PROVEN EFFICACY OF COVERED STENT (CERAB) TECHNIQUE IN TREATMENT OF AORTOILIAC OCCLUSIVE DISEASES

Prof. **Mahmoud Salah**

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Aortoiliac occlusive disease

According to TASC recommendations, lesions with

C & D better to be managed by surgical reconstruction

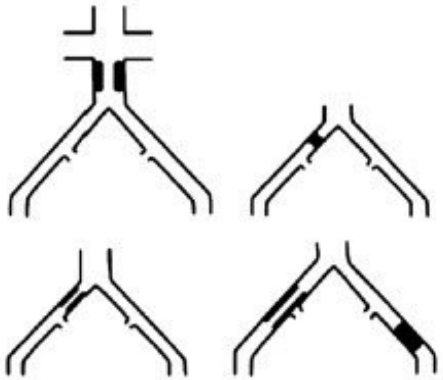
Some of them are high risk for intervention and needs alternate solution for their problem

Type A lesions

- Unilateral or bilateral stenoses of CIA
- Unilateral or bilateral single short (≤3 cm) stenosis of EIA

Type B lesions:

- Short (≤3cm) stenosis of infrarenal aorta
- Unilateral CIA occlusion
- Single or multiple stenosis totaling 3–10 cm involving the EIA not extending into the CFA
- Unilateral EIA occlusion not involving the origins of internal iliac or CFA

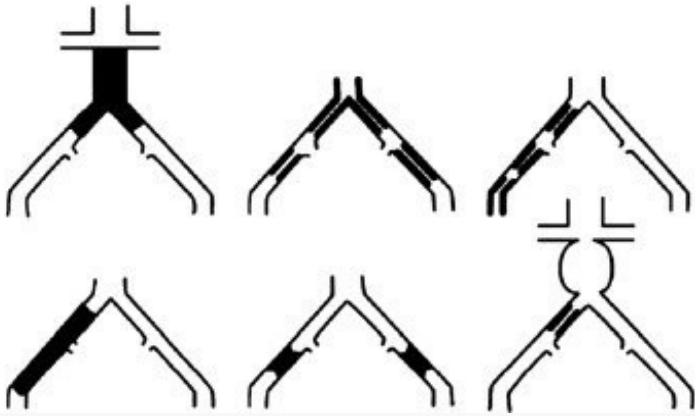


Type C lesions

- Bilateral CIA occlusions
- Bilateral EIA stenoses 3–10 cm long not extending into the CFA
- Unilateral EIA stenosis extending into the CFA
- Unilateral EIA occlusion that involves the origins of internal iliac and/or CFA
- Heavily calcified unilateral EIA occlusion with or without involvement of origins of internal iliac and/or CFA

Type D lesions

- Infra-renal aortoiliac occlusion
- Diffuse disease involving the aorta and both iliac arteries requiring treatment
- Diffuse multiple stenoses involving the unilateral CIA, EIA, and CFA
- Unilateral occlusions of both CIA and EIA
- Bilateral occlusions of EIA
- Iliac stenoses in patients with AAA requiring treatment and not amenable to endograft placement or other lesions requiring open aortic or iliac surgery



Surgical repair vs kissing stents

Inferior Patency rates based on neo-intemal hyperplasia kept the surgical intervention more favorable Options for decades

Evolution Of CERAB

A CERAB was First introduced in 2013.

To reconstruct the aortic bifurcation in a more anatomical and physiological fashion.

Unlikely for the kissing stents

Advantages of CERAB

Reduced Complications and shorter Recovery Time Compared to open surgery.

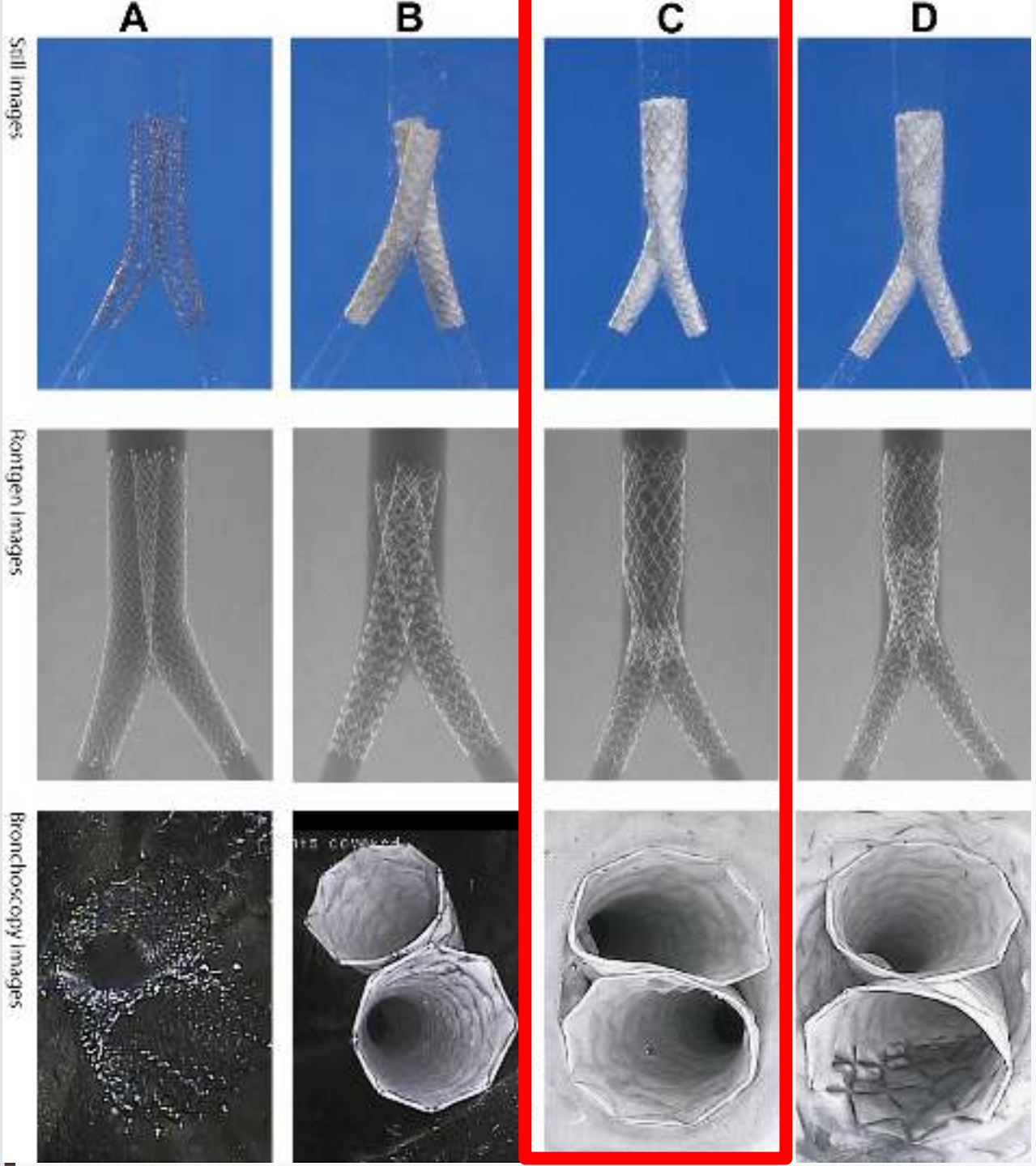
Improved Patency rates, reduced restenosis Compared to kissing stents .

A self-expandable nitinol kissing stents(KS)

B balloon-expandable kissing covered (KC) stents

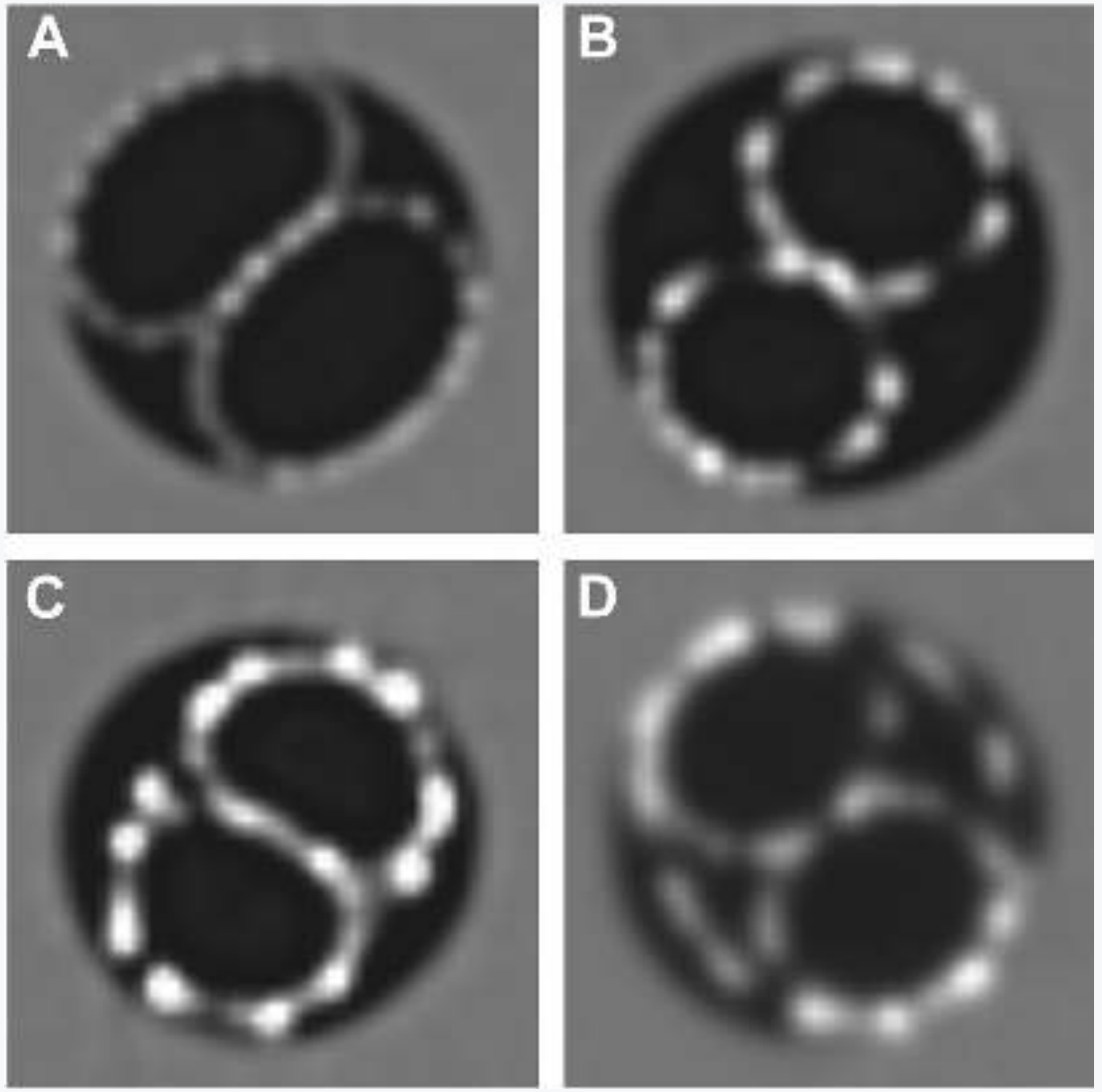
C Covered Endovascular Reconstruction of the Aortic Bifurcation (CERAB)-1 with the limbs starting in the tapered part of the aortic cuff

