DR EUGENE B WU
FOUNDING DIRECTOR HKSTENT
FOUNDING DIRECTOR APCTO CLUB
DIRECTOR CARDIOVASCULAR INTERVENTION CENTRE, CHINESE UNIVERSITY HONG KONG

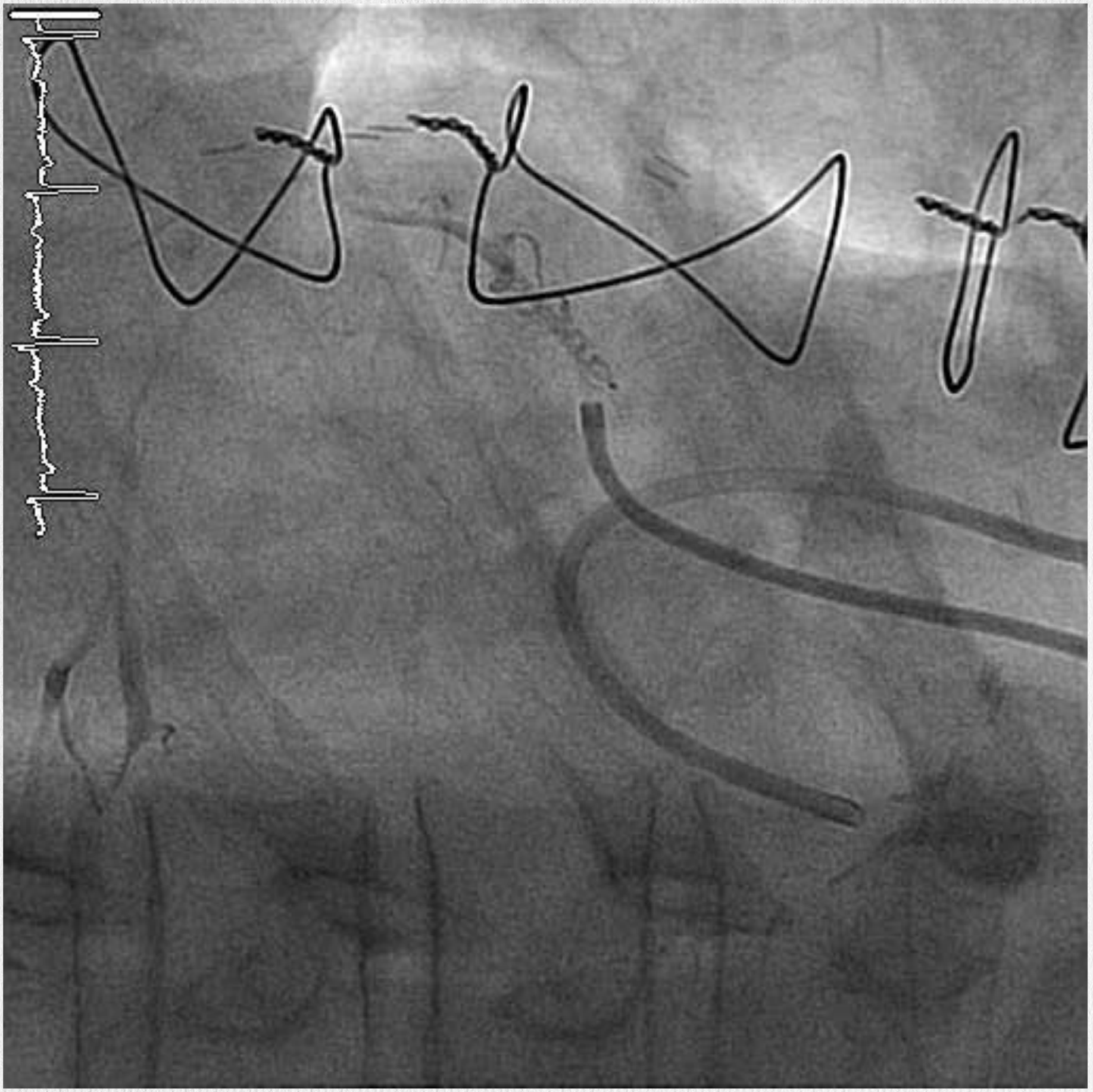
CATASTROPHIC TRAPS IN RETROGRADE CTO-PCI

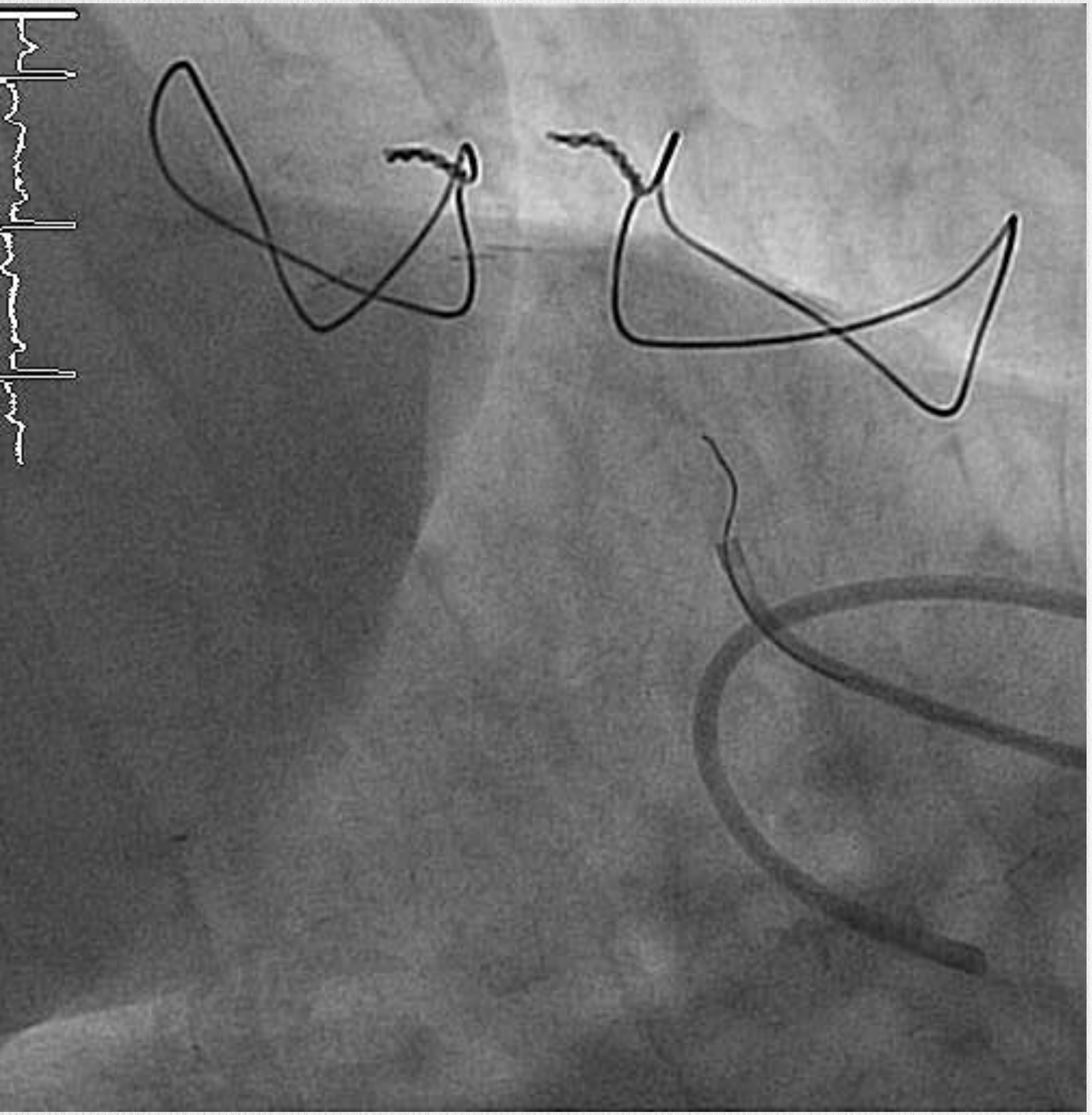
INHERENT CATASTROPHIC TRAPS OF RETROGRADE CTO PCI.

