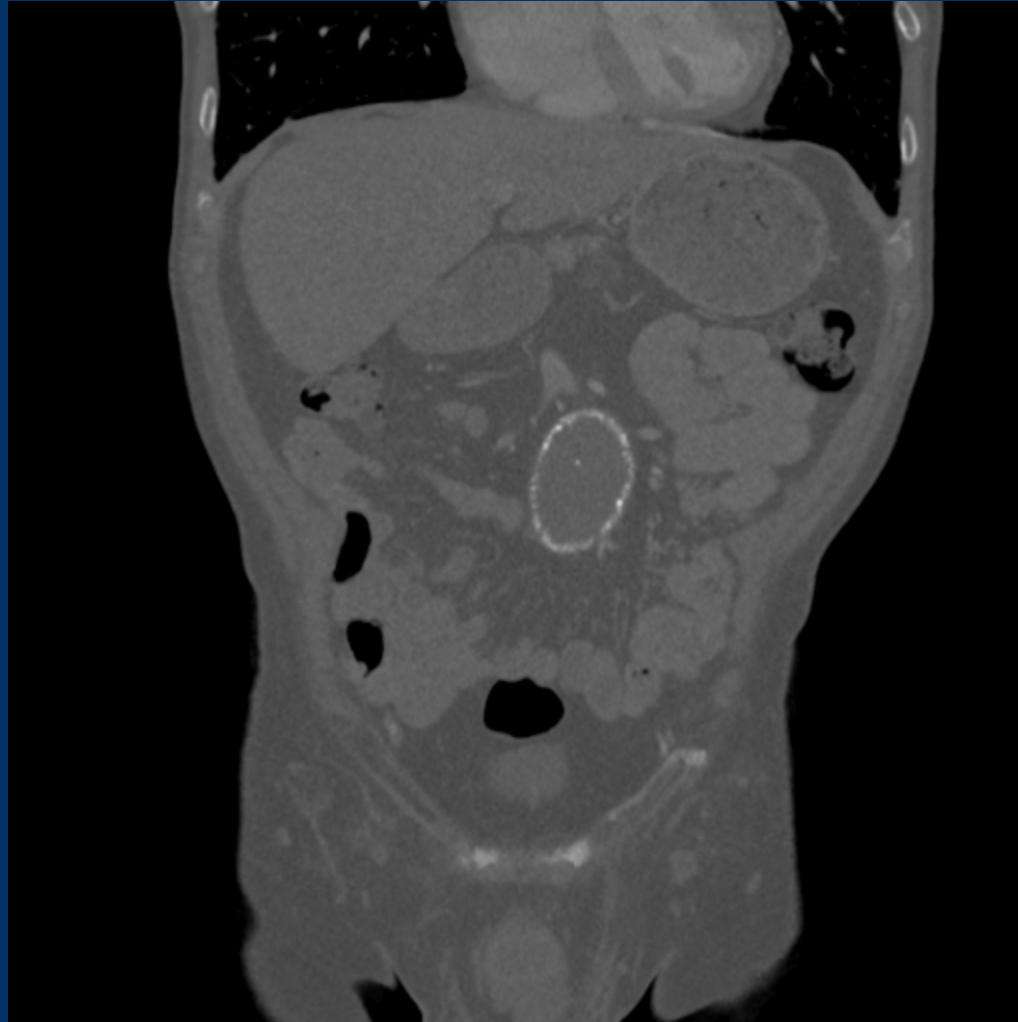
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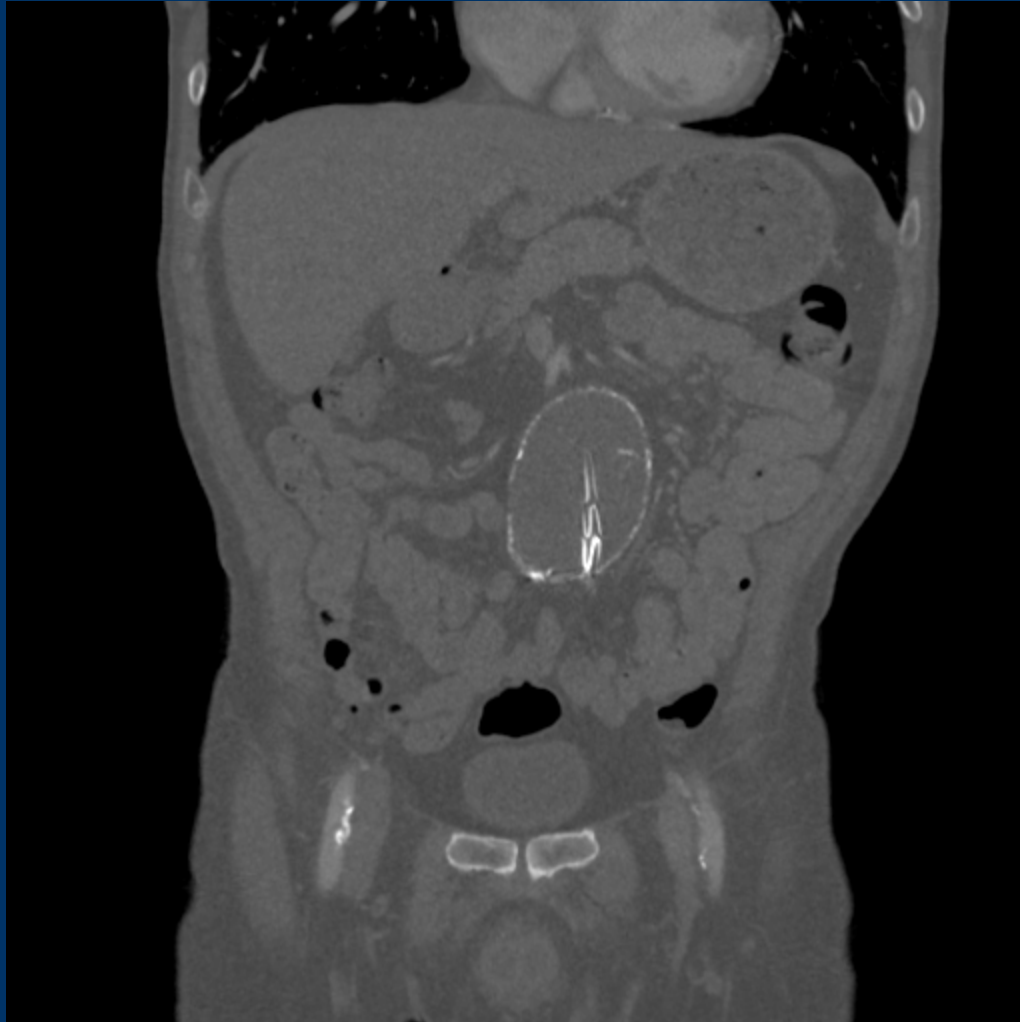
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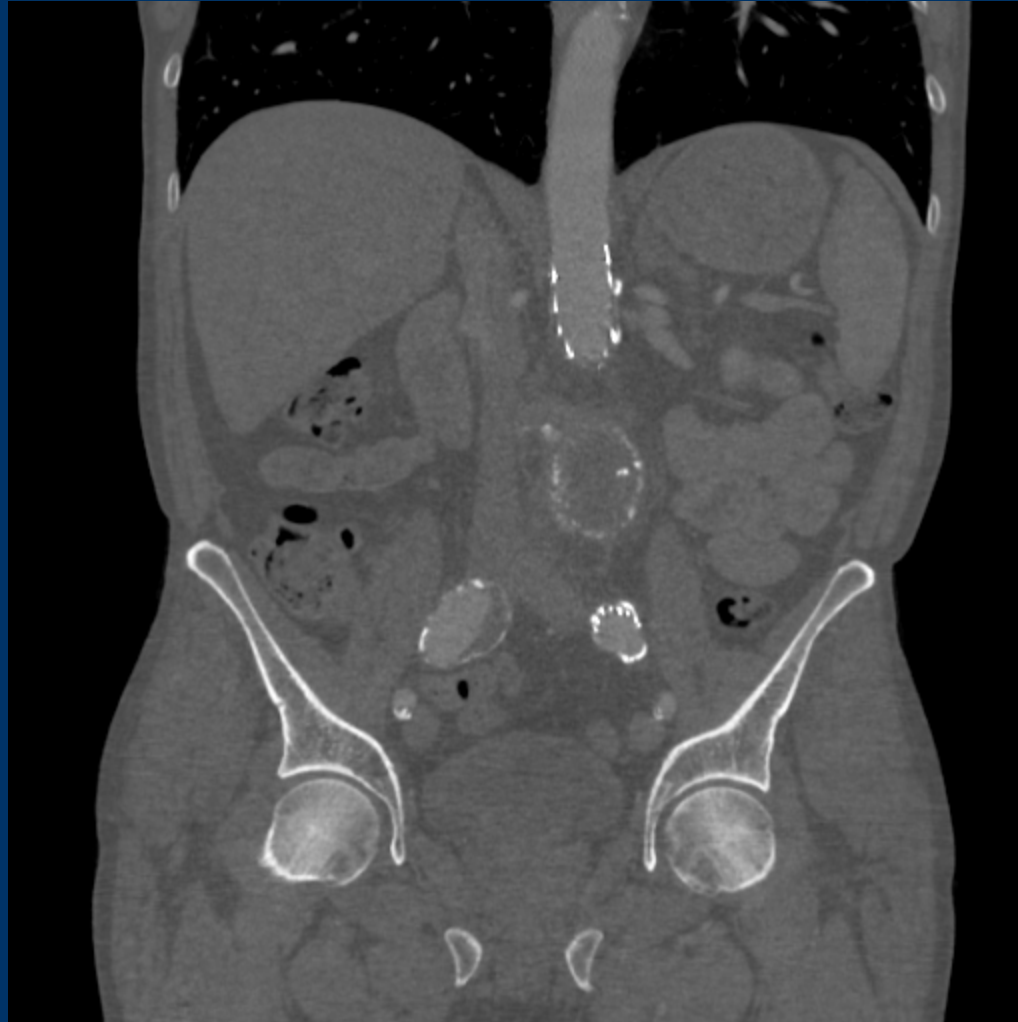
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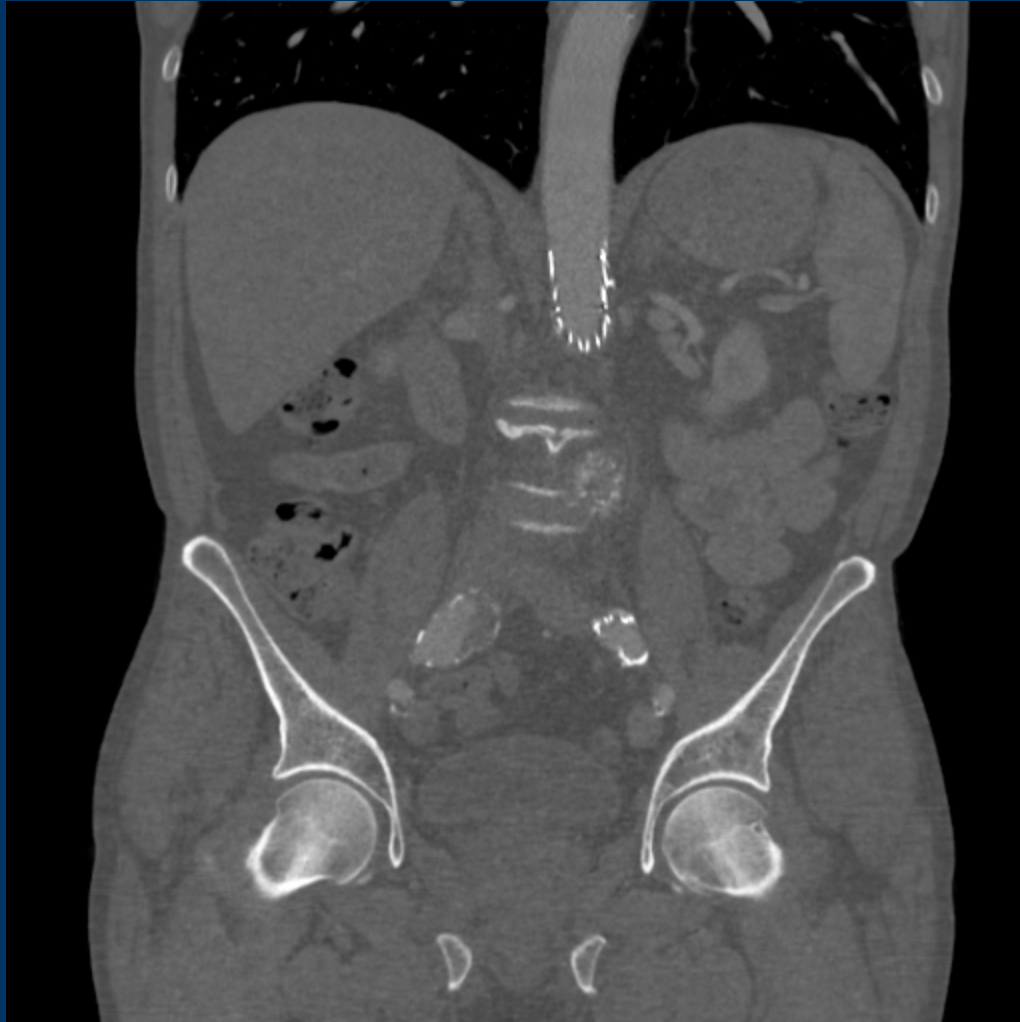