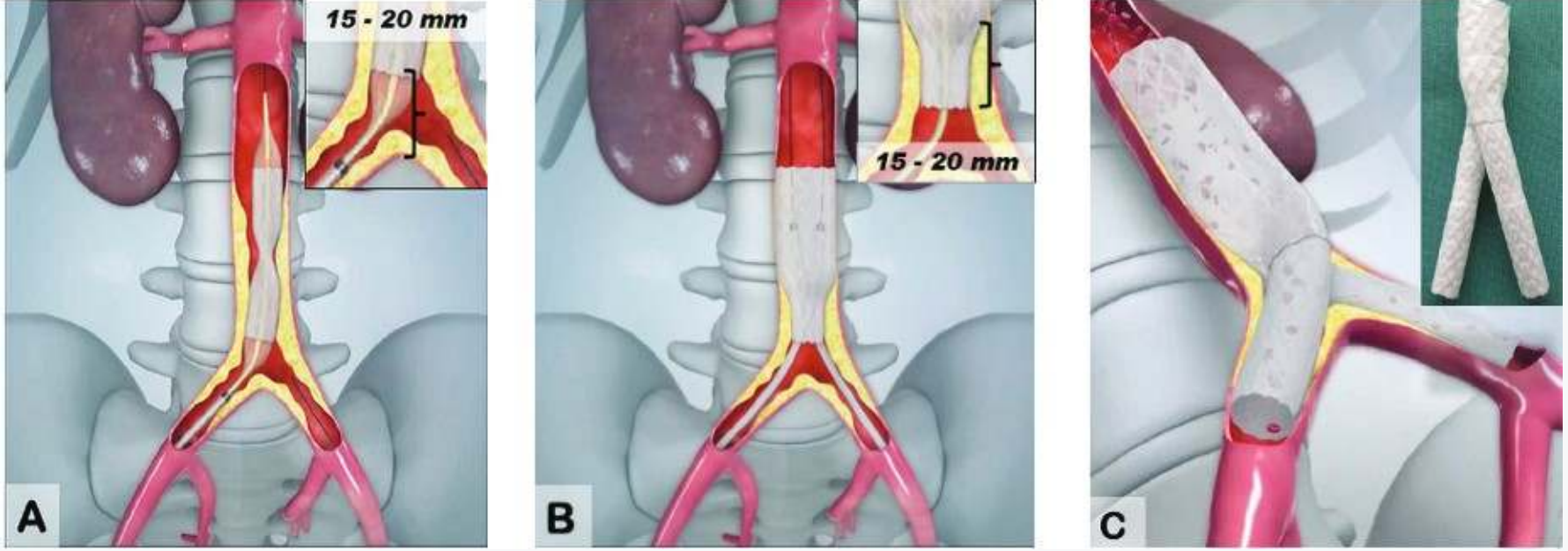
D CERAB-2 with the iliac limbs starting just above the tapered segment of the aortic cuff.



Axial slices of the computed tomography (CT) scans of the inflow portions of the four models

A, Self-expandable nitinol kissing stents (KS);
B, balloon-expandable kissing covered (KC) stents;
C, Covered Endovascular Reconstruction of the Aortic Bifurcation (CERAB)-1 with the limbs starting in the tapered part
of the aortic cuff;
D, CERAB-2 with the iliac limbs starting just above the tapered segment of the aortic cuff.





Procedure Details

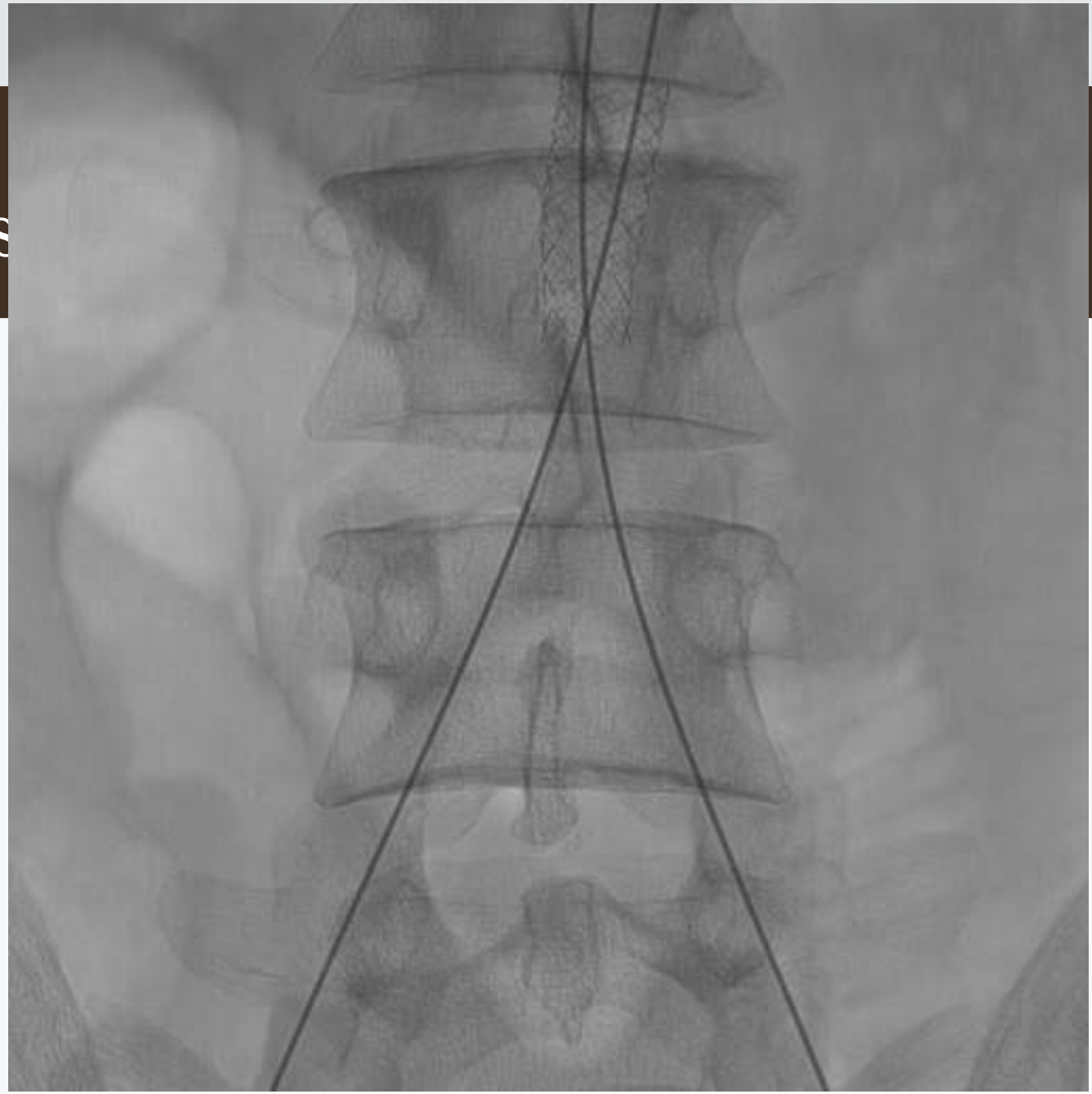
Procedure Details

Bilateral femoral Access and 2 sheaths were applied (9Fr and 7Fr).

Advance both wires inside the true lumen

Procedure Details

Deployment of
12-20 mm
covered stent .