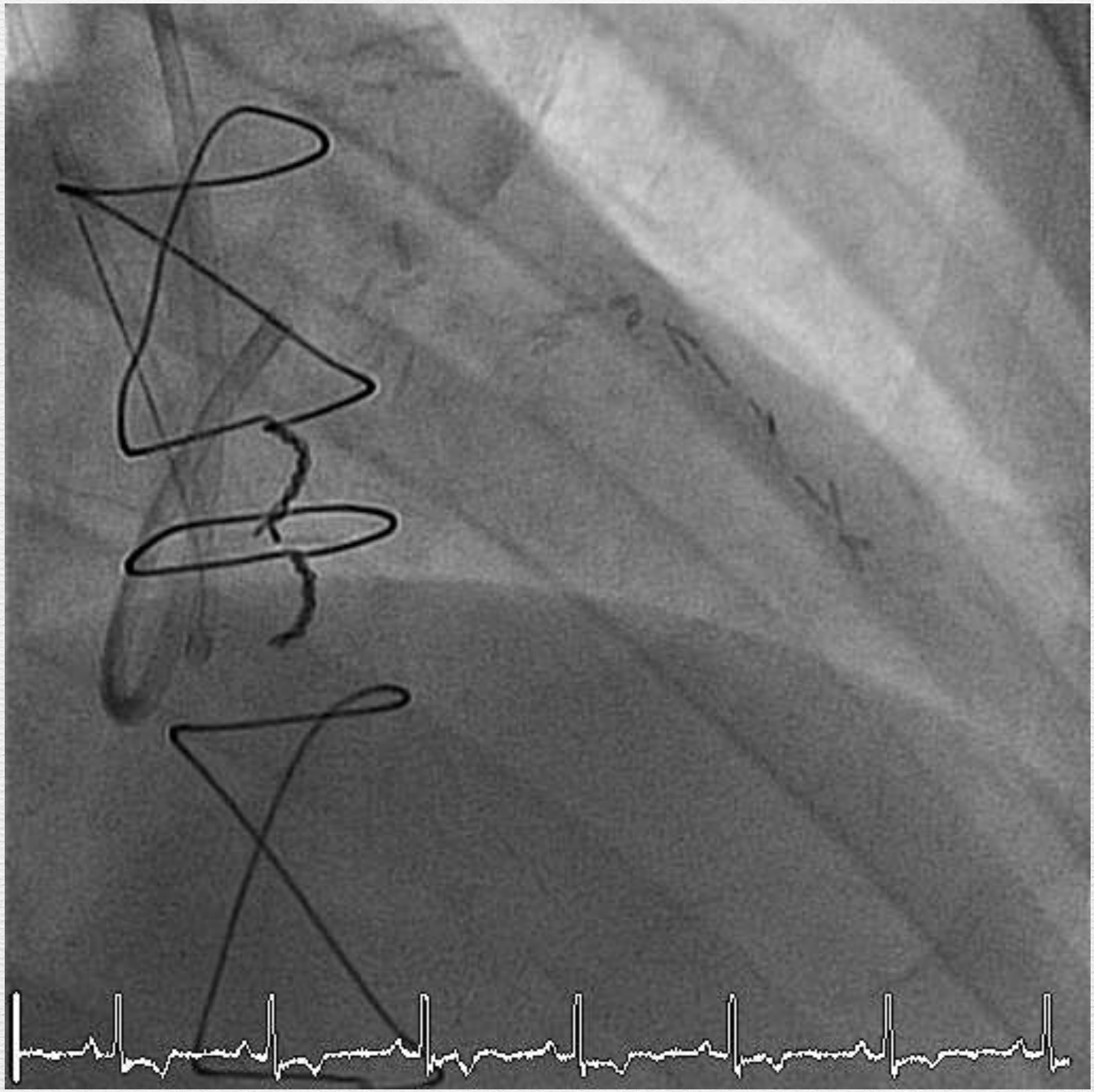
- 1. Donor artery ischemia and thrombosis.
- 2. Collateral Channel ischemia.
- 3. Forgetting to use short guide and guiding dissection.
- 4. Air embolism with trapping balloon.
- 5. Channel perforation.
- 6. Confirmation of retrograde wire position.
- 7. Dangers of stent reverse CART.
- 8. Subintimal path of retrograde wire.
- 9. Snaring retrograde wires.
- 10. Retrograde guide sucking in and dissection of donor artery ostium.
- 11. Hydraulic dissection.
- 12. Channel checking and channel protection.