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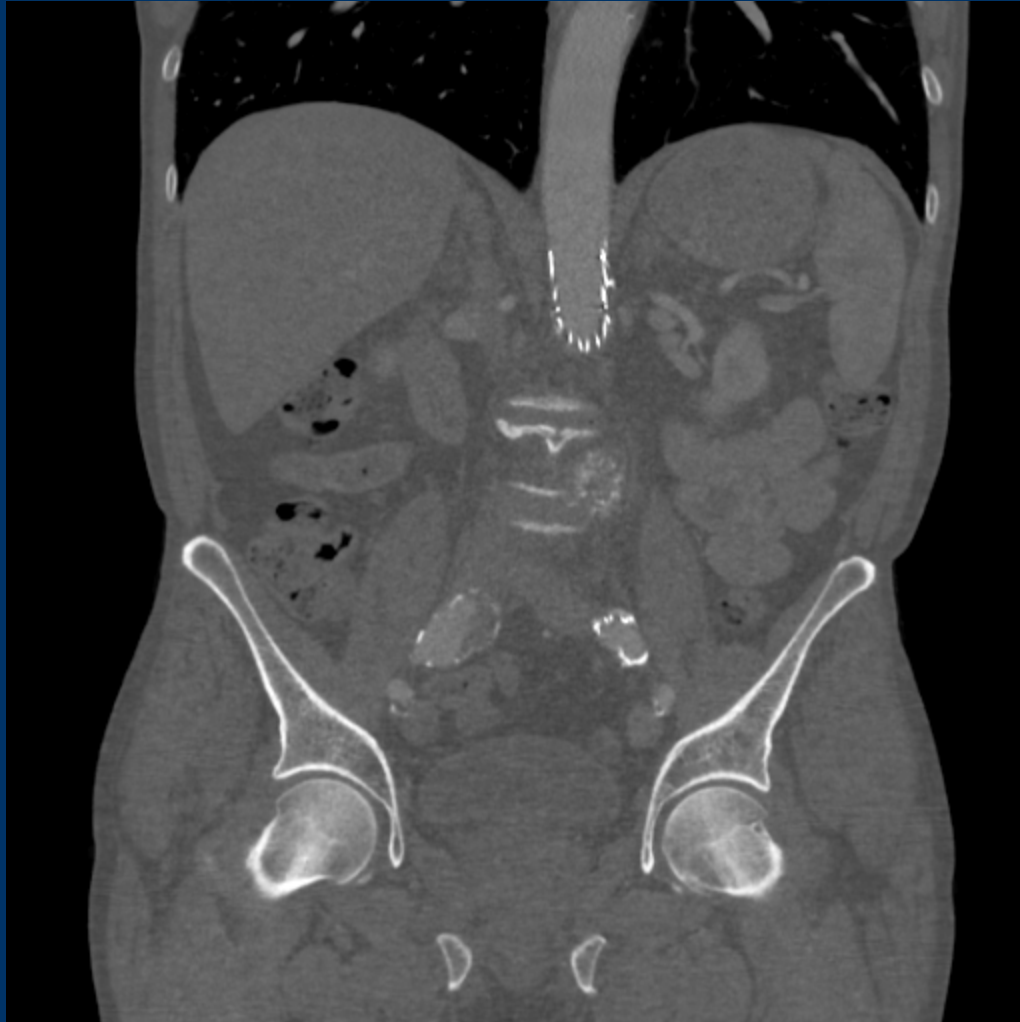
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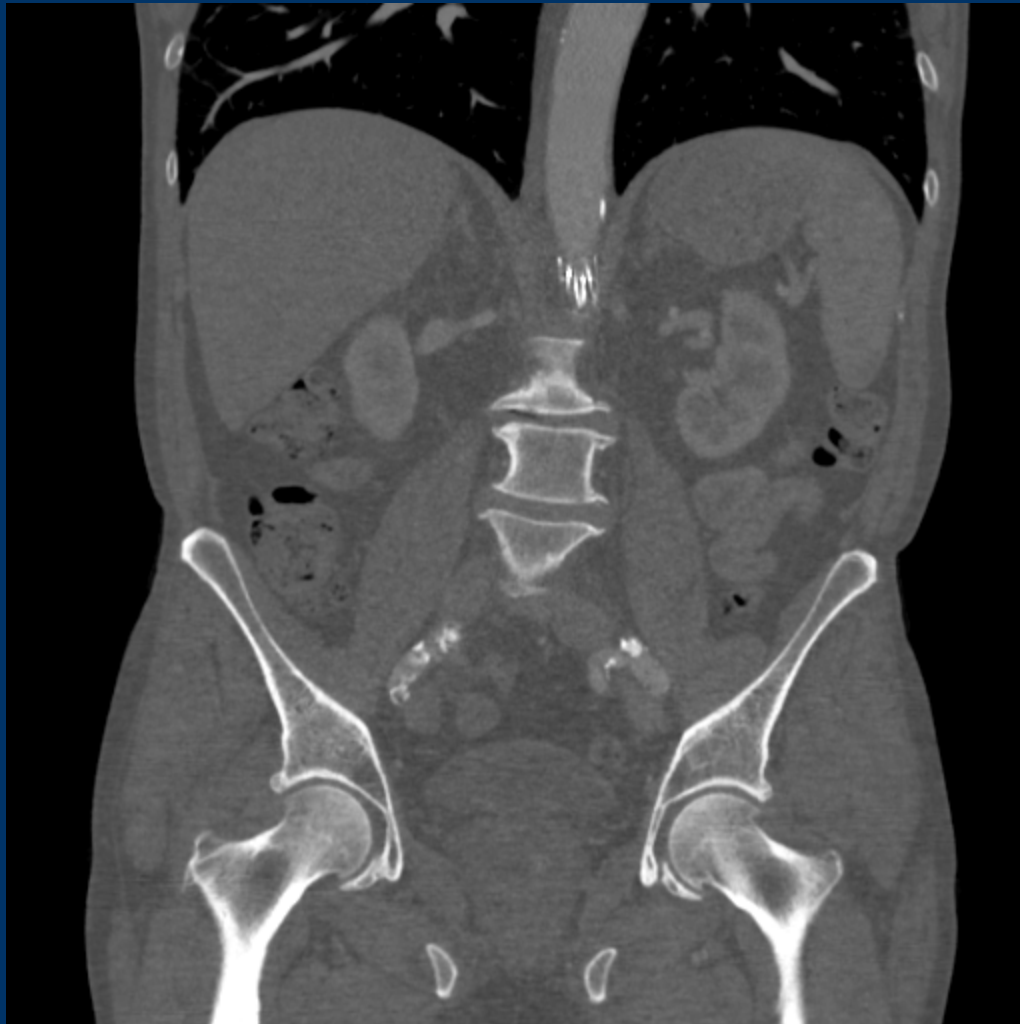
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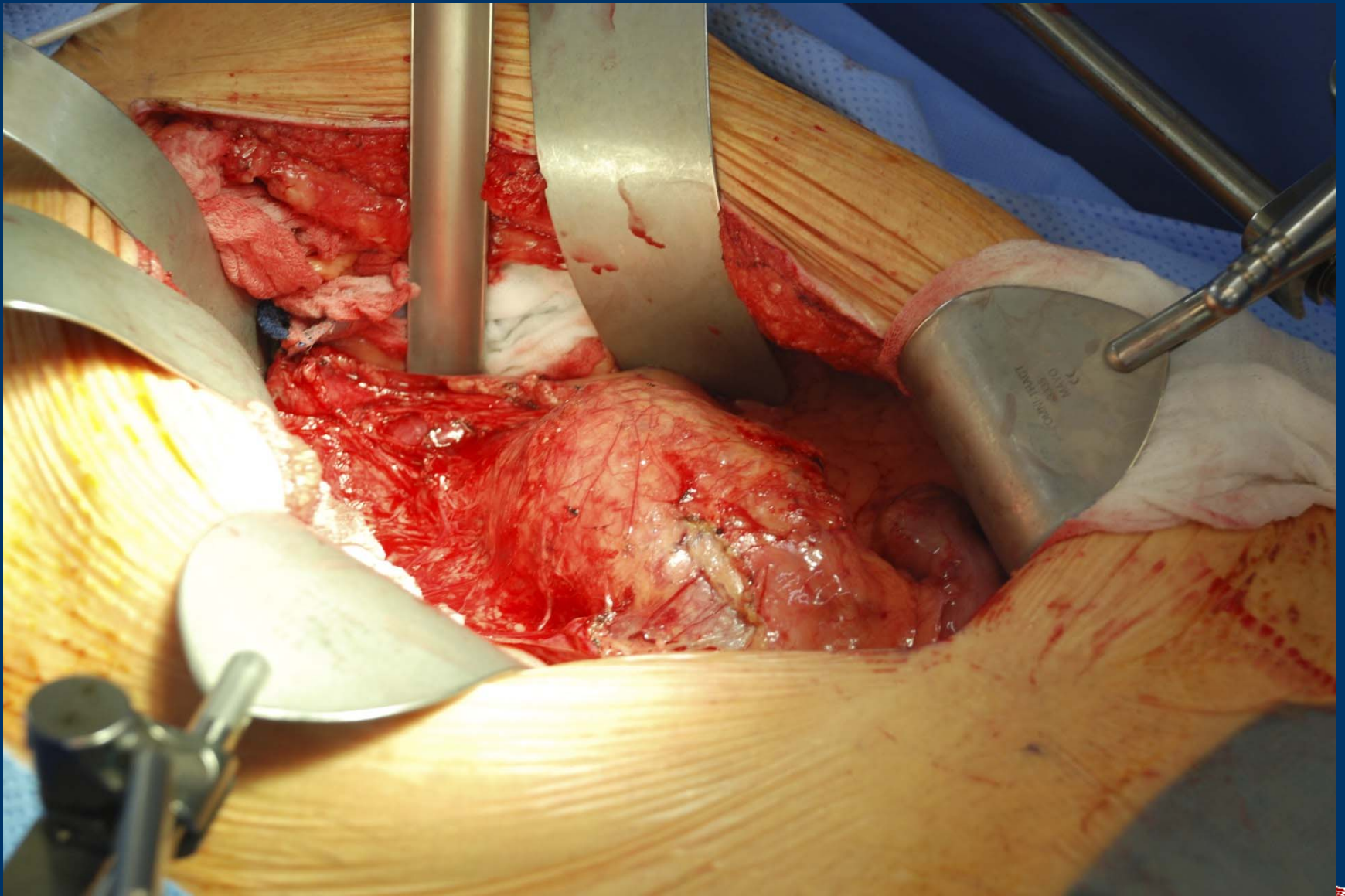
- Options discussed and the patient opted for open surgical repair
- OR Course
  - Bech/Alkhatib/Lee
    - Open Transabdominal approach
    - Partial Explantation of Endograft
    - Repair of AAA with 22mm Hemashield Bifurcated tube graft