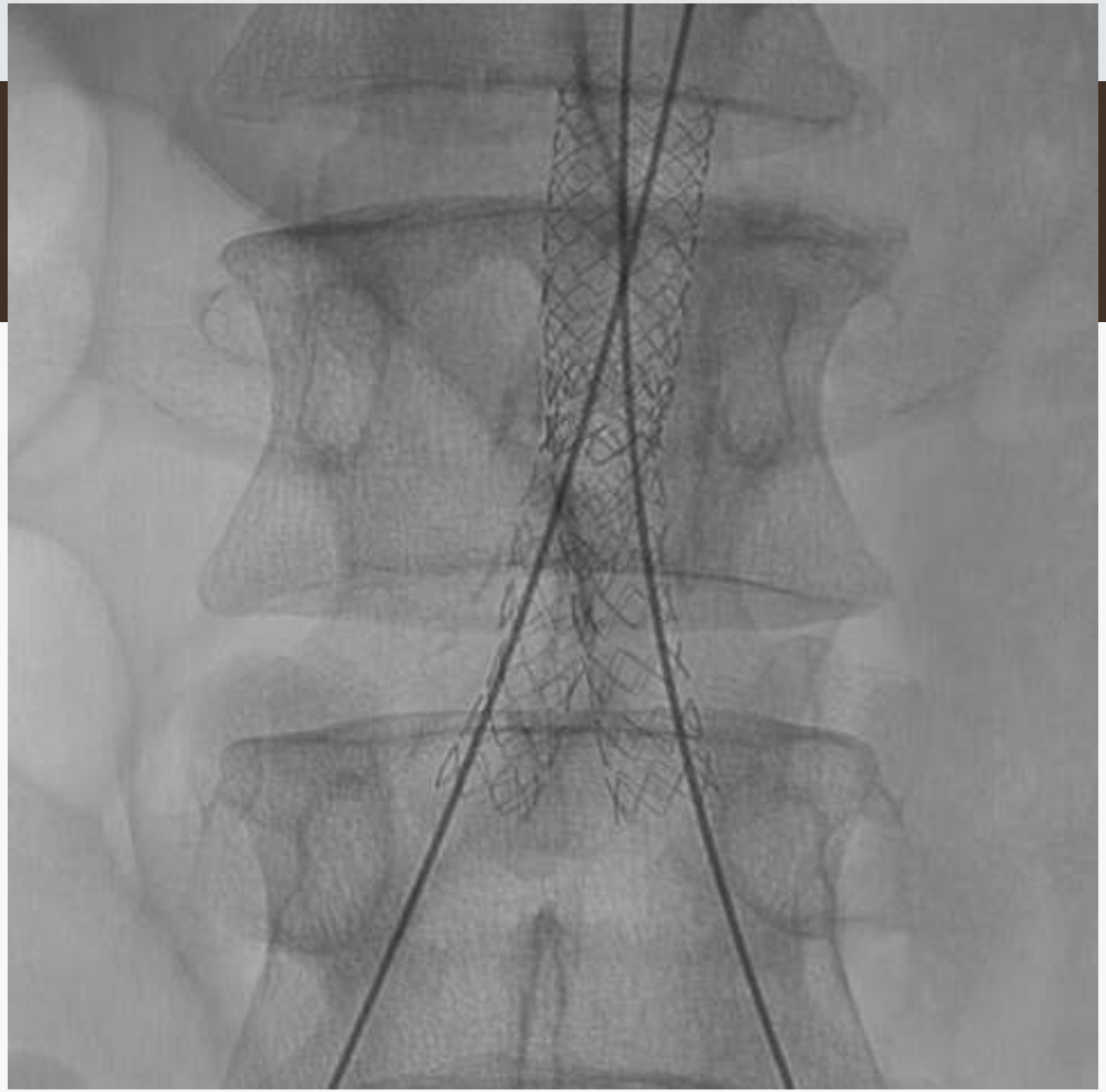


Procedure

Flaring
of the
proximal end

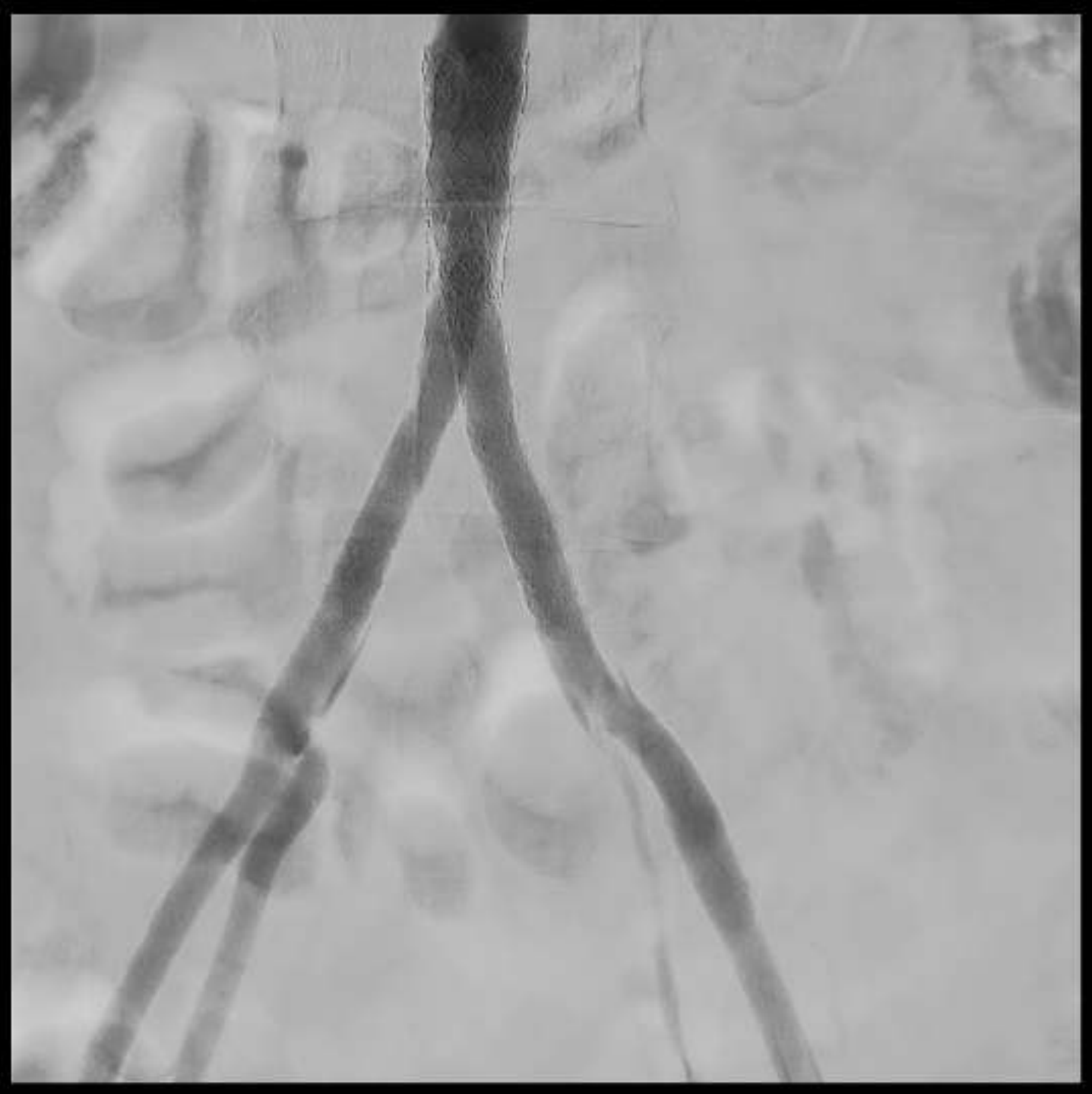
Procedure Details

Deployment of 7-10 mm covered stents from both sides inside the lowest tapered portion of the aortic cuff.



Procedure Detai

Final angiogram



Challenges and Limitations

Technical Challenges: Complex anatomy, operator skill level.

Potential Complications: Dissections, perforation, access complications.

Cost Considerations: Expense of stents and equipment.

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Treatment of Aortoiliac Occlusive Disease With the Covered Endovascular Reconstruction of the Aortic Bifurcation (CERAB) Technique: Results of a UK Multicenter Study

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Bella Huasen, MD, FRCR[3], Ansy Egun, MBBS, FRCS[3],
Jennifer Nash, MBChB, MRCS[4], Pui Fong Lau, MBBS, FRCR[4],
Arindam Chaudhuri, MBBS, MS, FRCSEd, MSc, FRCS[5],
Ramita Dey, MRCS, FRCR[5], Lorenzo Patrone, MD[6],
Martin Malina, MD, PhD[6], Robert Davies, MMedSci, MD, FRCS[1],
and Hany Zayed, MD, MSc, FRCS[2]

Abstract

Objective: This UK multicenter study aims to report early- and medium-term results following covered endovascular reconstruction of aortic bifurcation (CERAB) for the treatment of aortoiliac occlusive disease (AIOD) in patients with chronic limb threatening ischemia (CLTI) or intermittent claudication (IC). **Materials and Methods:** Retrospective case analysis was performed of patients who underwent CERAB between November 1, 2012 and March 31, 2020 in 6 centers across the United Kingdom. Anatomical data, including degree of plaque calcification, were assessed using preoperative imaging. Outcome measures included mortality, perioperative complications, target lesion reintervention (TLR), and major limb amputation. Primary, assisted primary, and secondary patencies were calculated at set intervals. **Results:** A total of 116 patients underwent CERAB over the study period for the following reasons [48% presenting with CLTI (Rutherford 4–6) and 52% with IC (Rutherford 1–3)]; 82% presented had Trans-Atlantic Inter-Society Consensus (TASC) D AIOD disease. Median age was 65 years (range 42–90 years); 76% of the cohort were male. Severely calcified aortic and iliac lesions were noted in 90% and 80% of patients, respectively. Over a median follow-up of 18 months (range 1–91 months), 2 (1.7%) patients were lost to follow up. In total 5, (4.3%) patients died and 2 (1.7%) had a major amputation. Endovascular TLR was required in 14 (12.1%) patients at last follow up. Surgical TLR was performed in 4 (3.4%) patients at last follow-up. Seven (6%) patients developed an aortic/iliac stent occlusion at last follow-up. The Kaplan-Meier (KM) freedom from TLR at 1 year was 94% and KM 1-year primary patency, assisted primary patency, and secondary patency were 88%, 94%, and 98% respectively. Subanalysis found the following features were associated with need for TLR; TASC D disease (OR = 2.45, 95% CI 1.44 to 3.71), severe aortic calcification (OR = 2.01, 95% CI 1.03 to 2.20), and presence of tissue loss at baseline (OR = 1.43, 95% CI 1.01 to 4.63). **Conclusion:** Perioperative (<30 days) and medium-term morbidity, mortality, and patency rates in this pragmatic cohort of patients with severe AIOD lesions show that CERAB is a valid revascularization option. A direct comparison with surgical treatments for AIOD in a randomized controlled trial is justified.

Keywords

Abstract

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freedom from TLR at 1 year was 94% and KM 1-year primary patency, assisted primary patency, and secondary patency were 88%, 94%, and 98% respectively. Subanalysis found the following features were associated with need for TLR; TASC

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Keywords

Journal of Vascular Surgery
Volume 79, Issue 6, June 2024, Pages 1525-1535.e9

Review article

Covered endovascular reconstruction of the aortic bifurcation: A systematic review aggregated data and individual participant data meta-analysis

Vangelis Bontinis MD, MSc [a], Alkis Bontinis MD, MSc [a], Argirios Giannopoulos MD, PhD [a], Vasiliki Manaki MD, MSc [a], Ioannis Kontes MD, MSc [a], Theofanis Papas MD, MSc, PhD, MA [b], Nikolaos-Nektarios Giannakopoulos MD, MSc [b], Kiriakos Ktenidis MD, PhD, EBSQ-VASC [a]

Evidence

Eleven retrospective case series, involving **579 patients**, were incorporated in the review with **88.9%** of the included lesions being categorized as Trans-Atlantic Inter-Society Consensus **(TASC) C or D**.

pooled primary patency estimates at **12, 24 and 36 months** were **94.4%** (95% CI , 89.4-99.7), **84.4%** (95% CI,

Evidence

mean primary patency time, representing the period during which **individuals remained event-free**, was **51.9 months** (95% CI, 43.6-55.4).

The pooled secondary patency estimates at **12, 24, and 36 months** were **98.6%** (95% CI, 96.2-100.0), **97%** (95% CI, 93.1-100.0), and **97%** (95% CI, 93.1-100.0), respectively.

First published online June 13, 2023

Outcomes of Covered Endovascular Reconstruction of the Aortic Bifurcation (CERAB) Procedure for the Treatment of Extensive Aortoiliac Occlusive Disease Using the BeGraft Balloon-Expandable Covered Stent: A Multicenter Observational Study

Łukasz Kruszyna, PhD, Ewa Strauss, PhD, [...], and Zbigniew Krasiński PhD +7 View all authors and affiliations

Results:

In all, 120 patients (64 men) with a median age of 65 years (range: 34–84 years) were analyzed. Most patients had extensive AIOD classified as TASC II C (n=32; 26.7%) or TASC II D (n=81; 67.5%). The median duration of the procedure was 120 minutes (interquartile range [IQR]: 80–180 minutes). All 454 BeGraft stents (137 aortic and 317 peripheral) were successfully delivered and deployed. The overall procedural complication rate was 14 (11.7%). The median hospital length of stay was 5 days (IQR: 3–6 days). All patients improved clinically, and the ABI increased significantly ($p<0.05$). The median follow-up was 19 months (range: 6–56 months). The primary patency rate, secondary patency rate, and freedom from TLR at 12 months were 94.5%, 97.3%, and 93.5%, respectively.

Review article

Meta-analysis of direct surgical versus endovascular revascularization for aortoiliac occlusive disease

Presented as an oral presentation at Leipzig Interventional Course (LINC) 2019, Leipzig, Germany, January 22-25, 2019.