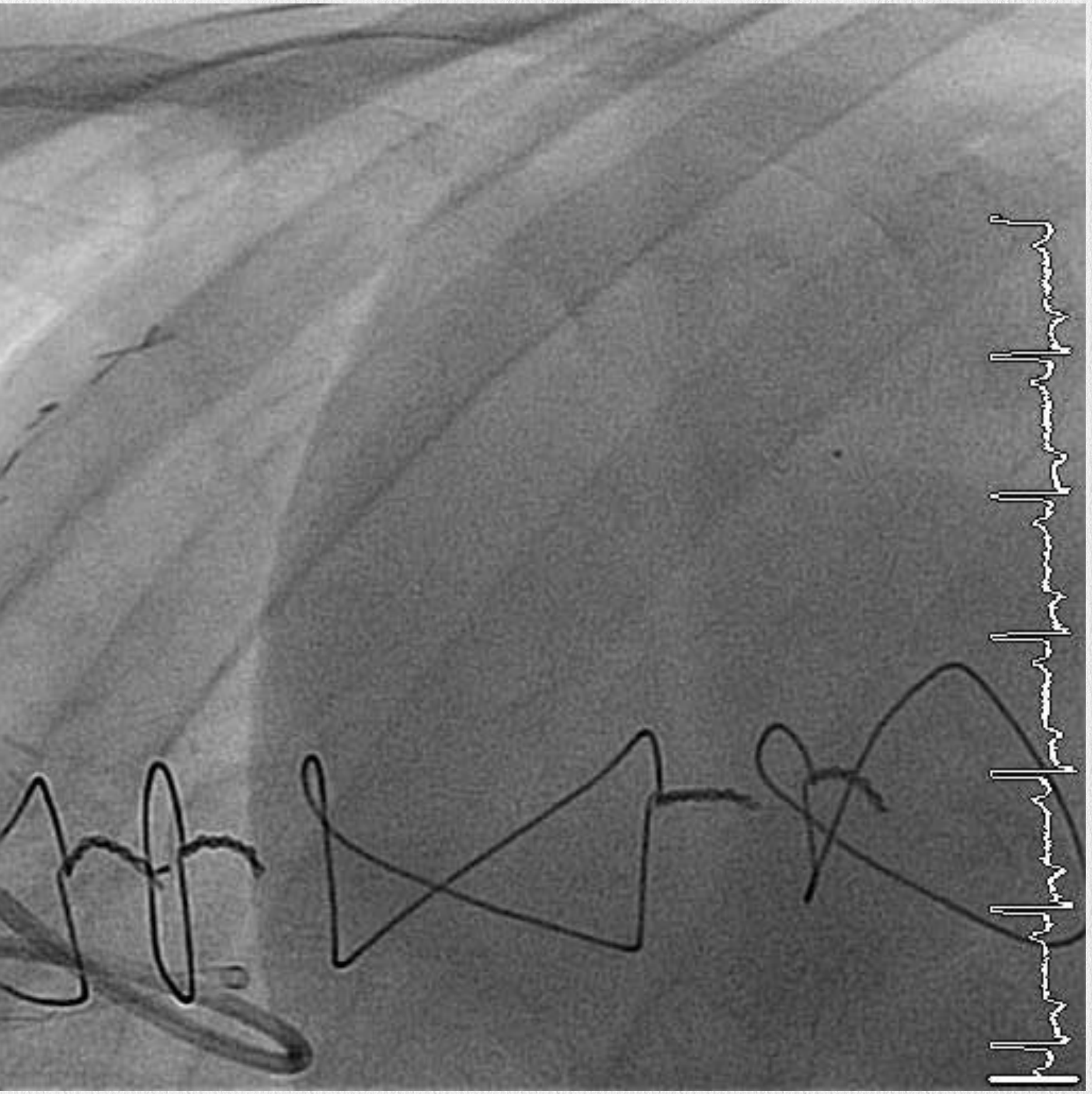
TEXT

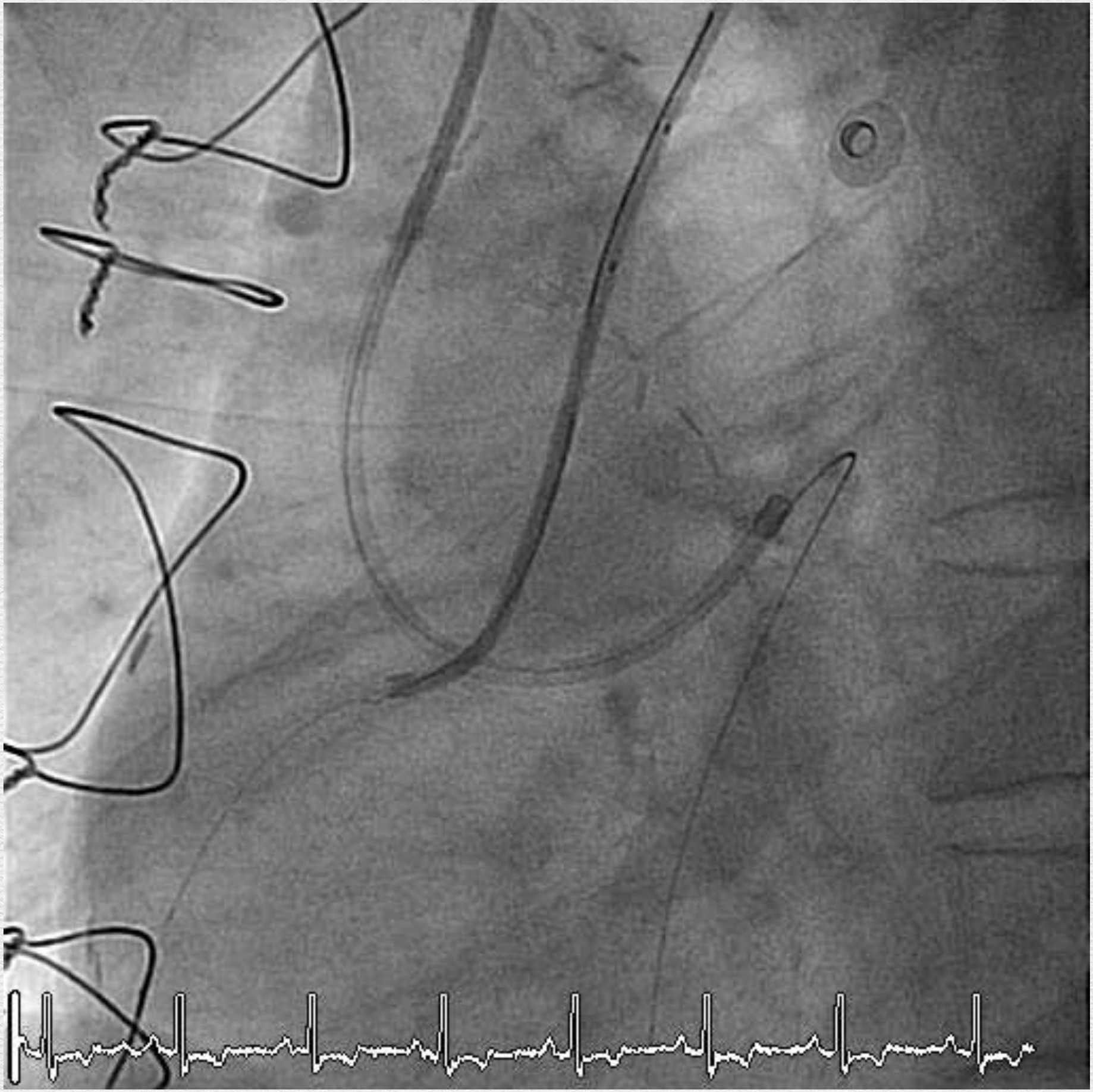
DONOR ARTERY THROMBOSIS.