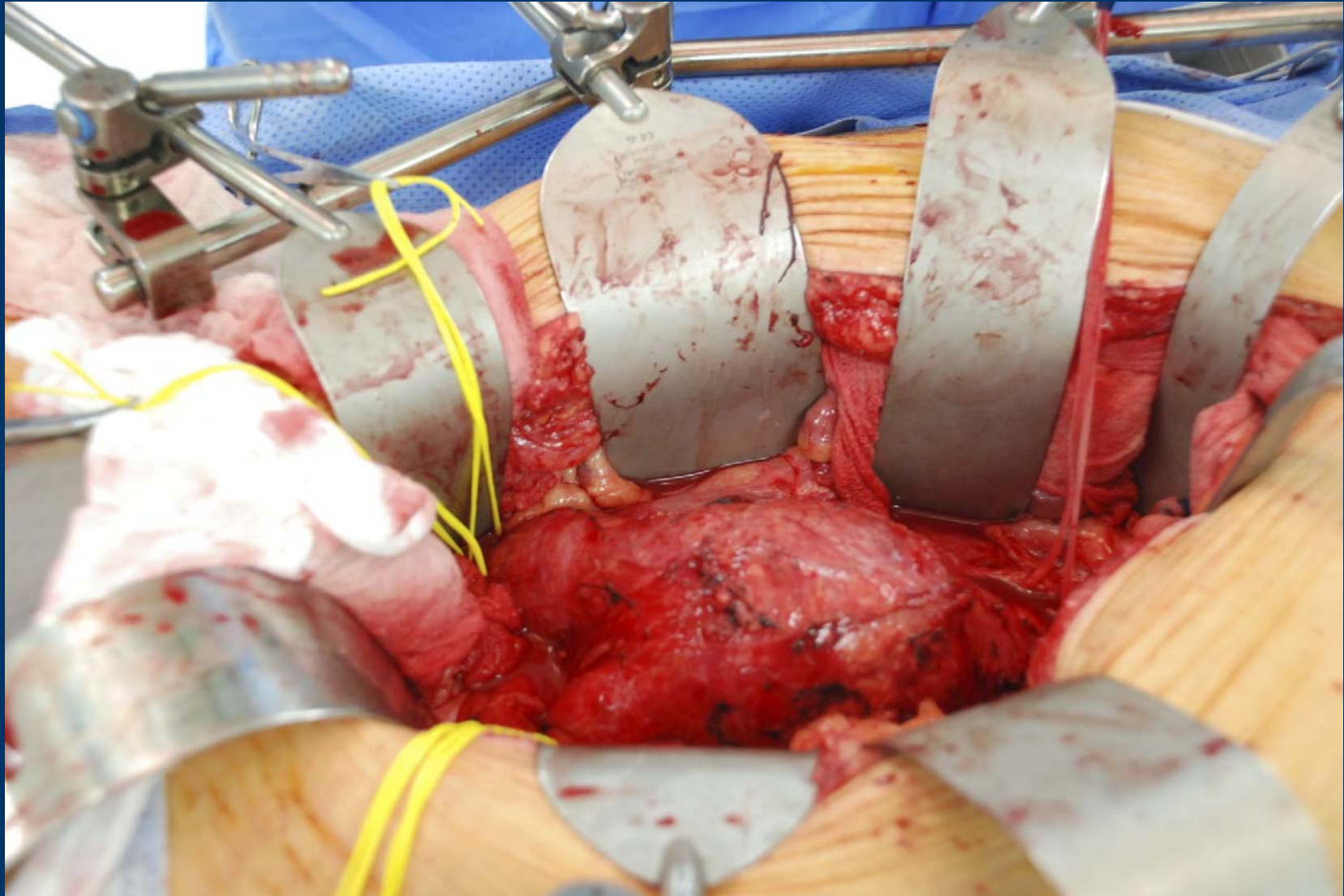
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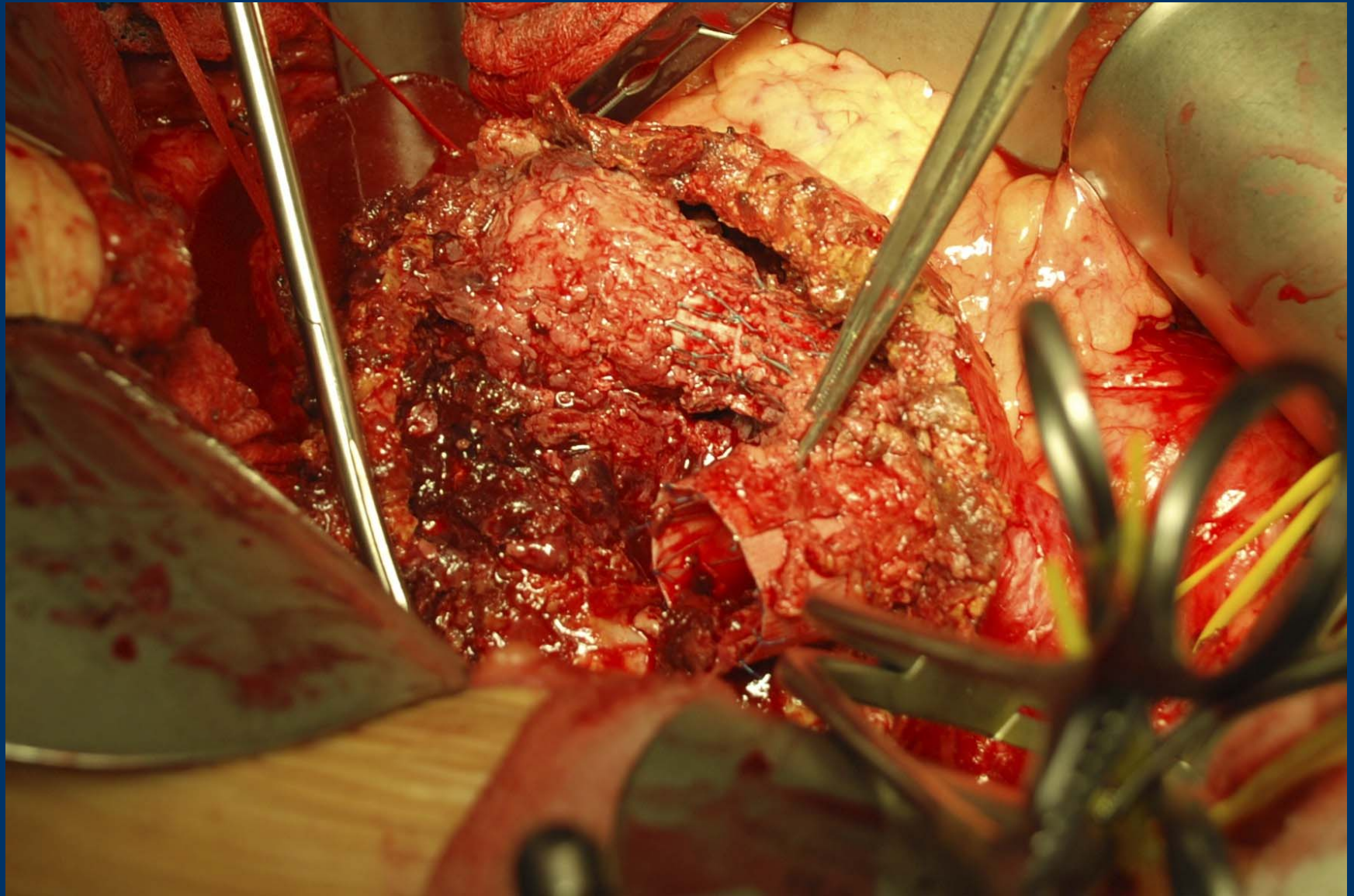