Sobath Premaratne MRCS, Jeremy Newman FRCS, Simon Hobbs FRCS, Andrew Garnham FRCS, Mike Wall FRCS

Studies eligible for the meta-analysis were clinical studies comparing DS and EVH revascularization for AIOD published in English. Patients presenting with claudication, rest pain, or tissue loss with aortoiliac lesions classified as TASC C and D were included. Studies investigating outcomes after aortobifemoral or aortobi-iliac bypass, aortounifemoral or aortouni-iliac bypass, or iliofemoral inline bypass, with or without common femoral endarterectomy (CFE), were included in the DS group. Studies investigating angioplasty, covered or bare-metal stenting, or self-expanding or balloon-expandable stents, with or without CFE, were included in the EVH group. The hybrid endovascular procedure

Eleven observational studies were identified comparing a sample of 4030 patients. The median Methodological Index for Non-Randomized Studies score was 19 of 24. A total of 1679 and 2351 patients underwent DS and EVH techniques, respectively. No significant lung disease, were comparable. Average hospital stay was significantly higher for the DS group (7.76 days vs 3.12 days; $P = .025$). Change in ankle-brachial pressure index, 30-day mortality, and 30-day graft/sten thrombosis were not significantly different for the groups. Overall, primary patency for a median follow-up of 50 months favored the DS group (hazard ratio [HR], 0.51; confidence interval [CI], 0.36-0.73; $P = .0002$). There was moderate heterogeneity among studies ($I^2 = 46\%$). The HR for the subgroup for which endovascular procedures were combined with common femoral endarterectomy was 0.43 compared with 0.88 for endovascular revascularization alone. Limb salvage was similar in both groups (HR, 1.10; CI, 0.74-1.64; $P = .63$), but overall survival after the procedure favored the DS group (HR, 0.75; CI, 0.60-0.94; $P = .01$; $I^2 = 0\%$).

Case 1

65-year-old male patient DM HTN

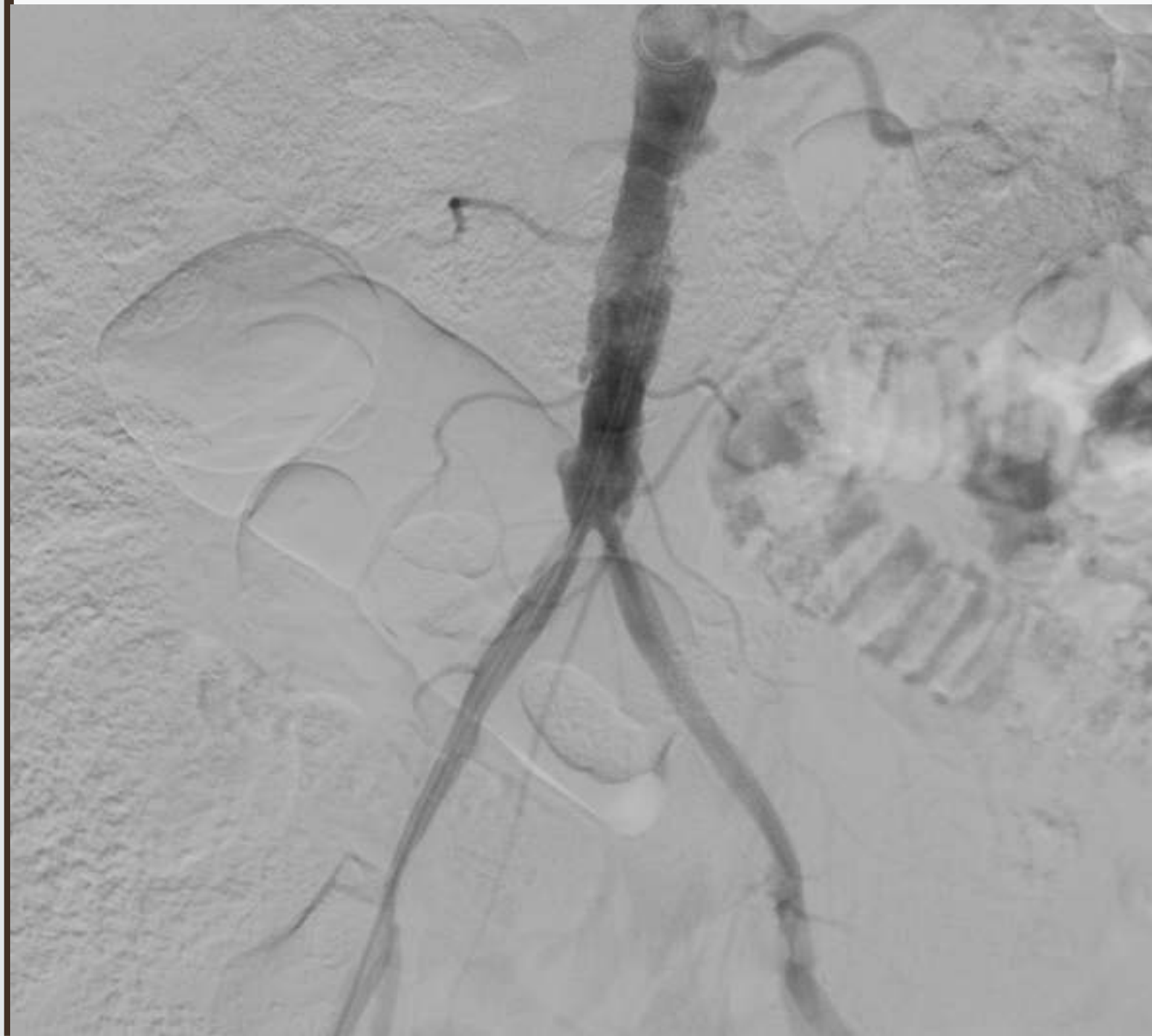
heavy smoker, Severe claudication .

absent Right femoral pulse,

weak Left femoral pulse.

CT Angio revealed bilateral CIA stenosis and right EIA stenosis.

Case 1



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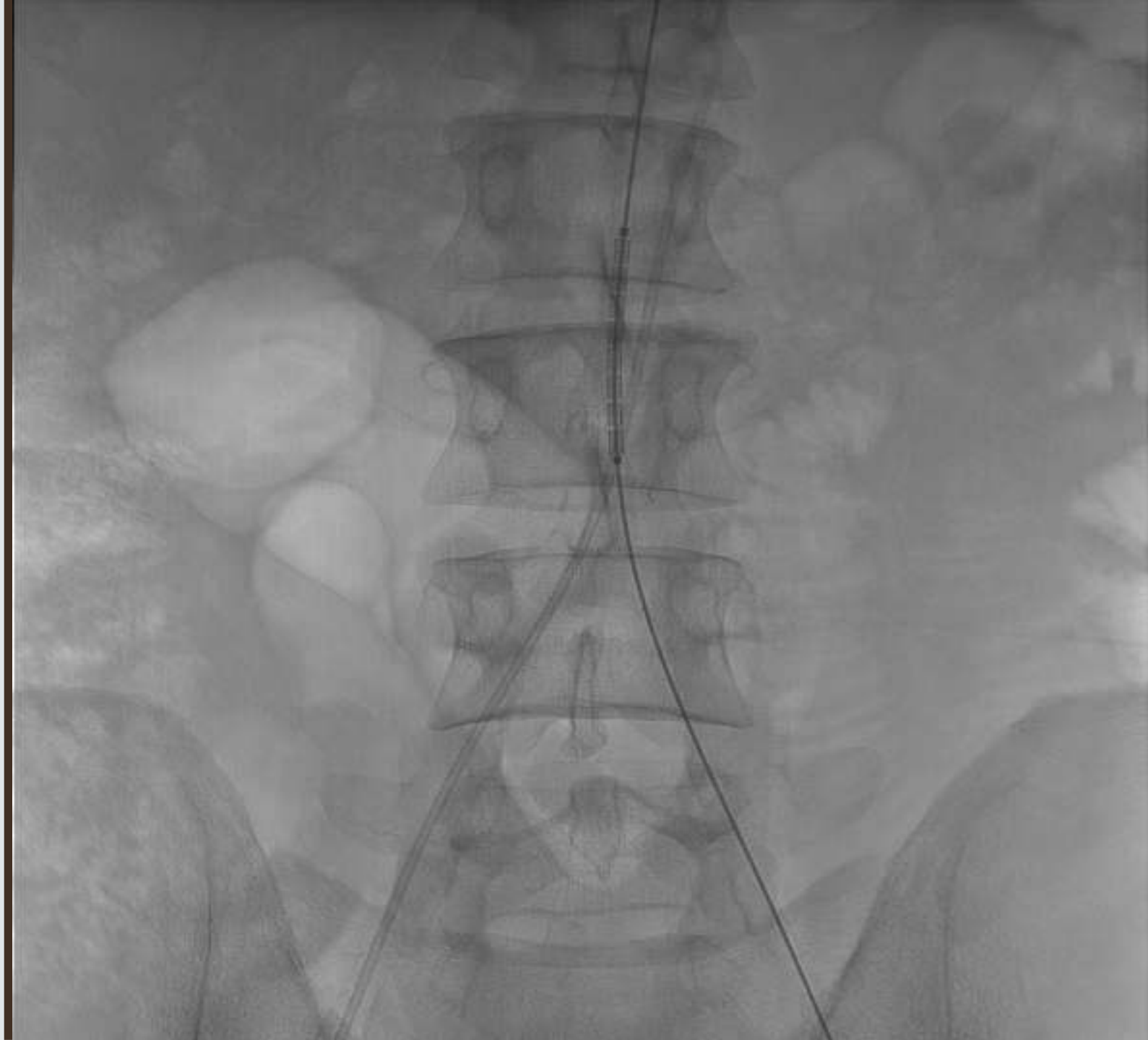

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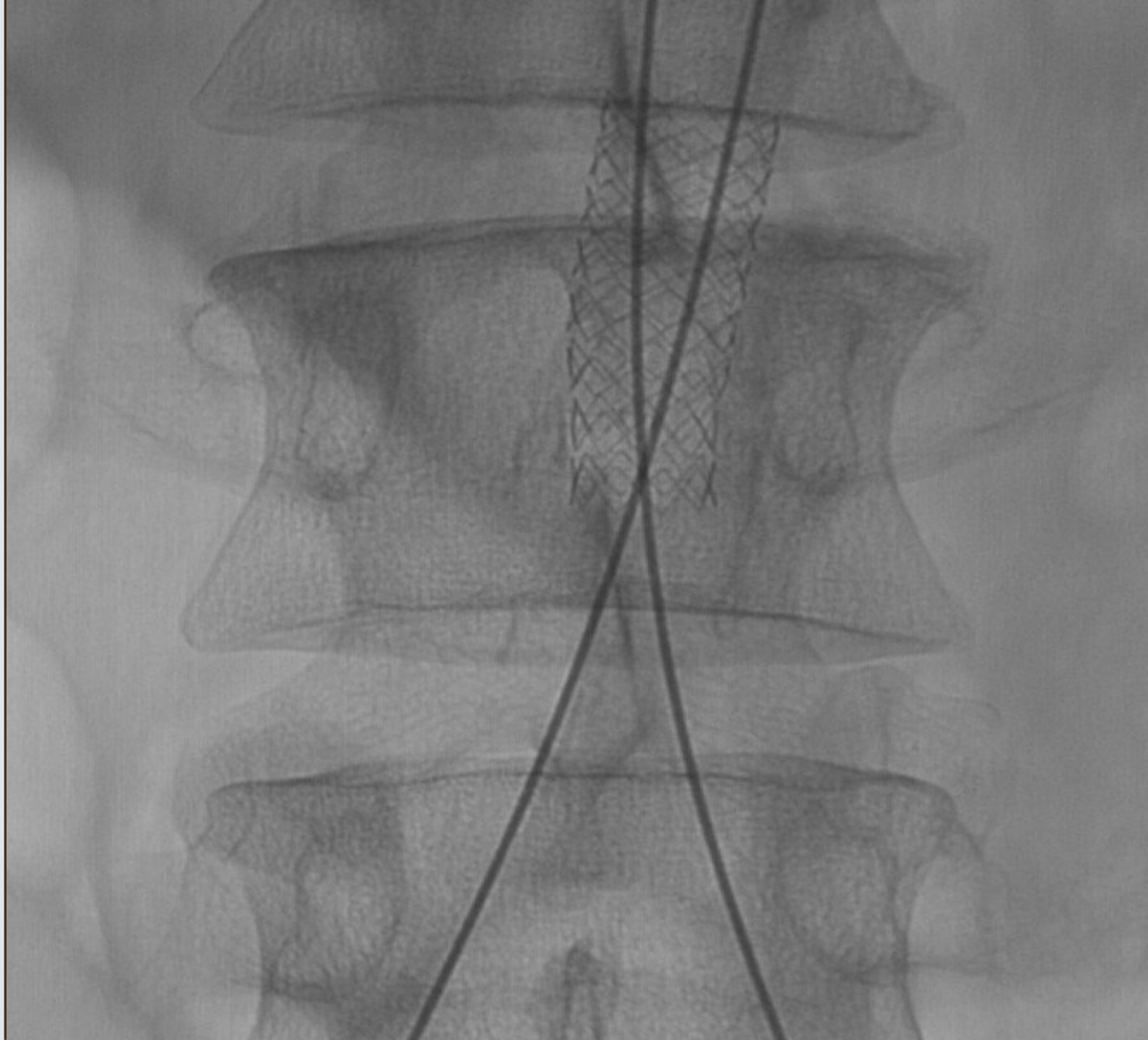