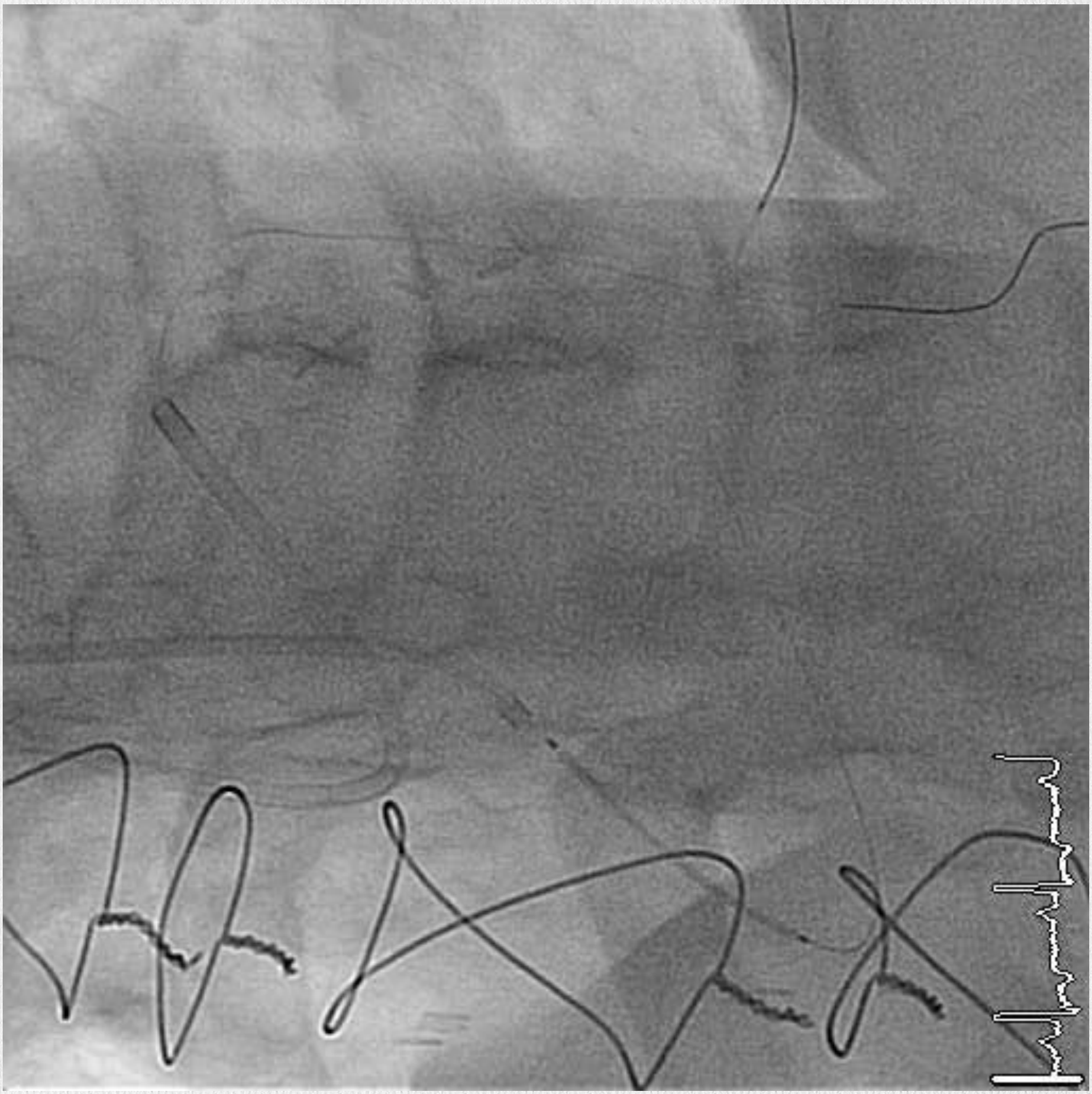


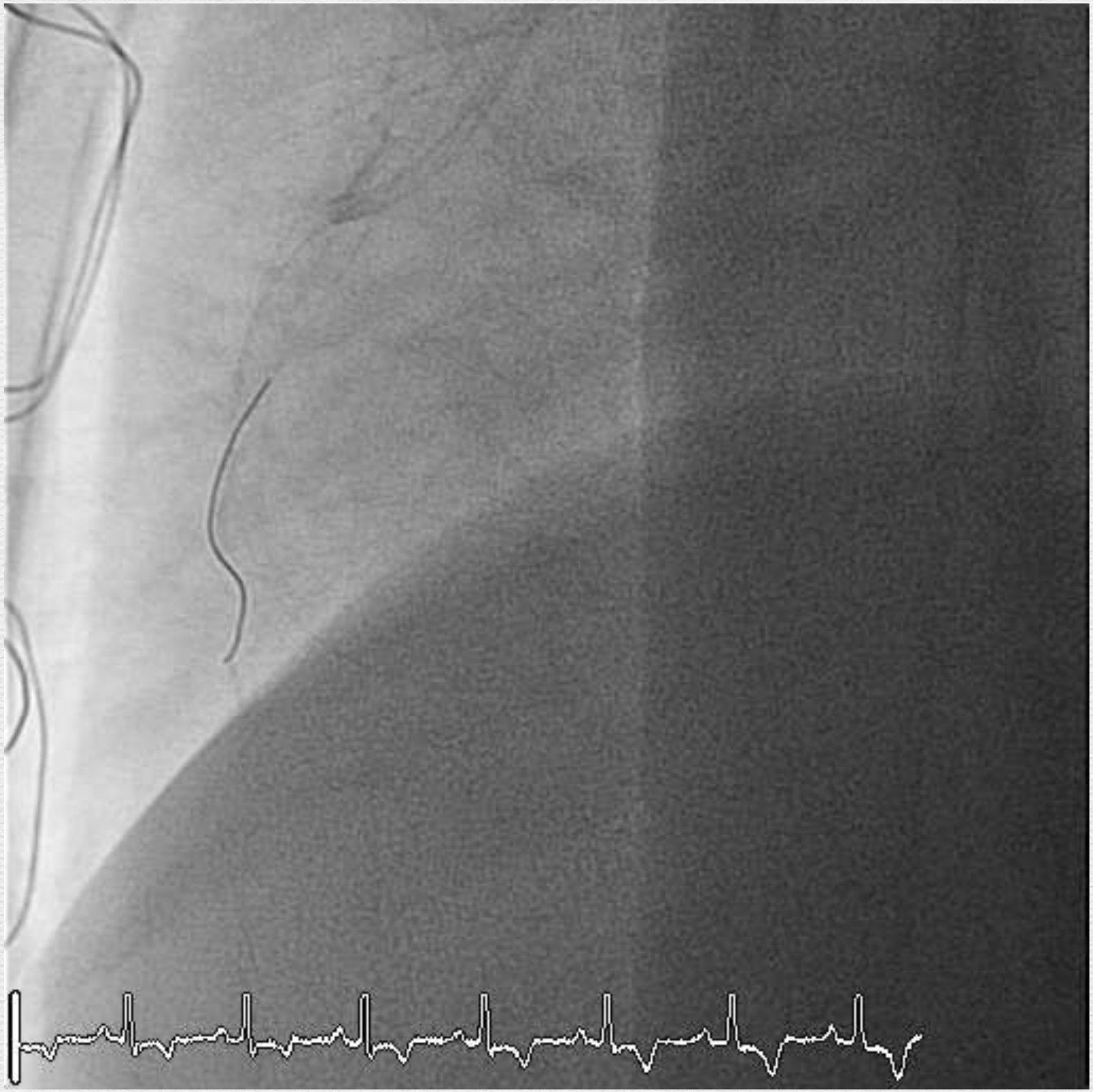


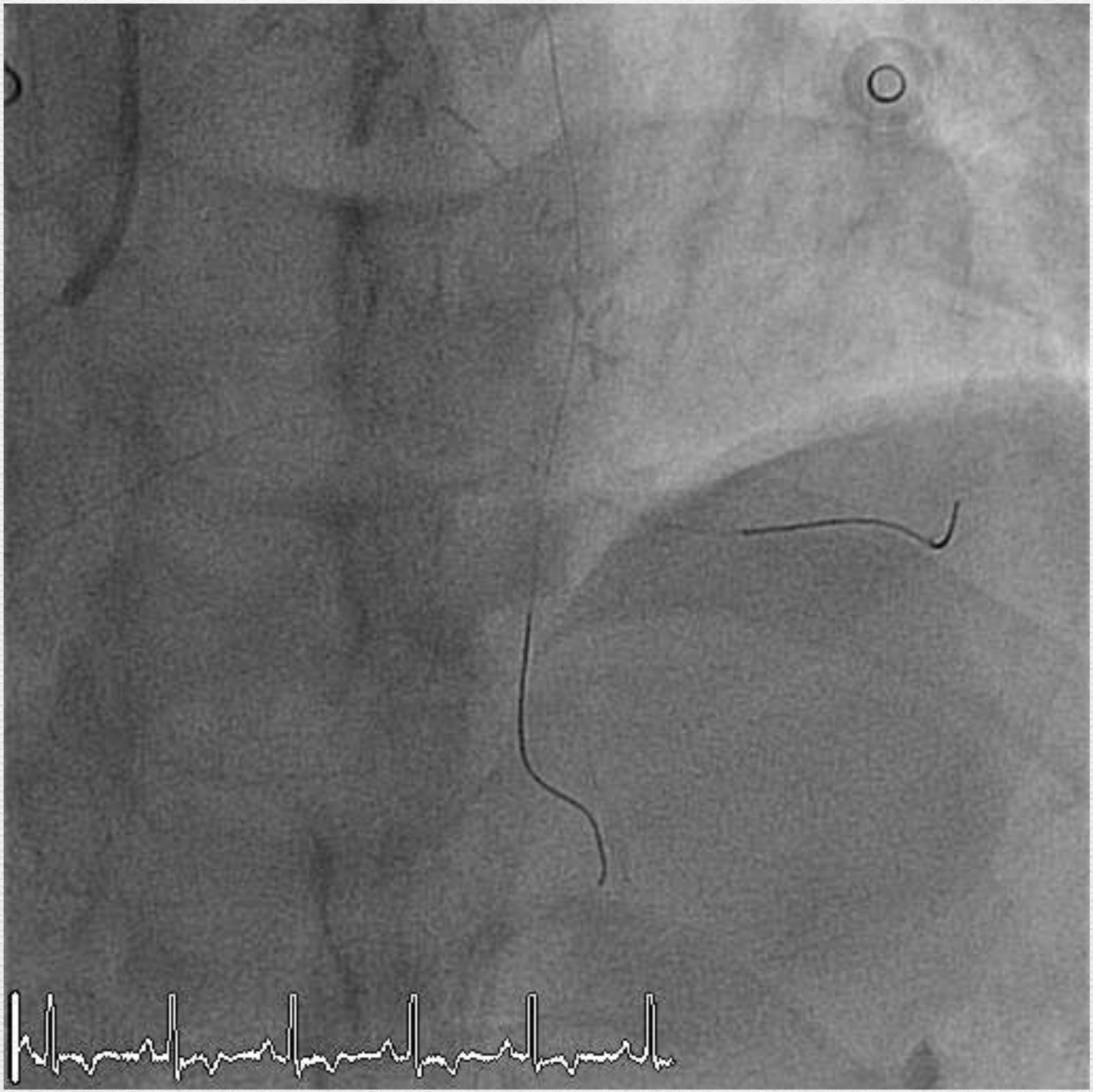


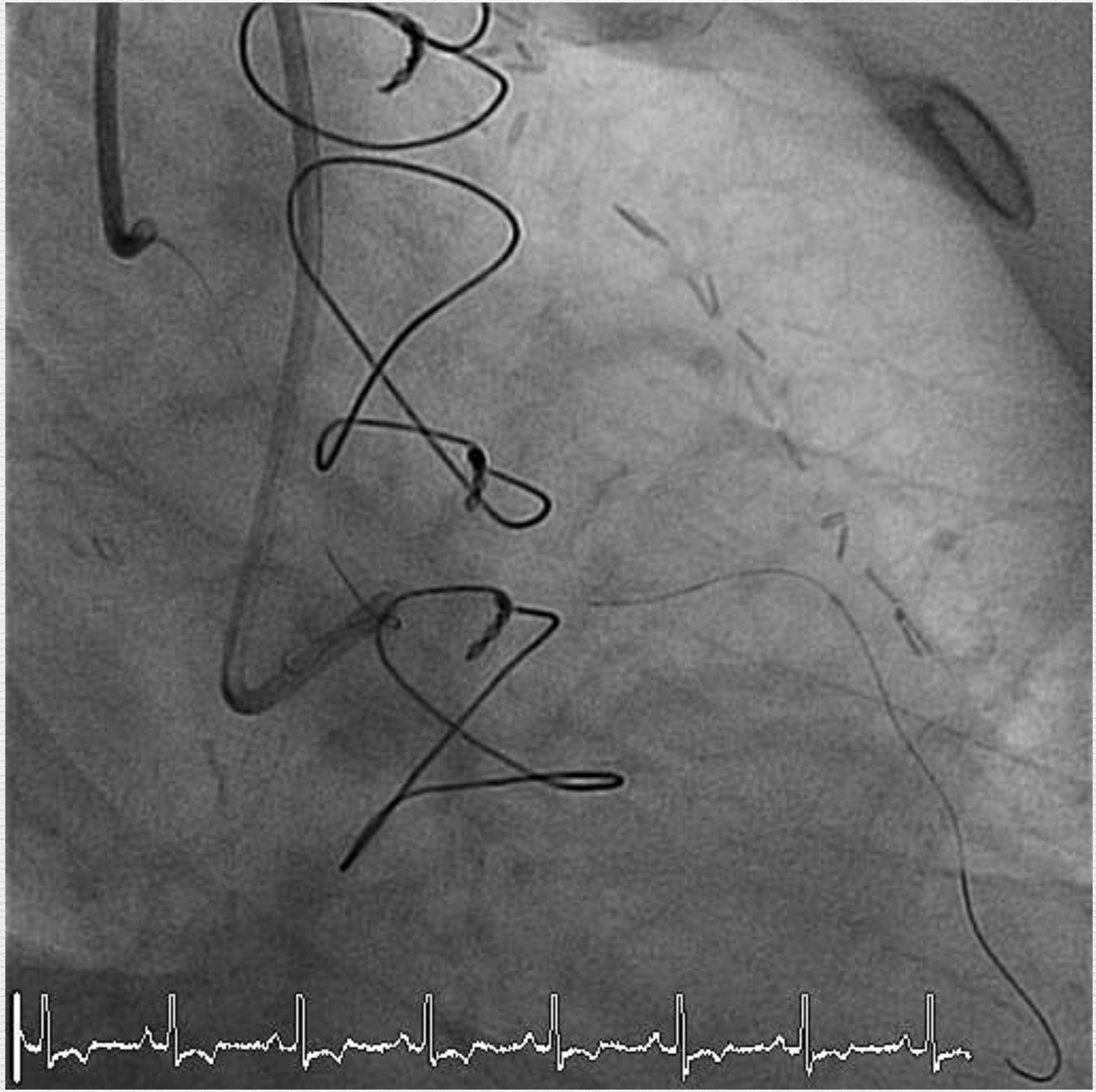


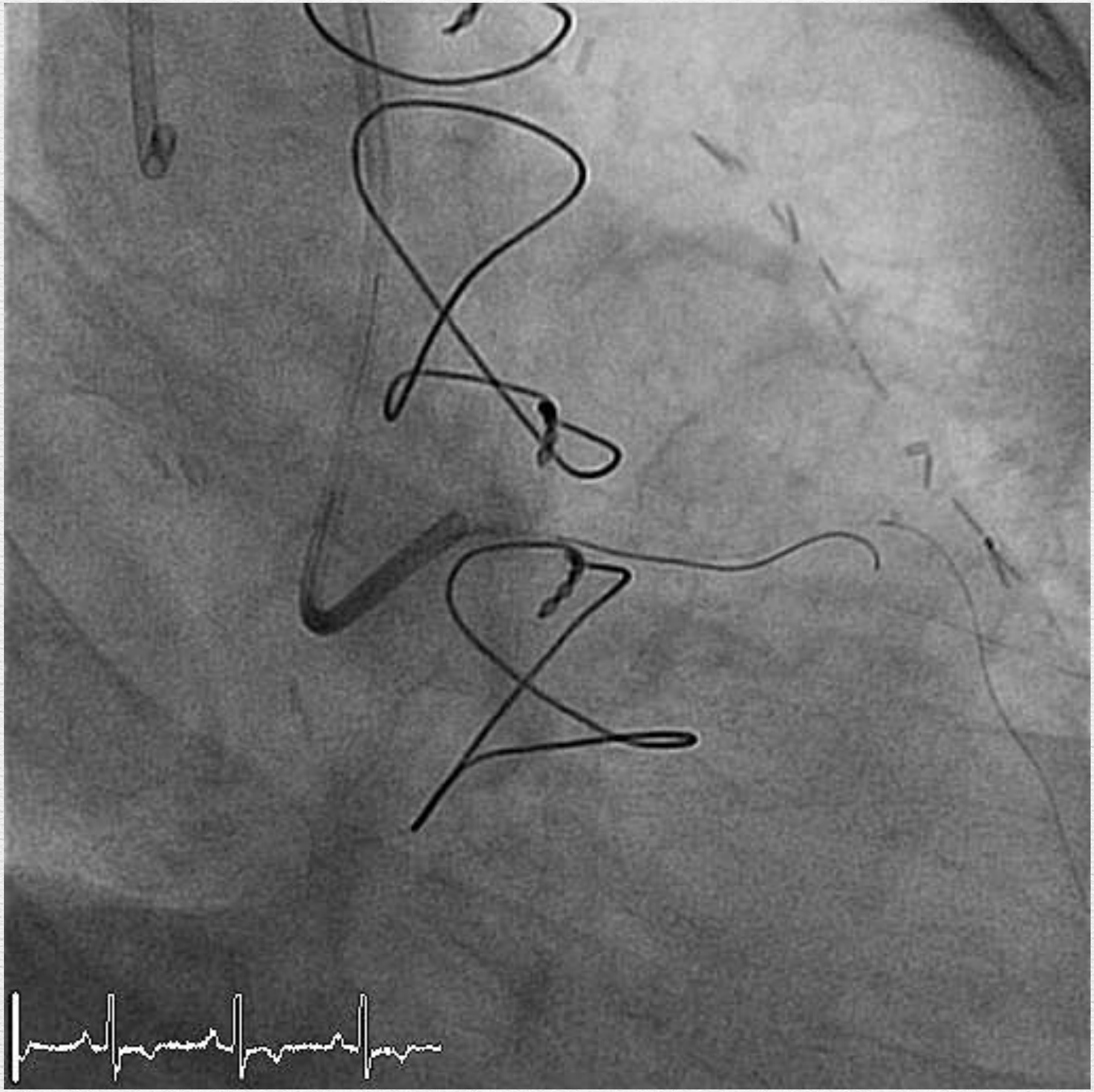


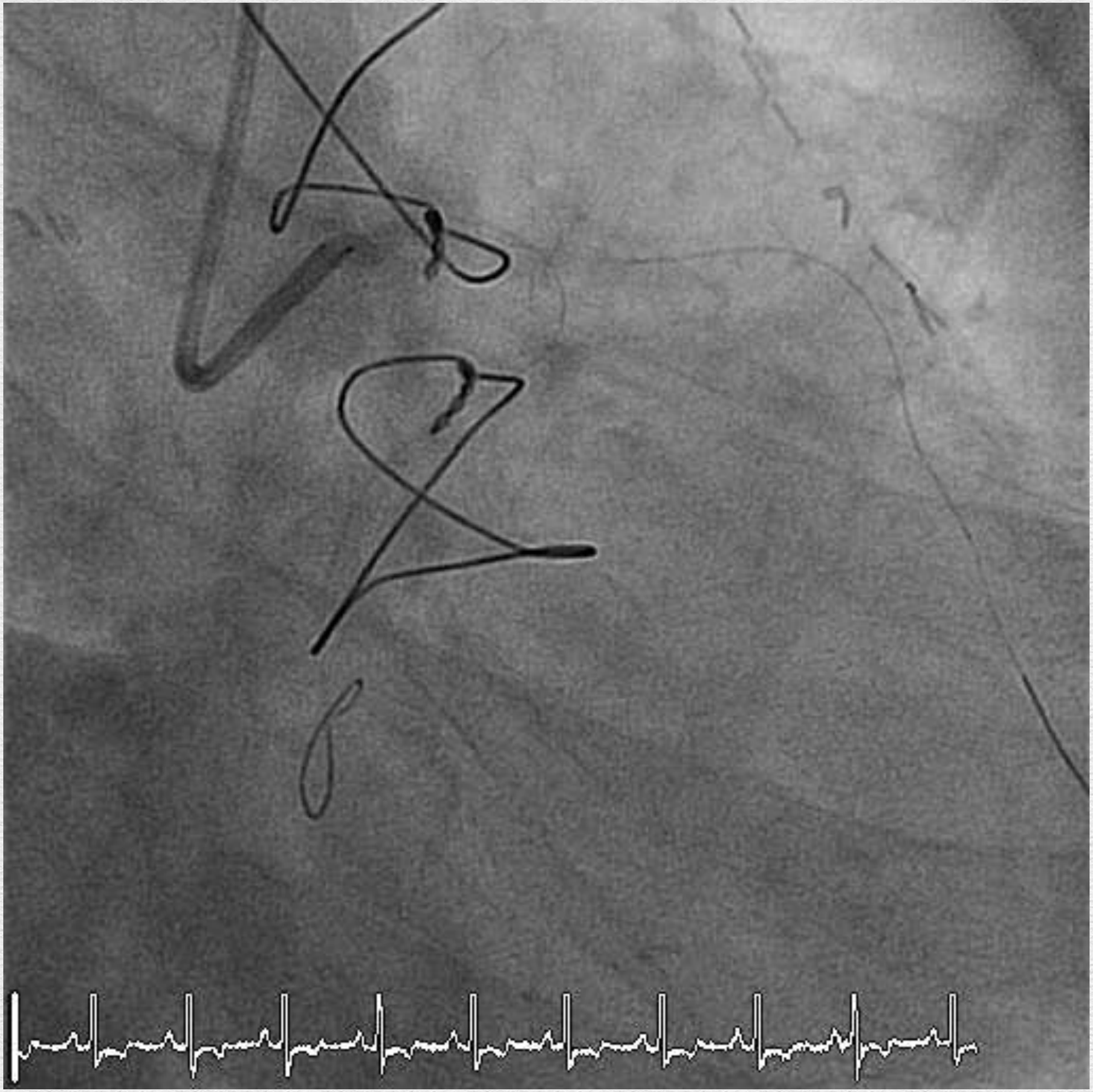