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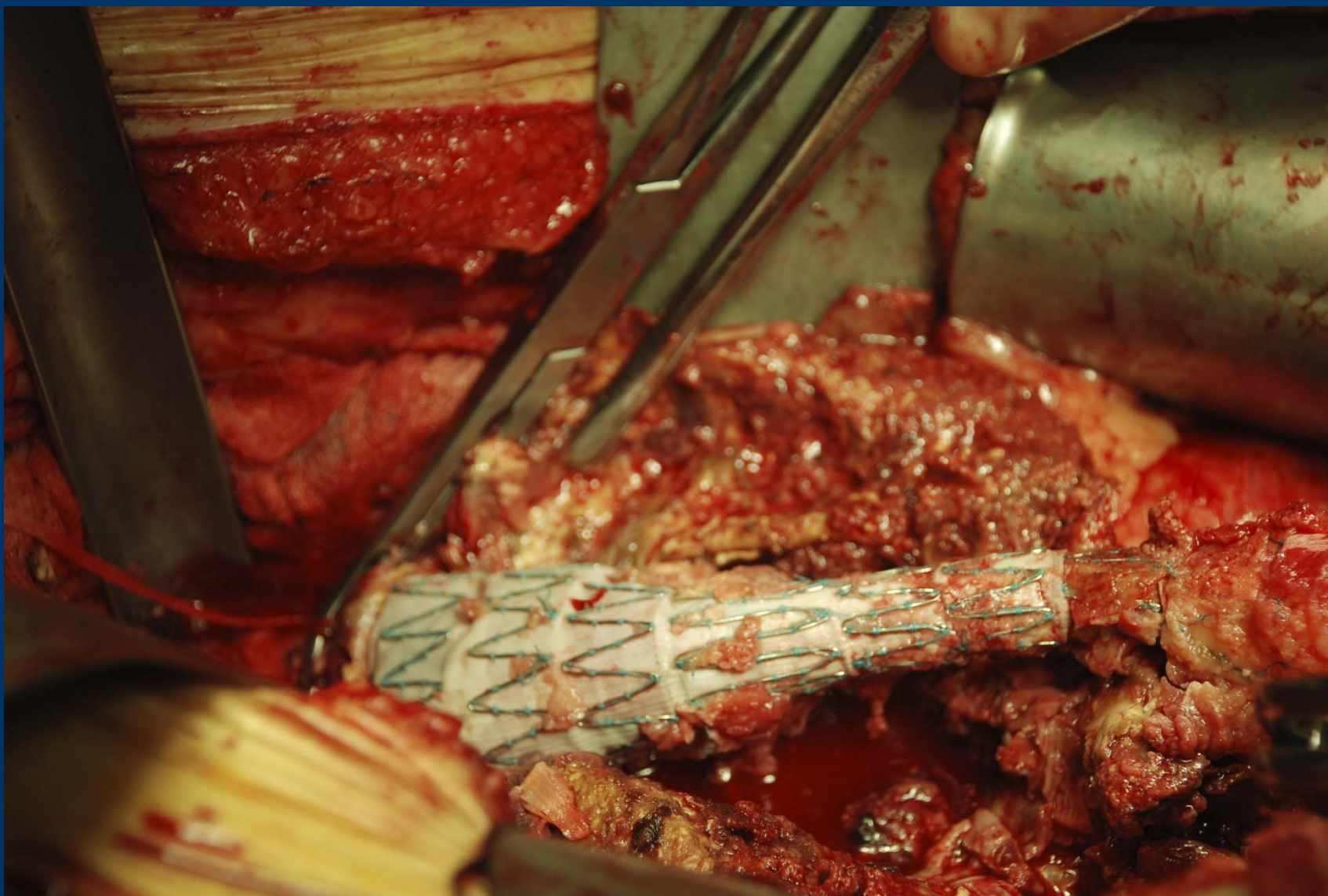