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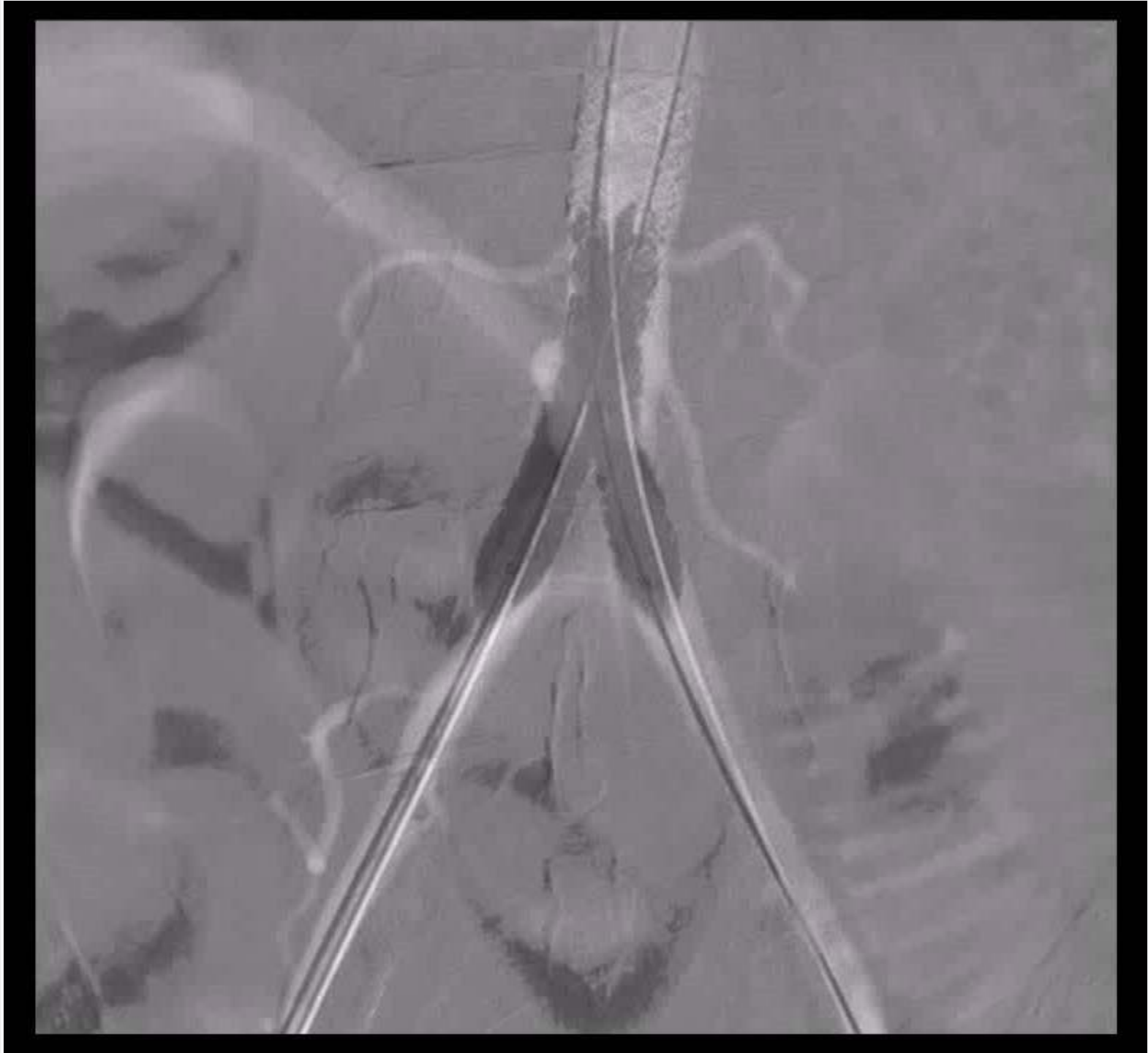

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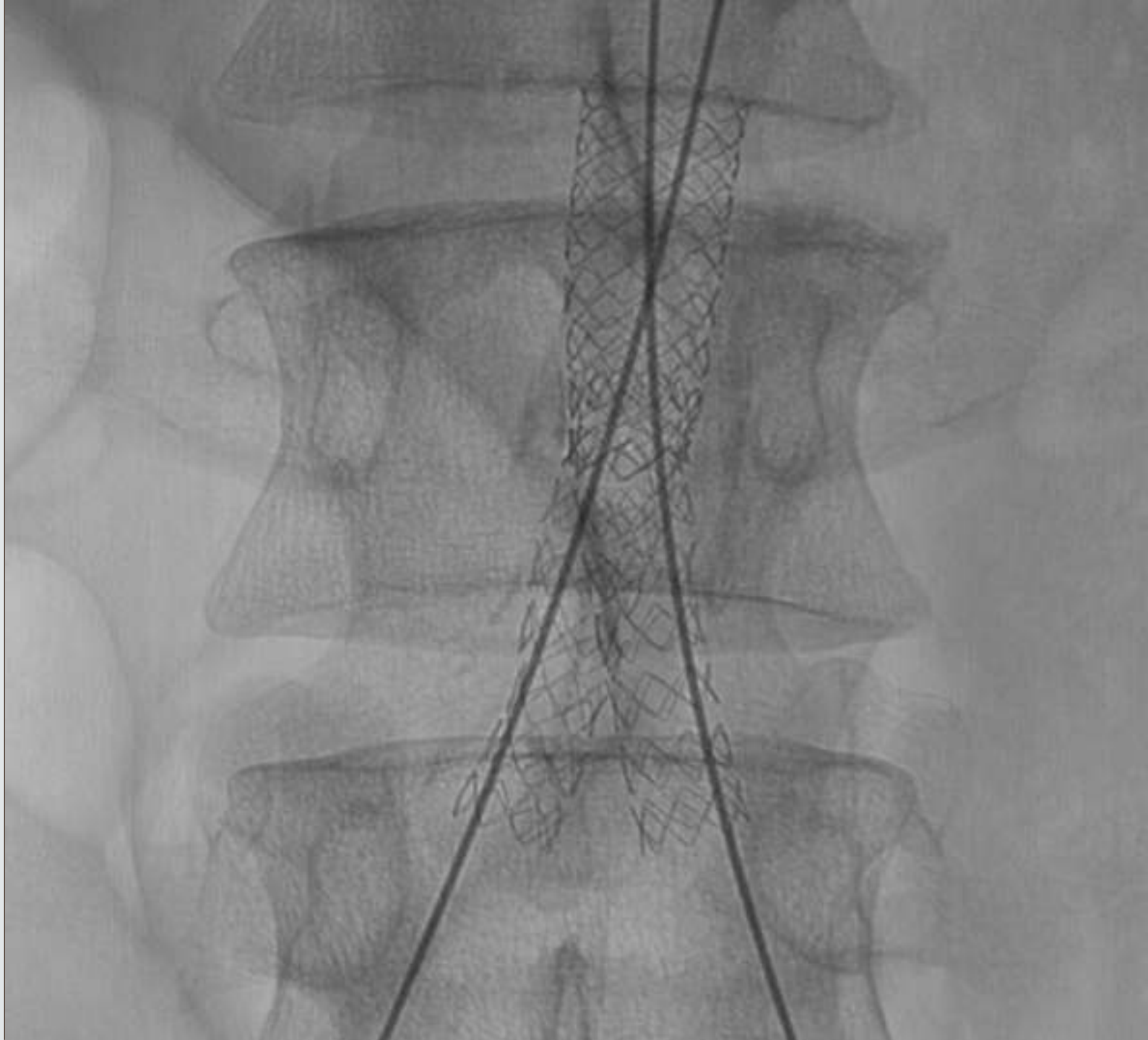
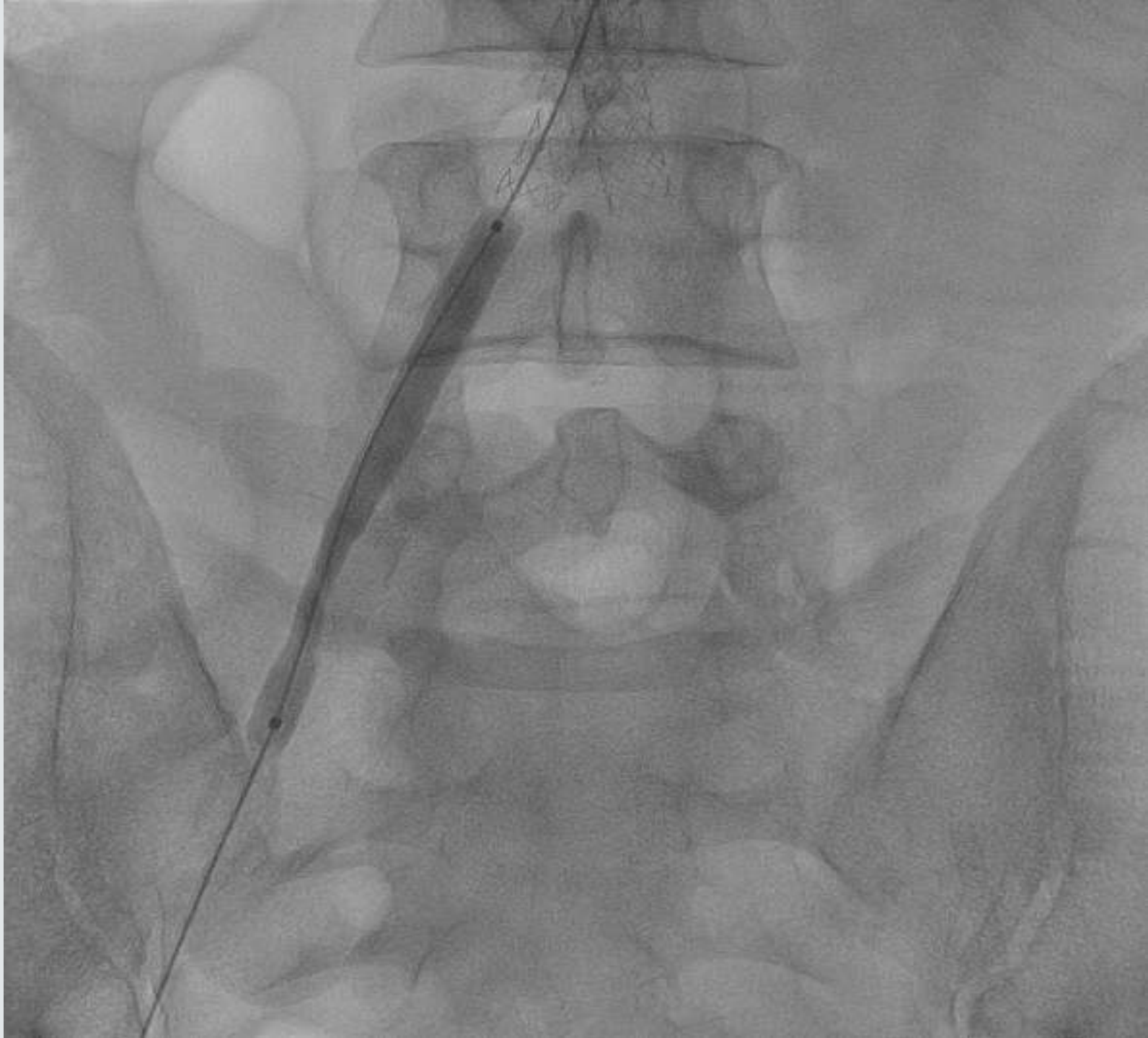