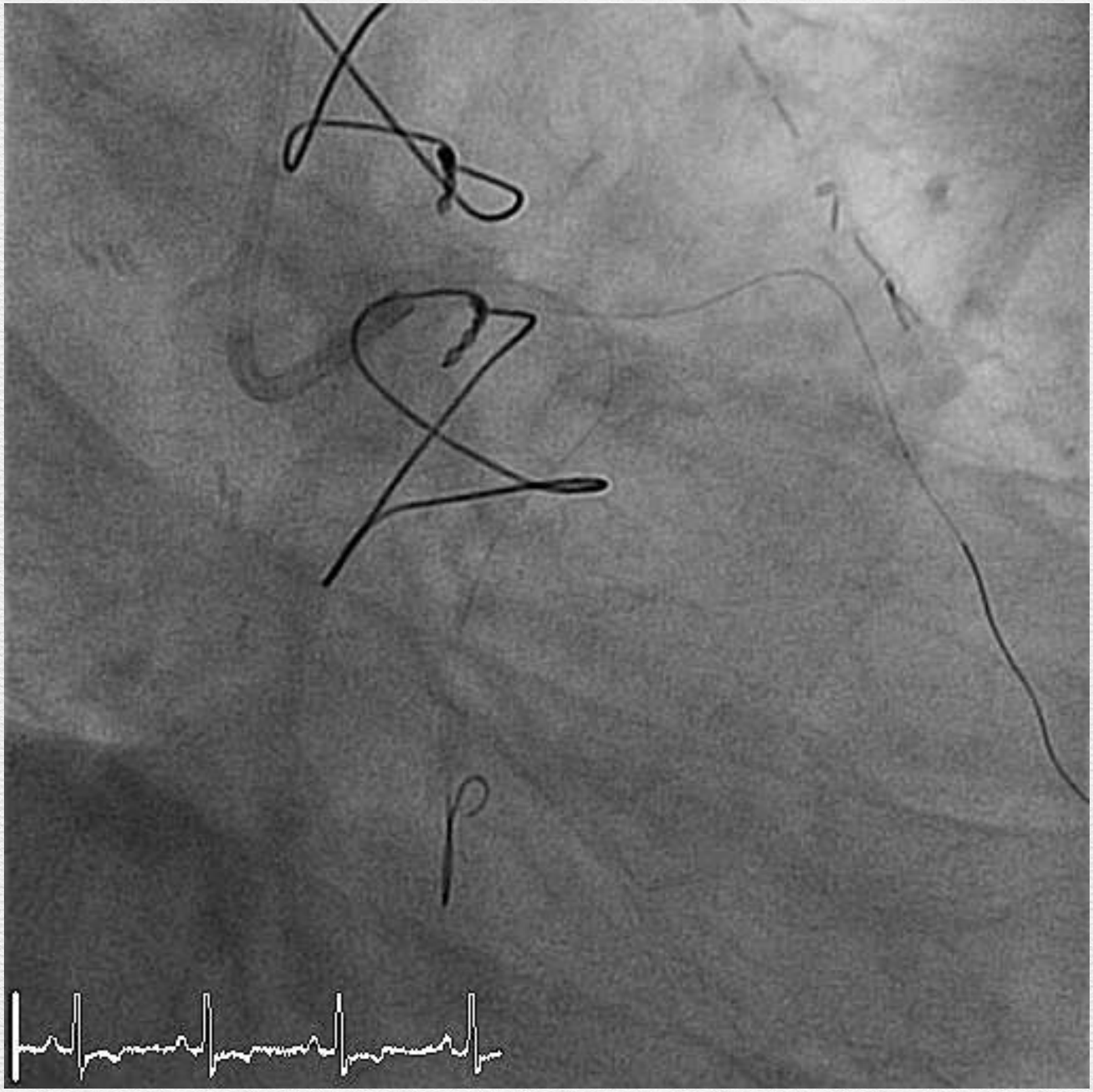


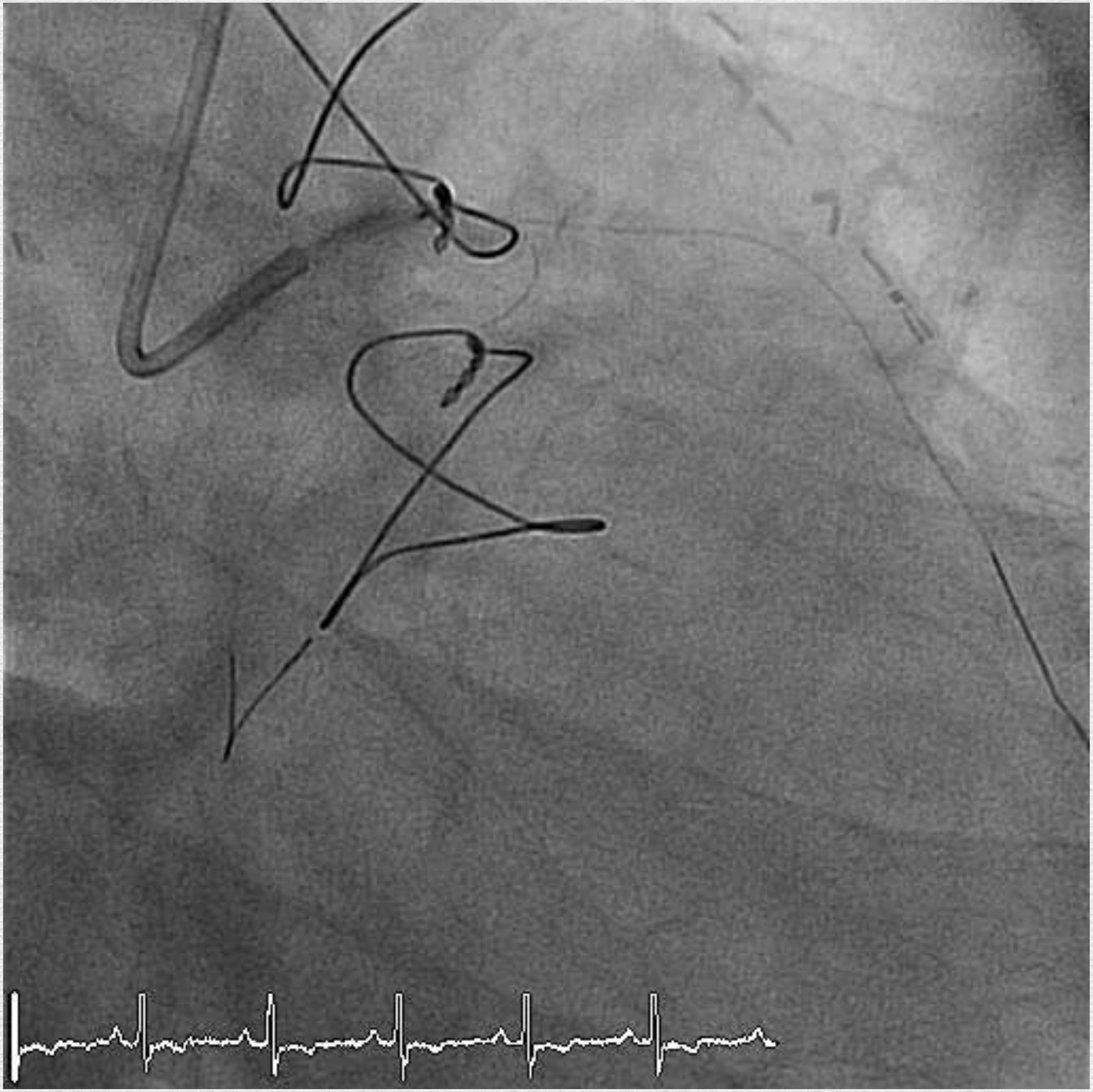


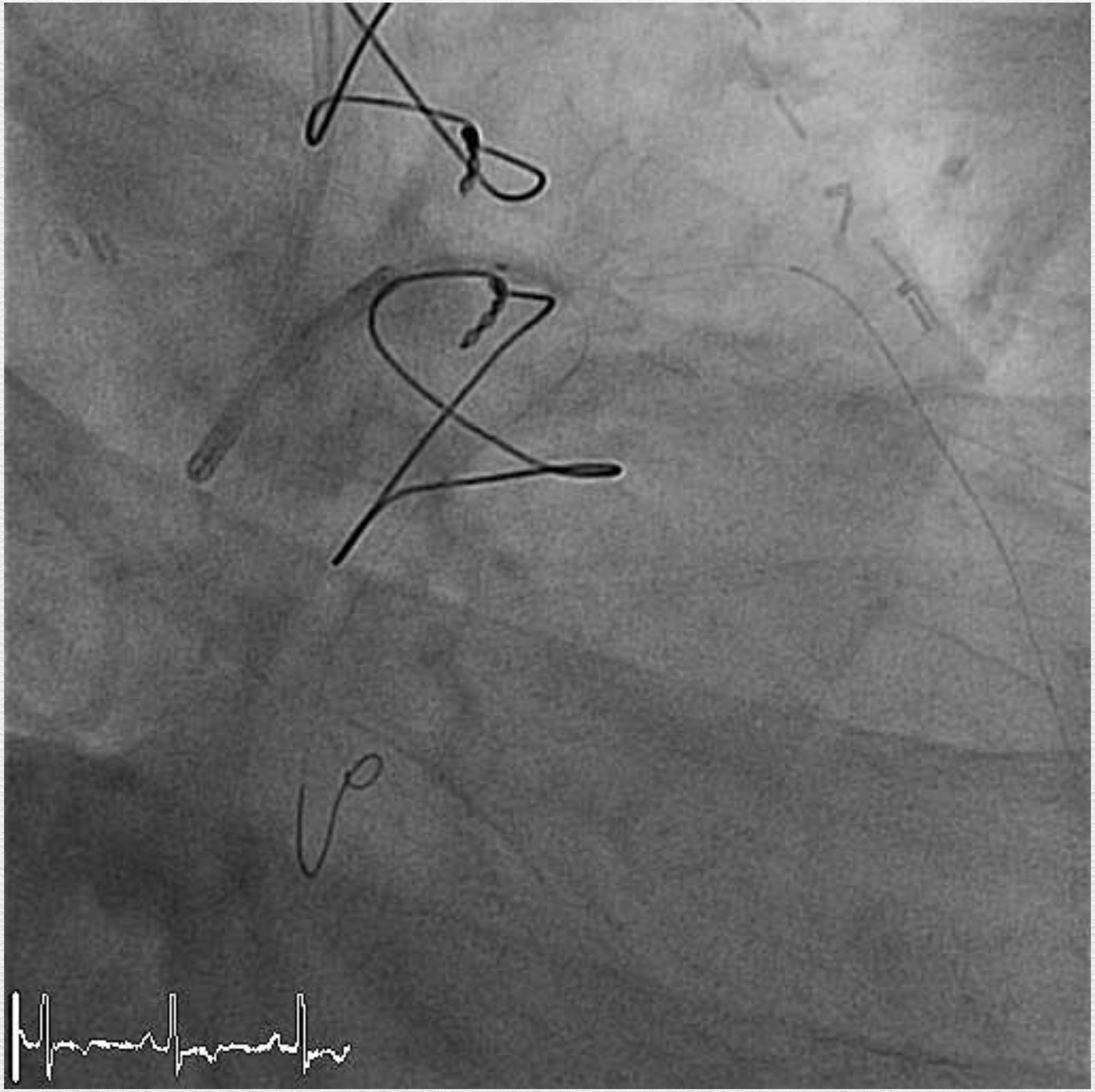


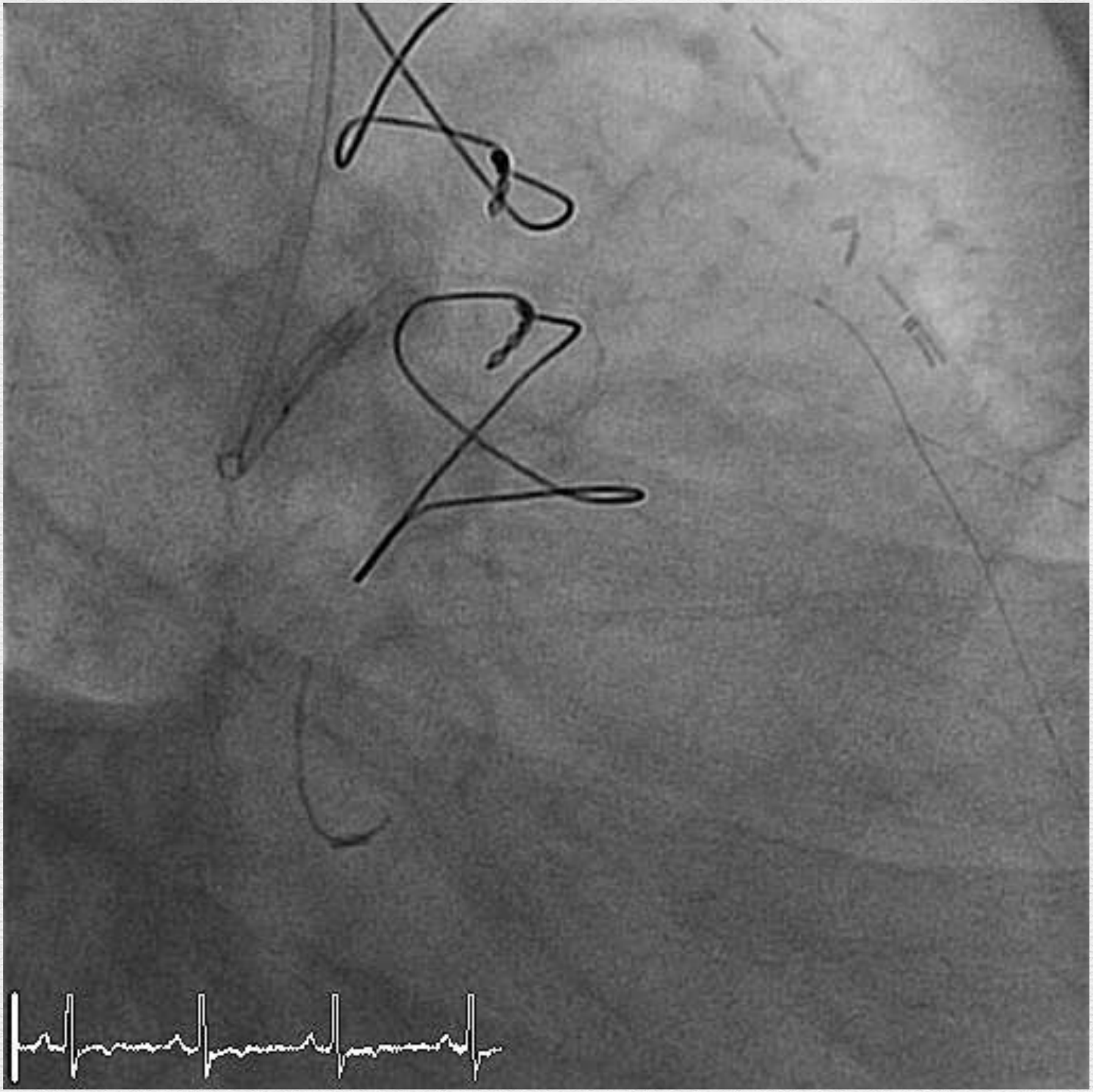


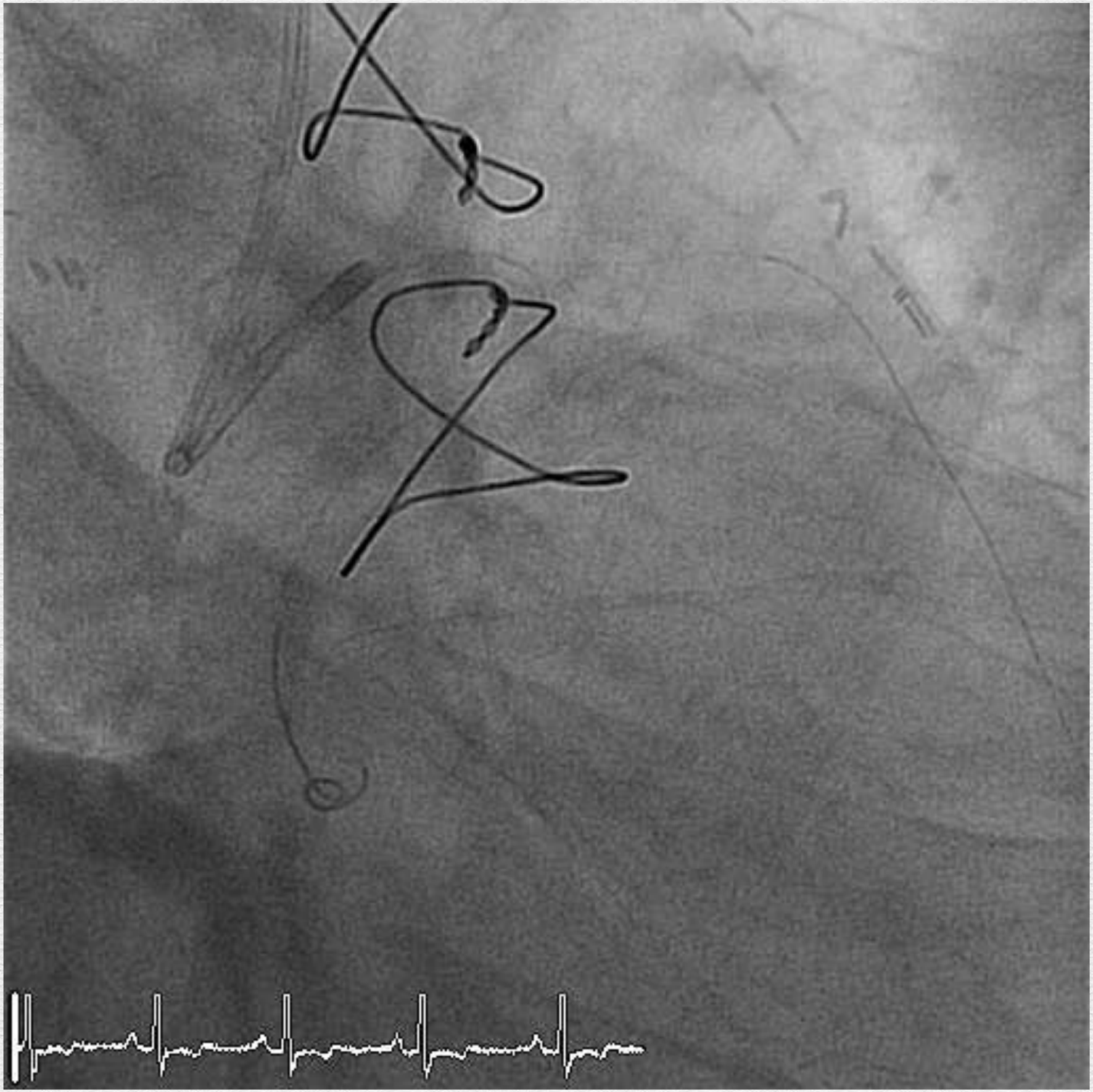


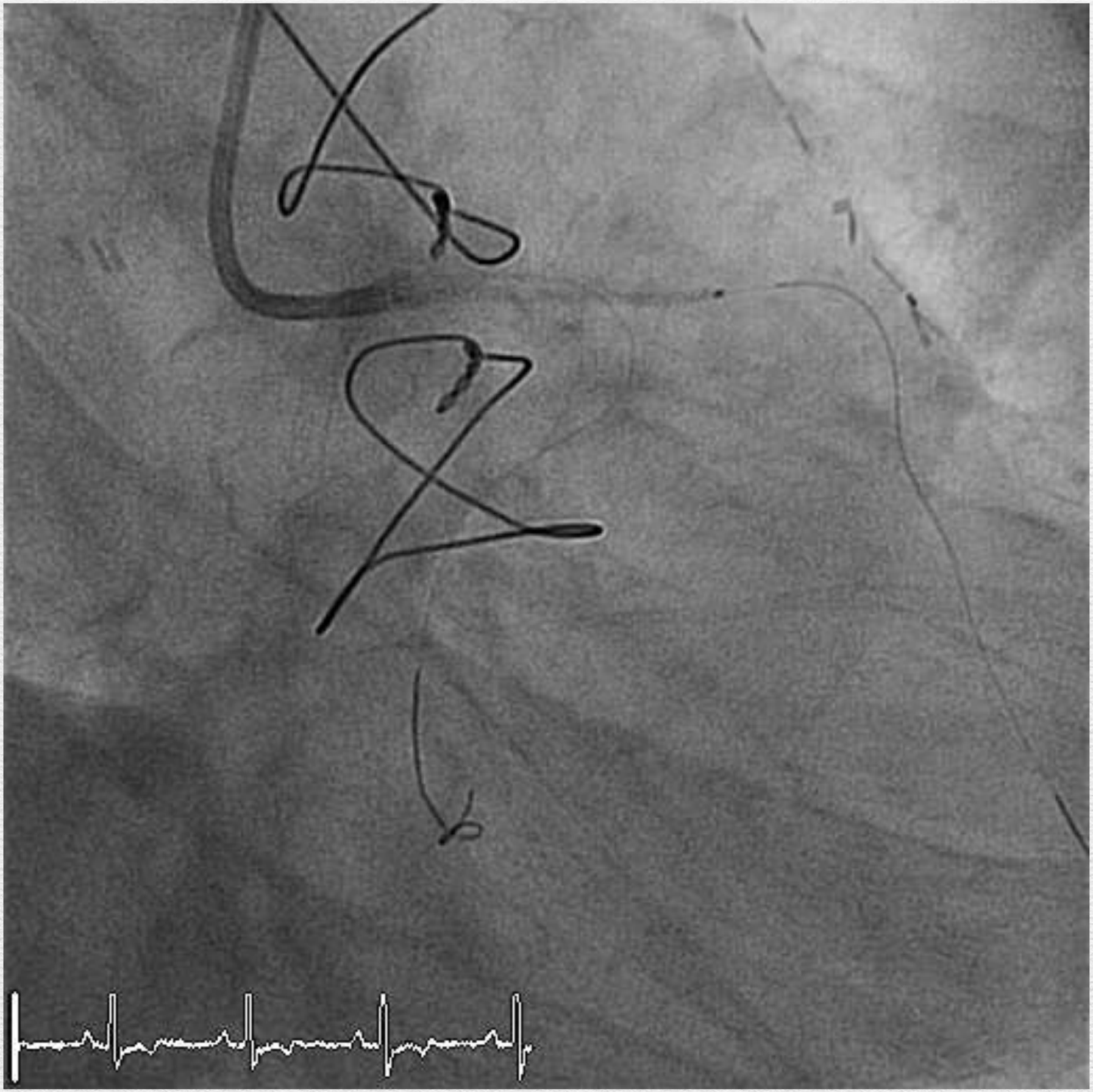