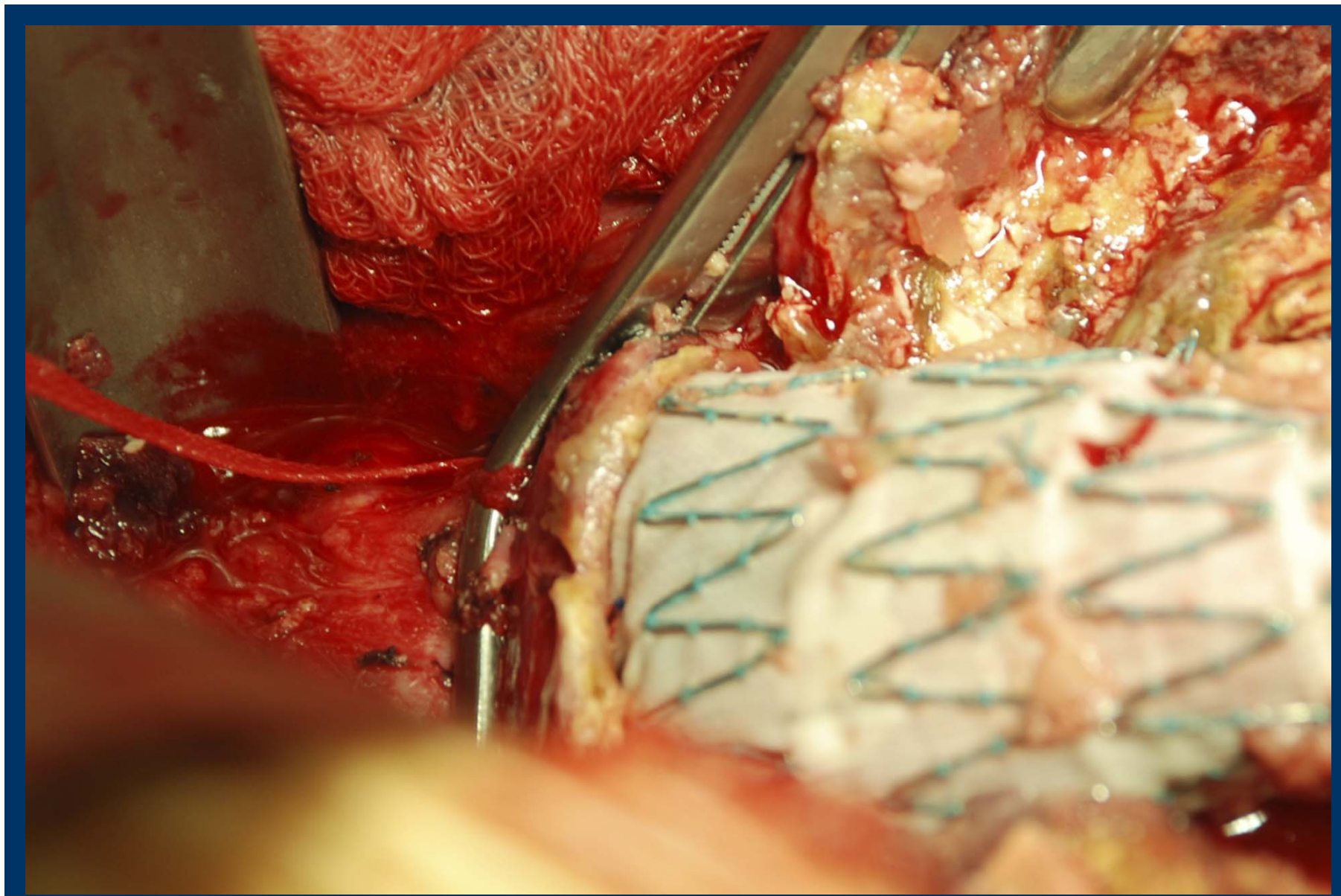
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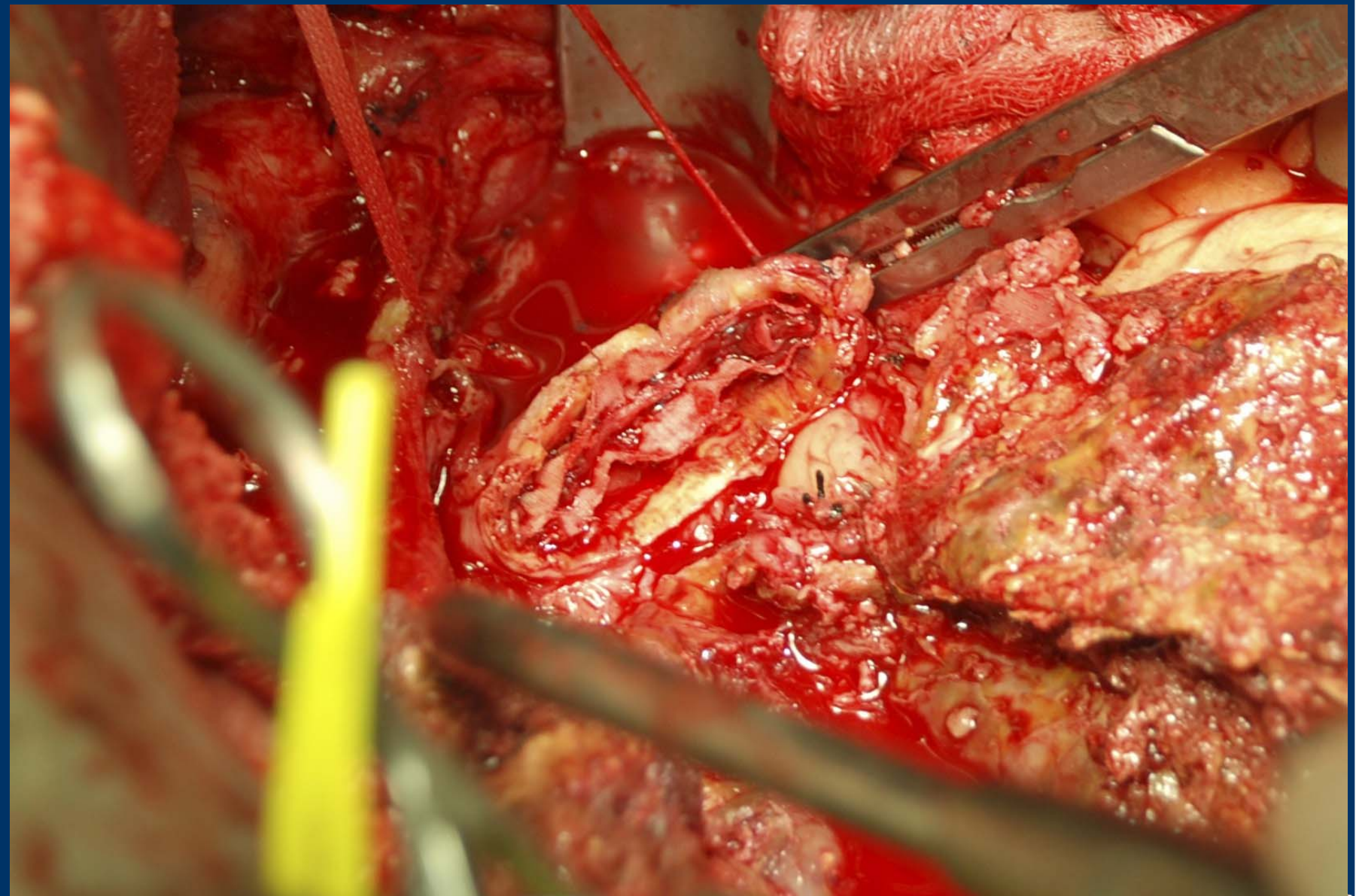
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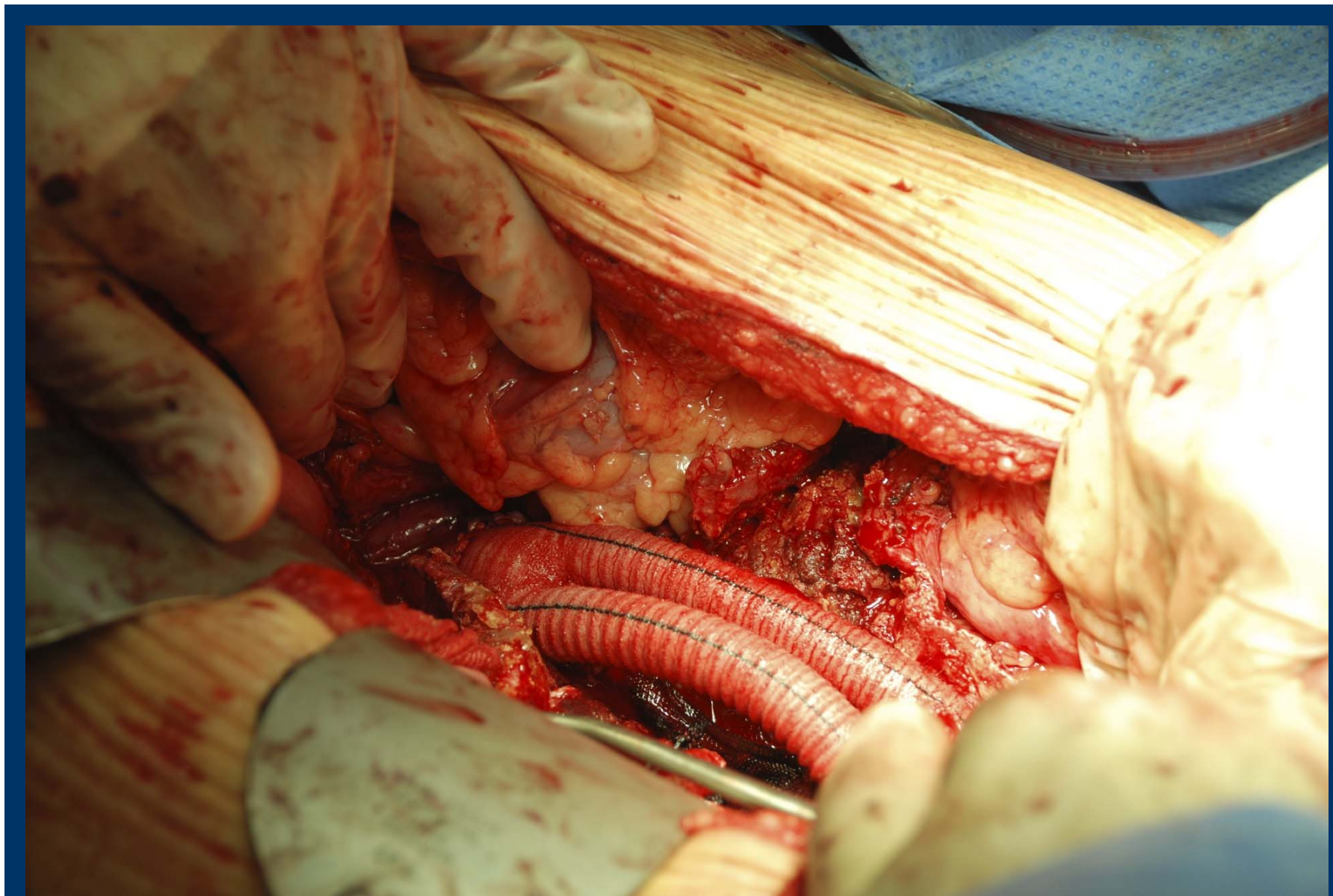
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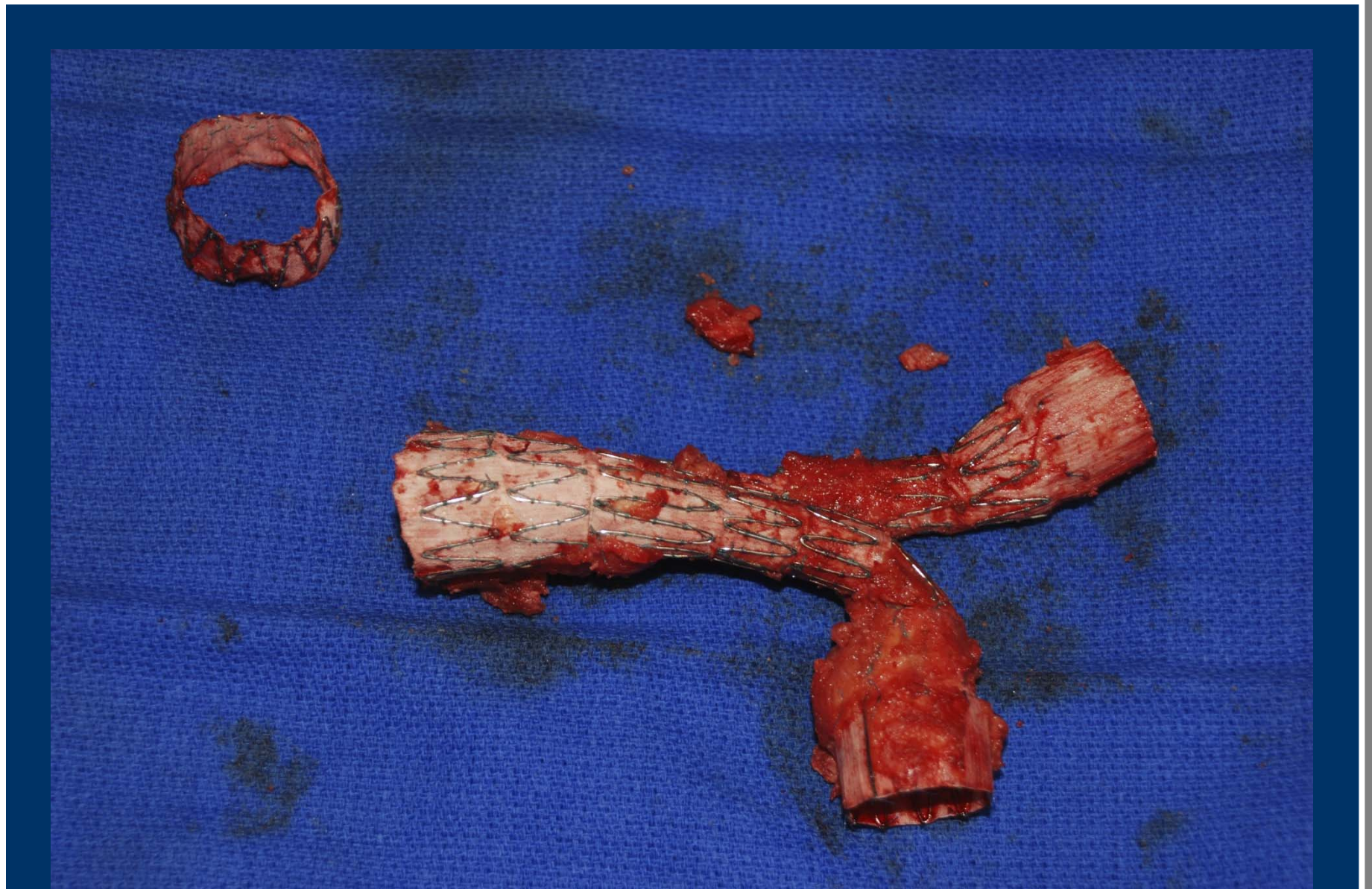
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- Post Op Course:
  - Extubated POD 1
  - Developed ETOH withdrawal POD 3
    - Treated with Dexmetomedine
  - Transferred out of ICU on POD 5
  - Discharged Home POD 7 without complication