Case 1

Case 2



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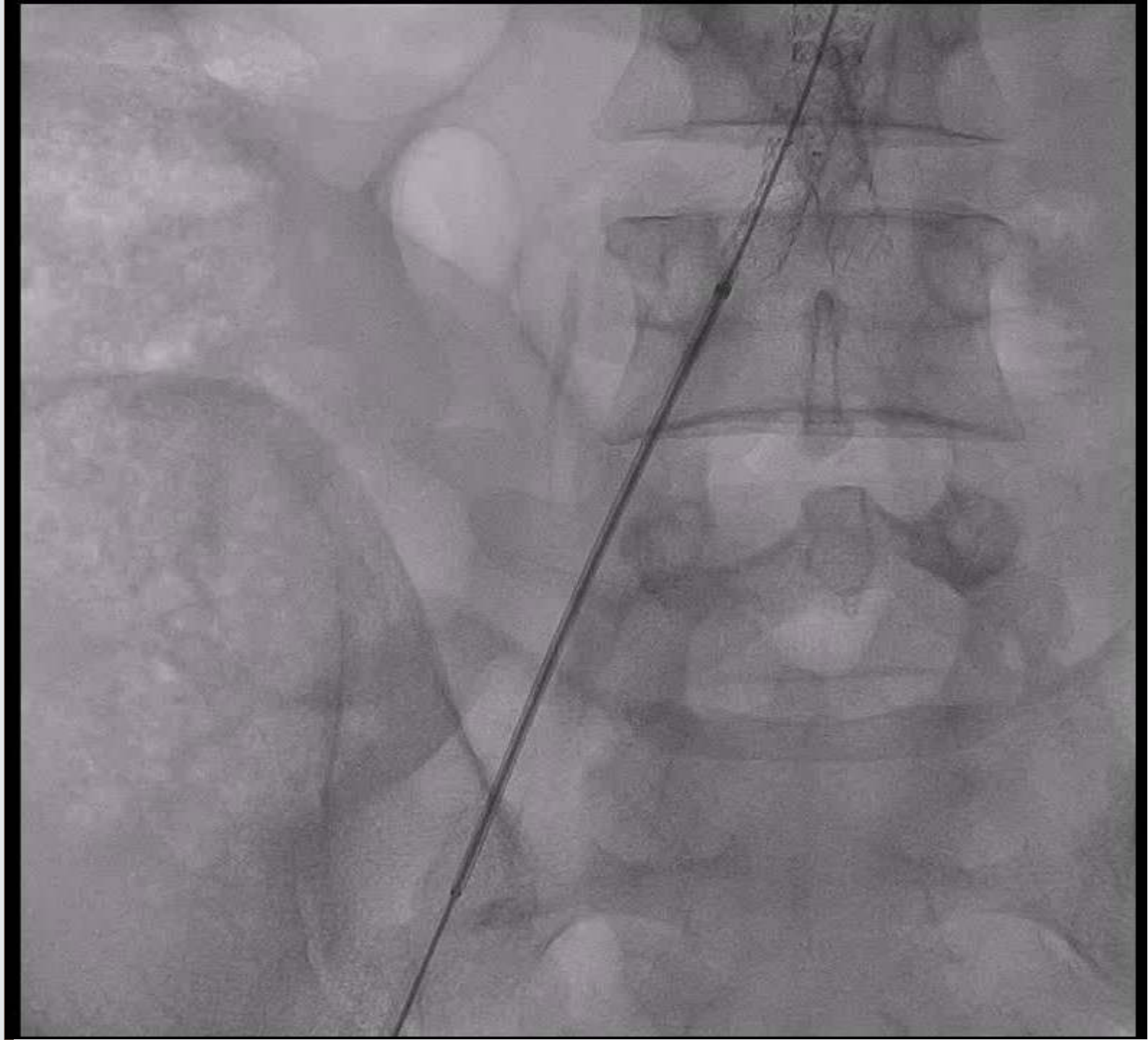

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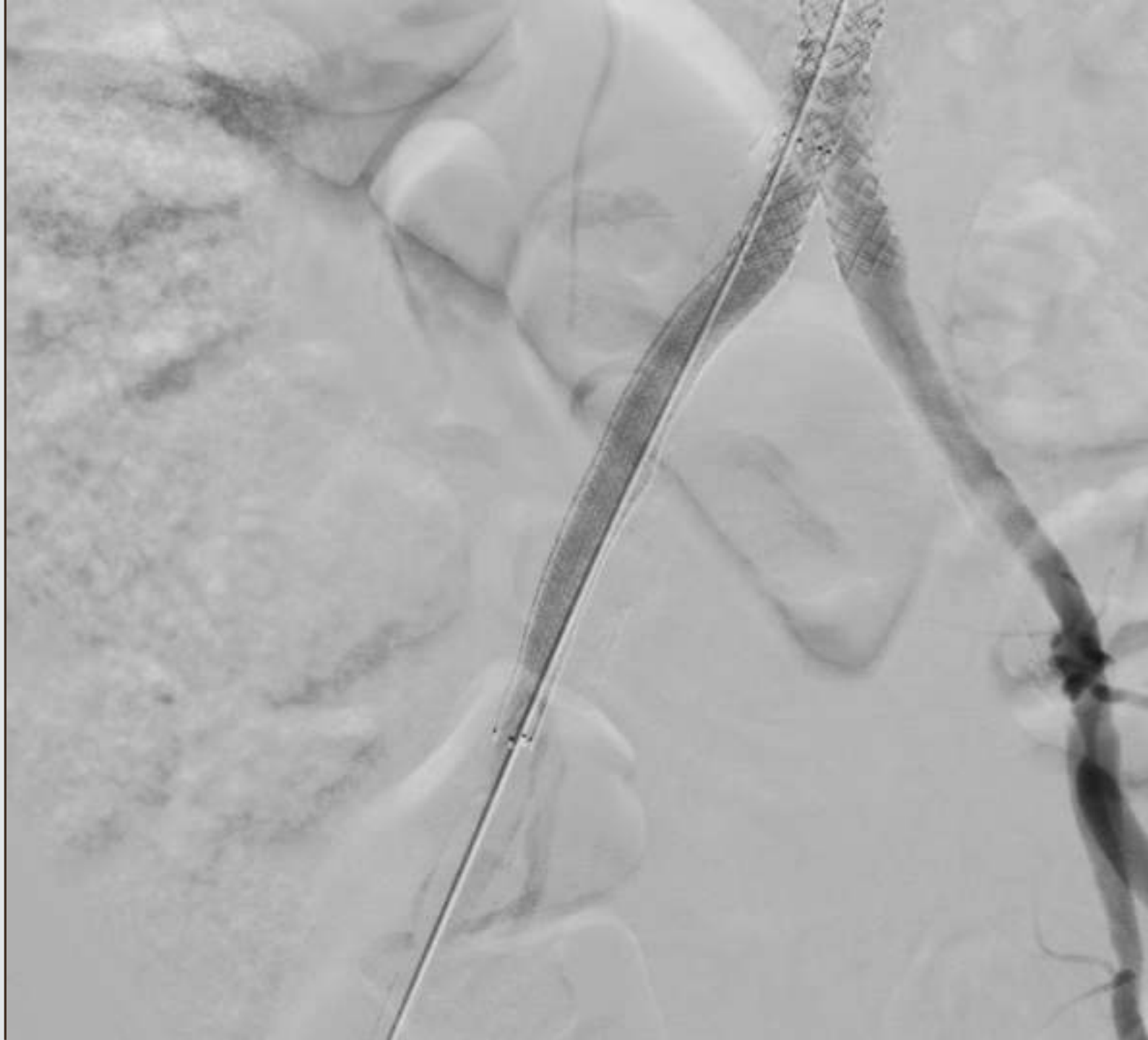

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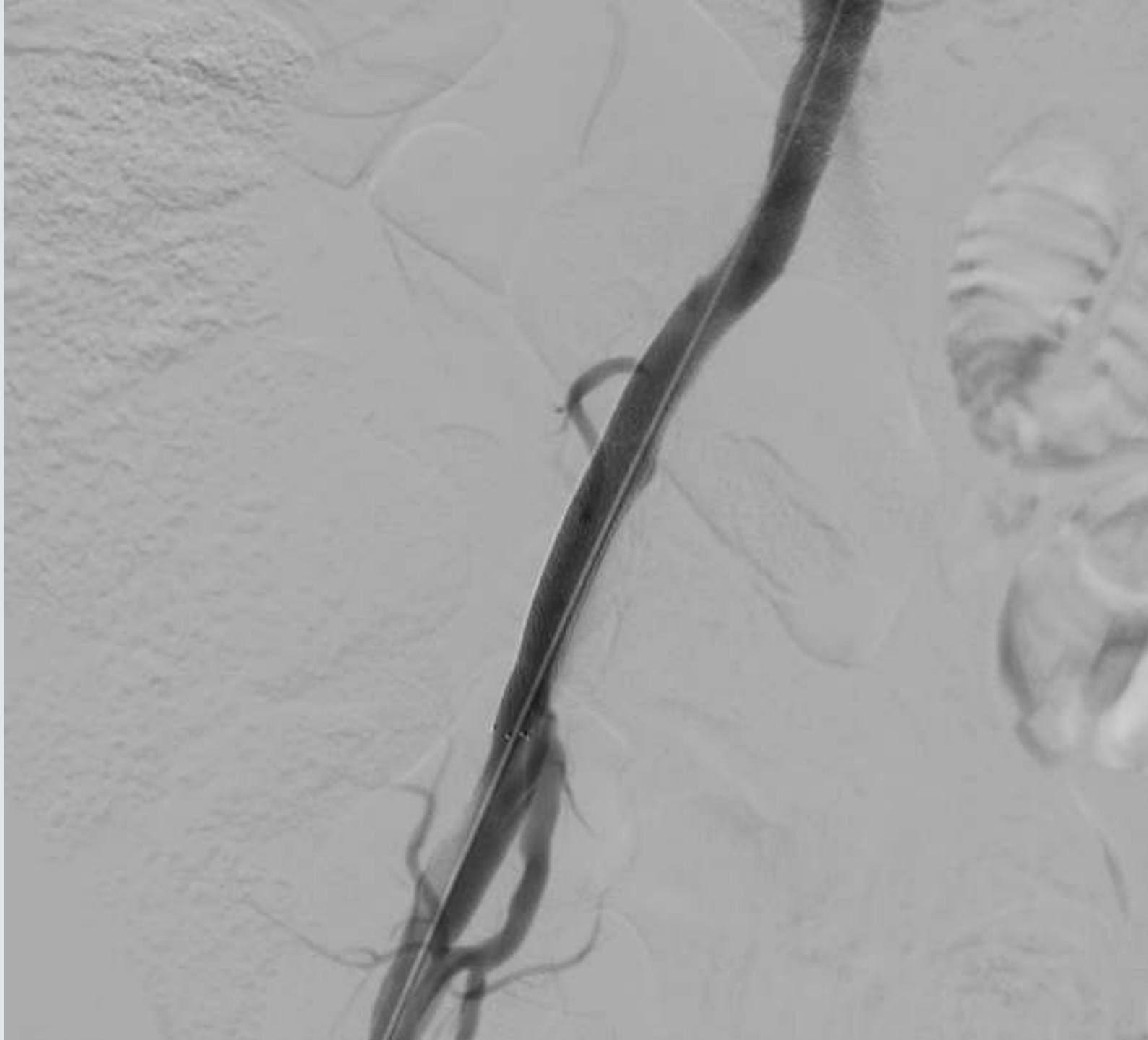


Case 2

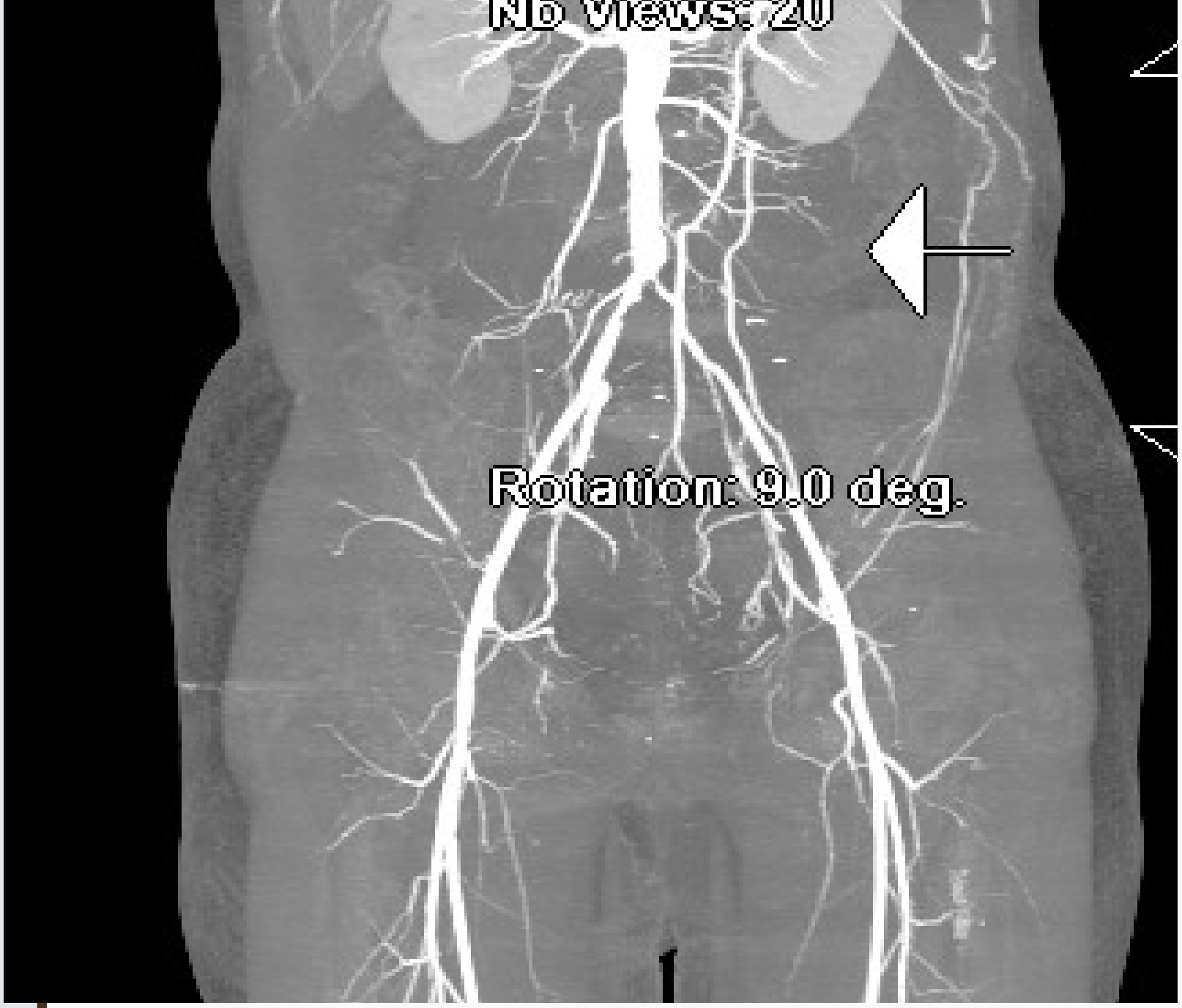
67-year-old DM, HTN, heavy smoker.

Had Angioplasty of left CIA 2020.

Sever bilateral claudication Less than10 m.

absent left femoral pulse weak right femoral.

Case 2



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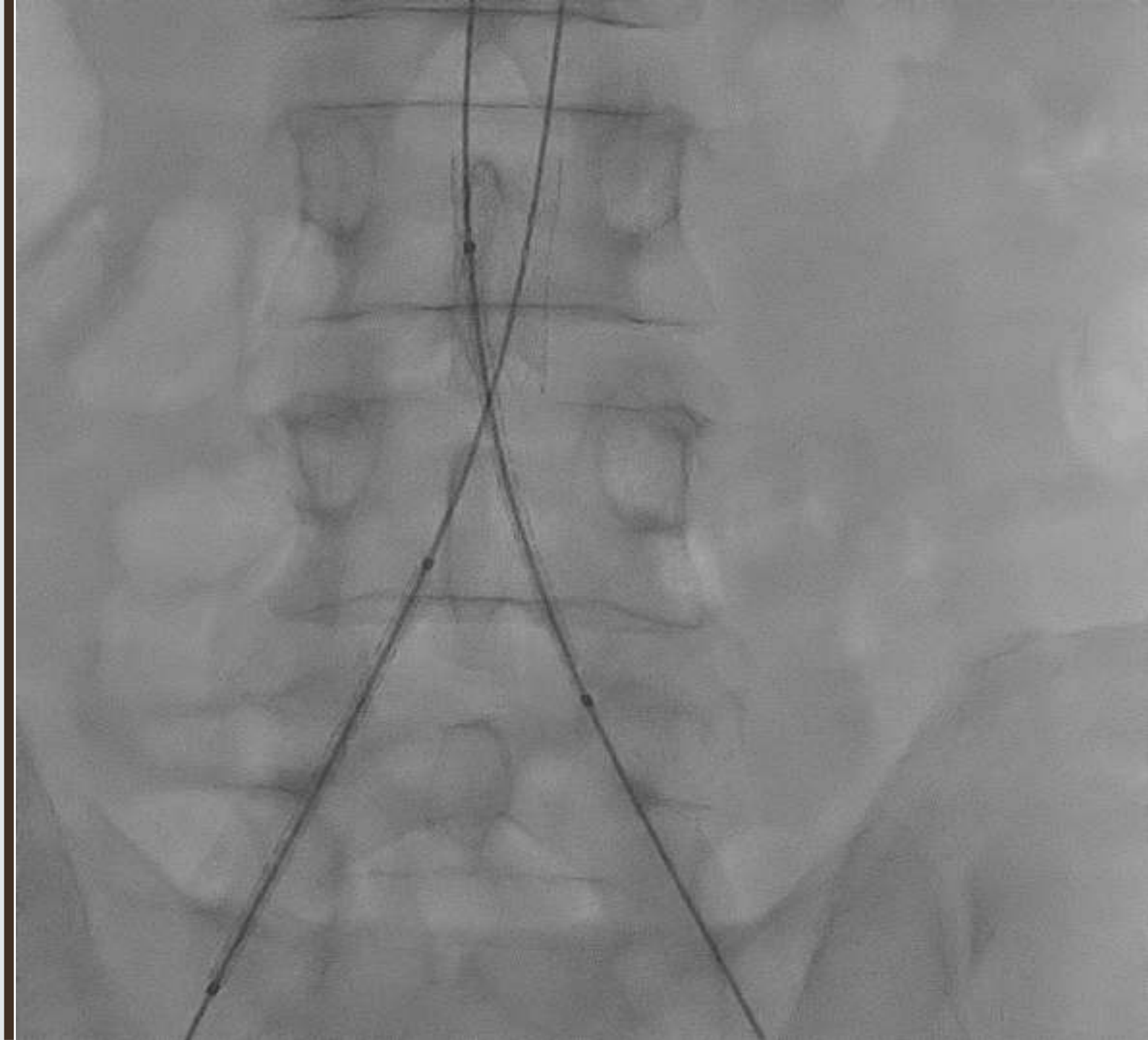