Rebecca L. Kelso, MD, Sean P. Lyden, MD, Brett Butler, MD et al.

### Late conversion of aortic stent grafts

J Vasc Surg 2009;49:589-95

- Method: Retrospective analysis of EVAR patients requiring explantation >1 month after implantation.
  - Analysis was conducted of the type of graft, duration of implant, reason for removal, operative technique, death, and length of stay.
- Results: 1999-2007. 1606 EVARs 25 required explantation as well as 16 referred from outside institutions (n=41)

**Table I.** Indications for explant (patients may have  $\geq 1$ )

Variable	No. (%)
Patient total	41 (100)
Endoleak	30 (73)
Type I	16 (39)
Type II	9 (22)
Type III	9 (22)
Aneurysm growth	30 (73)
With endoleak	25 (83)
Without endoleak	6 (20)
Migration	10 (24)
Rupture	6 (15)
Aortoenteric fistula	3 (7)
Infected Graft	1 (2)
Limb thrombosis	3 (7)
Claudication	1 (2)



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Table II. The distributions of outcomes by graft type are shown <sup>a</sup>

Variable	Aneur, No. (%)	AneurX, No. (%)	Zenith, No. (%)	Excluder, No. (%)	Talent, No. (%)	P <sup>b</sup>
Total <sup>c</sup>	7	16	4	6	4	
Endoleak	4 (57)	14 (88)	3 (75)	2 (33)	3 (75)	.19
Type I	2 (29)	6 (38)	2 (50)		2 (50)	.41
Type II	2 (29)	6 (38)		1 (17)		.37
Type III	1 (14)	6 (38)	1 (25)		1 (25)	.45
Aneurysm growth	4 (57)	14 (88)	1 (25)	4 (67)	4 (100)	.057
With endoleak	3 (75)	13 (93)	1 (25)	2 (50)	3 (75)	.40
Migration	2 (29)	5 (31)	1 (25)		1 (25)	.70
Rupture	1 (14)	3 (19)	1 (25)			.77
Aortoenteric fistula	1 (14)	1 (6)		1 (17)		.99
Infected graft				1 (17)		.38
Limb thrombosis	2 (29)		1 (25)			.096
Death	2 (29)	3 (19)	1 (25)	1 (17)	1 (25)	.99

<sup>a</sup>Patients may have ≥1 indication for explant.

<sup>b</sup>P is from an exact Pearson  $\chi^2$  test.

<sup>c</sup>Four other grafts with N ≤1 were excluded from this analysis.



Rebecca L. Kelso, MD, Sean P. Lyden, MD, Brett Butler, MD et al.

## Late conversion of aortic stent grafts

J Vasc Surg 2009;49:589-95

- Outcomes: Mortality 19%
  - (4 ruptures, 1 infected graft, 1 Aortoenteric fistula, 1 following repair of aneurysmal visceral segment, and 1 who had claudication due to graft stenosis)
- Technical factors:
  - Proximal aortic control:
    - Suprarenal 23
    - Suprarenal 12
    - Infrarenal 6
  - Reconstruction
    - Aorto-iliac repair 63%
    - Tube graft 25%
  - Clamp Time
    - Suprarenal fixation vs. Infrarenal 43min vs. 28 min.
  - Graft Removal
    - Complete 85% (35)
    - Hybrid repair 15% (6)



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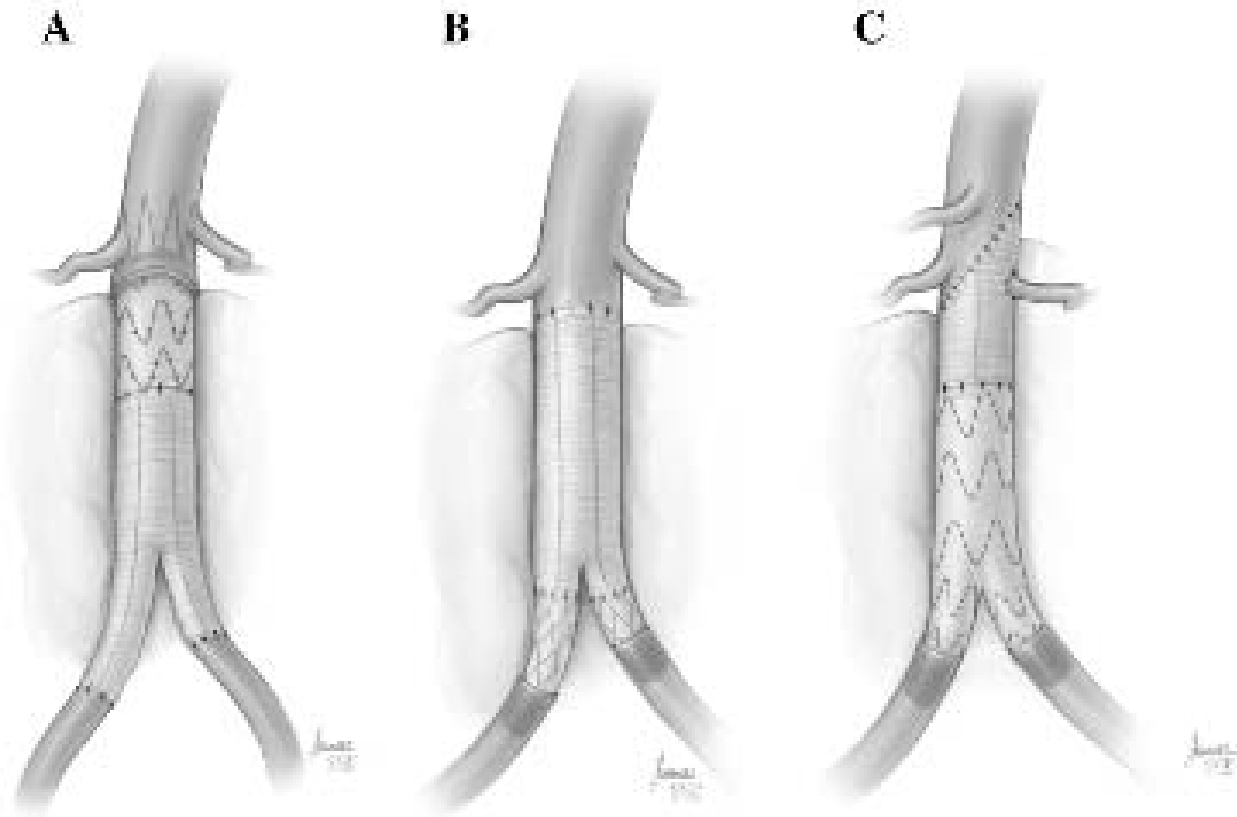


Fig 1. Hybrid reconstruction. Examples incorporating residual endografts into the aortic reconstruction. **A**, Incorporated proximal Zenith endograft into distal aortobiliac repair. **B**, Proximal Dacron graft with distal AneuRx limbs. **C**, Bevelled proximal Dacron graft with left renal implant anastomosed to distal Talent endograft.



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## Late conversion of aortic stent grafts

J Vasc Surg 2009;49:589-95

- Technical Considerations/Lessons Learned

- Previous studies have recommended Retroperitoneal vs. Midline approach

- No difference was found in this series
- Endografts with supra-renal fixation were more likely to be approached from a retroperitoneal approach and required suprarenal clamp. Once the graft was removed the clamp was moved infra-renal.

- Helpful Maneuvers

- Removal of supra-renal fixation using metal cutters
- Collapsing proximal fixation using a 20 ml syringe
- Pouring iced saline on nitinol stents to help reduce size and ease removal from the aortic wall.
- If the proximal or distal device is incorporated into the wall consider hybrid repair and incorporation of the device into the repair.
  - 2003 Lipsitz et al. reported follow up in 7 patients with partial resection and hybrid reconstruction
  - 22 months with no anastamotic complications
    - » 2 Technical points- incorporation of native artery into the anastomosis as an additional buttress, and tight closure of the aortic sac to minimize potential movement.
- In hybrid reconstructions patients should continue with annual endograft surveillance due to future complications of the endograft element.



Evan C. Lipsitz, MD, Takao Ohki, MD, PhD, Frank J. Veith, MD  
Delayed open conversion following endovascular aortoiliac aneurysm repair: Partial (or complete) endograft preservation as a useful adjunct.  
J Vasc Surg 2003;38:1191-8

- Method: Retrospective analysis 1192-2003, 11 patients required delayed conversion to open repair at an average of 30 mo.
- Results:
  - Talent (4), Vanguard (2,) AneuRx (1), and Surgeon (4)
  - 9 transabdominal, 1 retroperitoneal, 1 transabdominal plus thoracotomy
  - Performed for aneurysm rupture in 7 patients, Aneurysm enlargement in 4 patients
    - Rupture: (4 type 1 endoleak, 2 type 2 endoleak, 1 aortoenteric fistula)
    - Aneurysm enlargement: (1 type 1 endoleak, 1 type 2 endoleak, 1 type 3 endoleak, 1 endotension)
  - 2 deaths
  - Of the remaining 9 patients 1 graft completely removed, 6 partially removed, 2 left insitu.
    - Supraceliac balloon control (2), supraceliac clamping (1), suprarenal clamping (1), or infrarenal clamping (5)
  - Perioperative morbidity and mortality for all patients was 27%.
  - The Perioperative morbidity for those with any or all endograft remaining 13% vs. 67% for those with complete graft excision.
  - At mean follow up of 22 mo all patients with residual endograft remained without complication from endograft remnant.

Vascular Surgery



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Delayed open conversion following endovascular aortoiliac aneurysm repair: Partial (or complete) endograft preservation as a useful adjunct.

J Vasc Surg 2003;38:1191-8

- Technical Considerations

- Endografts with stents located outside the graft may be more difficult to remove due to the inflammatory reaction to the stent. May lead to more damage of the native artery during removal.
- Supraceliac balloon occlusion via brachial or femoral approach may decrease time until proximal control can be achieved, and reduce the need for difficult dissection of the suprarenal or supraceliac aorta, or extensive arteriotomy.
- Retroperitoneal approach facilitates suprarenal or supraceliac exposure however complicates exposure of the right iliac system or repair of the right renal artery.
- Removal of distal limbs often requires significant traction and may render the iliac arteries unsuitable target vessels for outflow.
- Given the situation, Partial or complete graft preservation may improve outcome.
- In cases in which standard graft is anastomosed to the endograft, recommend incorporation of the native artery into the suture line to buttress the anastomosis
- Tight closure of the aneurysm sac over the new graft complex to prevent twisting or buckling which may lead to graft dislodgement.