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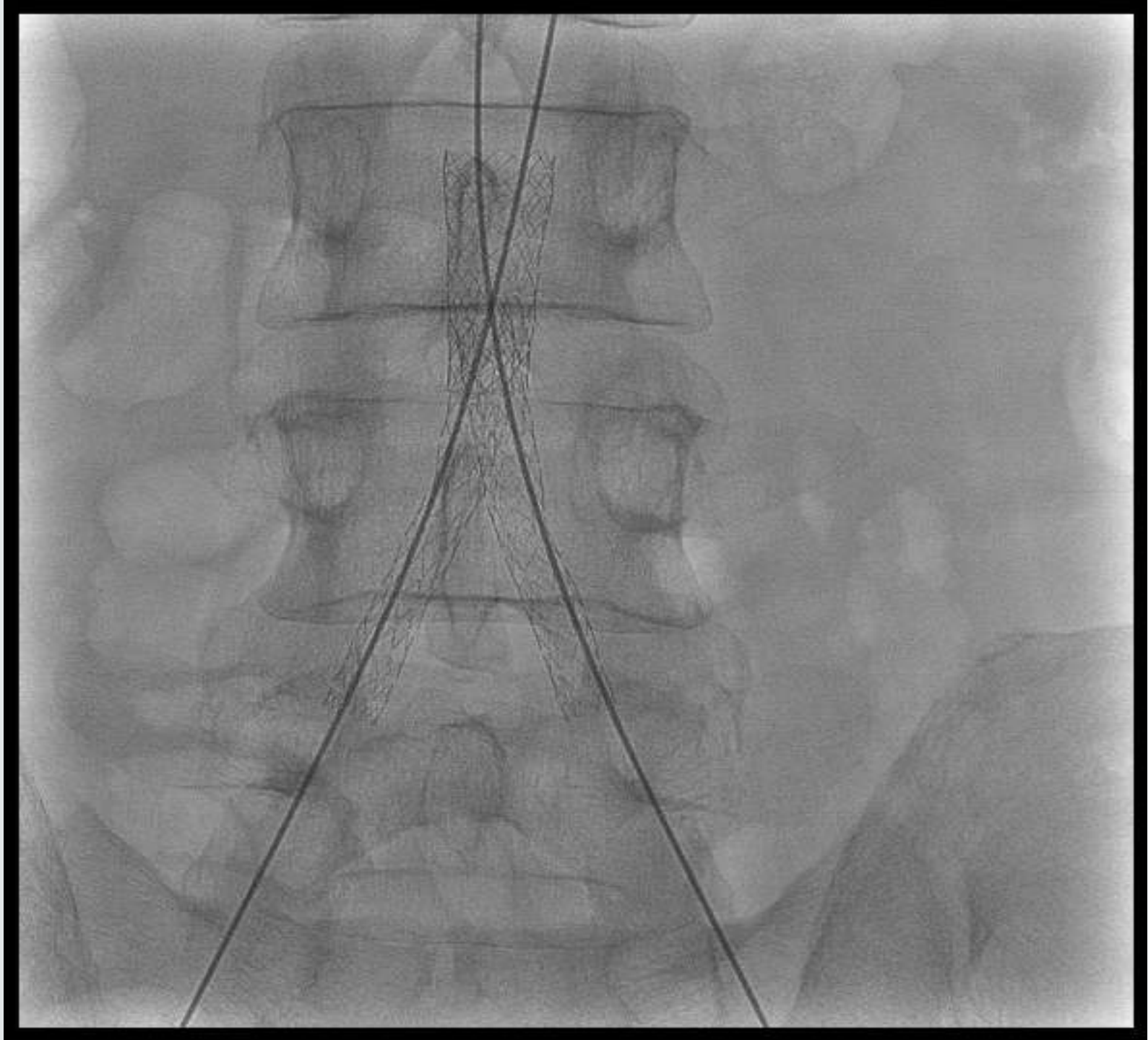

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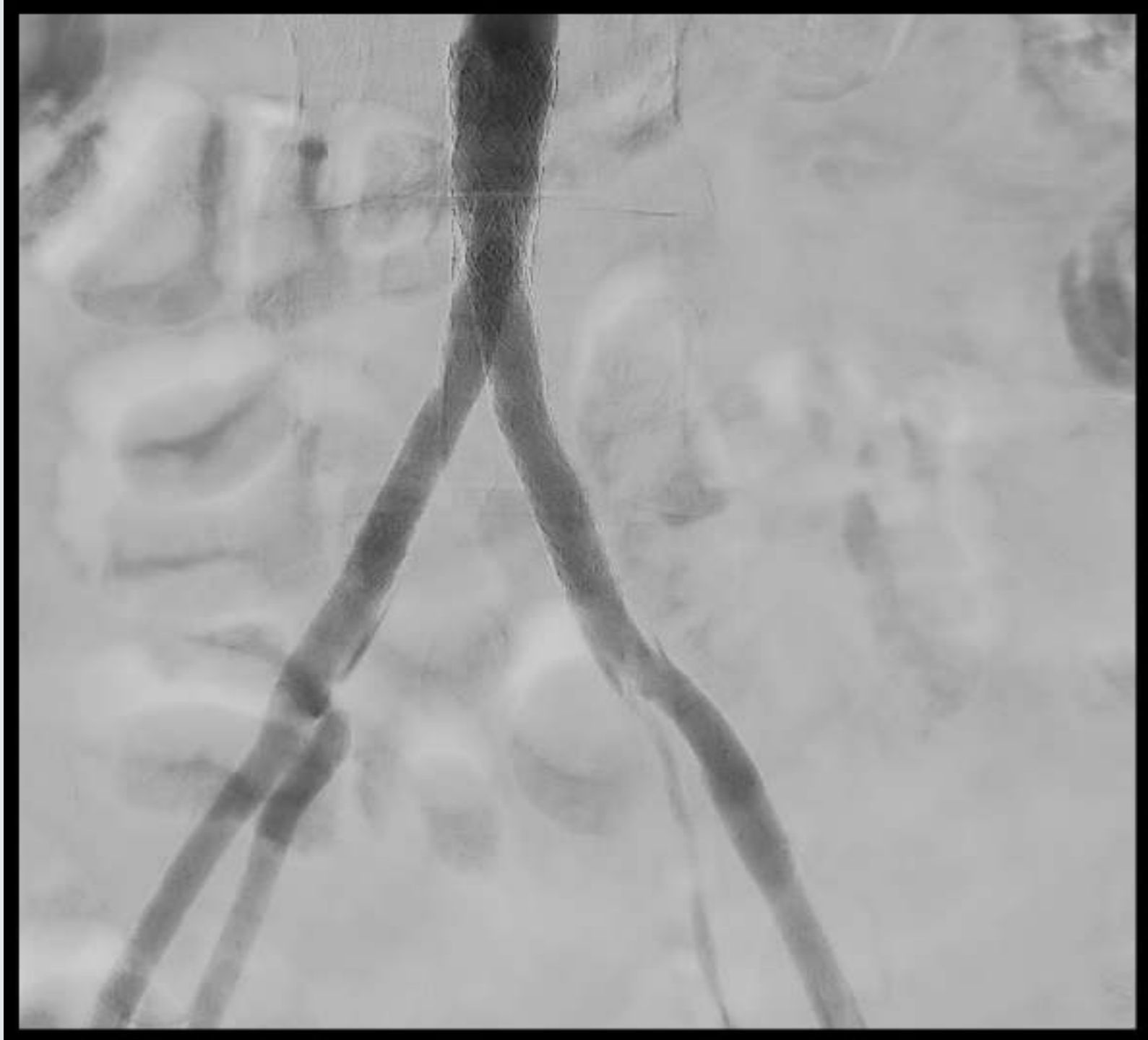

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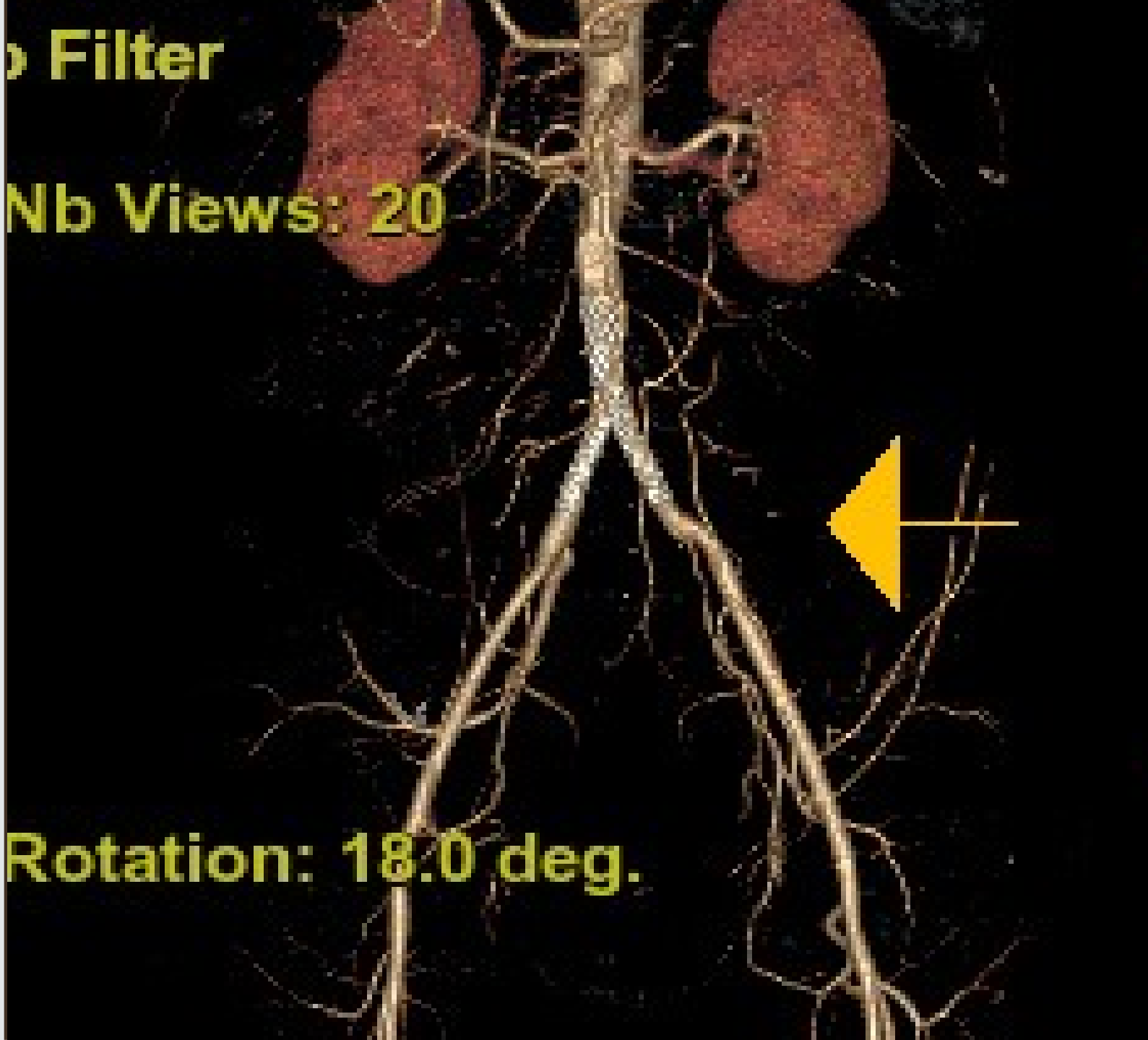

Conclusion

Since its first introduction in 2013, CERAB technique has proven its efficacy with high patency rates and minimal complications.

Among the invitro studies the CERAB has proven its efficacy Over the kissing stents.

Conclusion

CERAB became more favorable option By many surgeons over the surgical approach.

Further studies comparing Head to head the surgical open repair vs CERAB is needed.

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