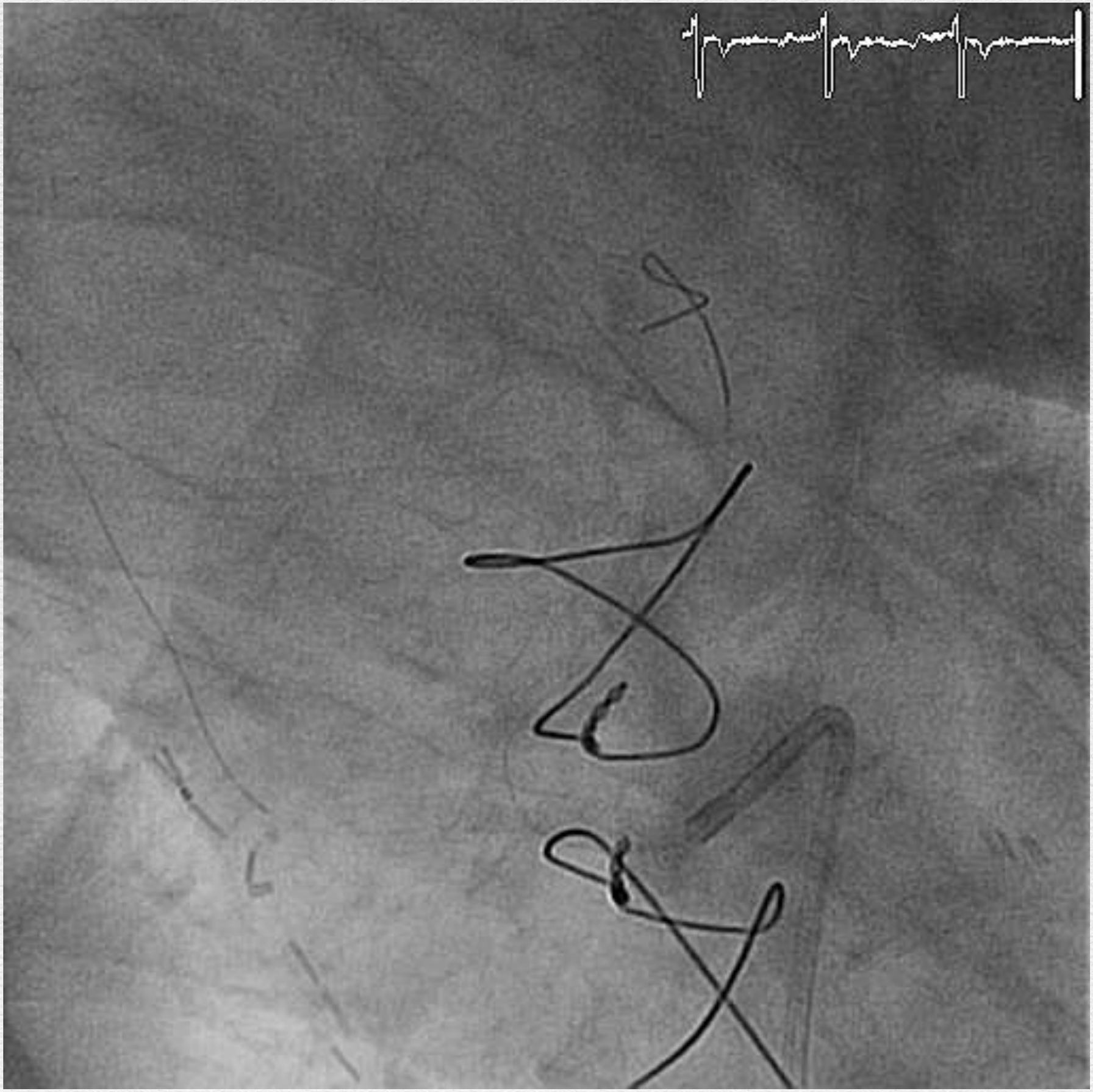












OUR PRACTICE

- 100u/Kg Heparin and ACT within 30 minutes.
- ACT at most every 30 mins keeping ACT > 300 sec.
- If ACT has dropped below 250 - ACT check every 15 minutes.

COLLATERAL CHANNEL ISCHEMA

- If dominant collateral channel, you should be aware that there maybe ischemia.
- You should chose another channel if there is ischemia from the dominant collateral use.

FORGETTING TO USE SHORT GUIDING.

- Always use short guiding if the length of the donor artery + channel +length of Cto vessel > 300 mm (Long corsair is 150 cm, normal guiding is 100cm, but there is 10 cm from corsair hub to entrance into the Y connector and the Y connector is about 10 cm long too.)
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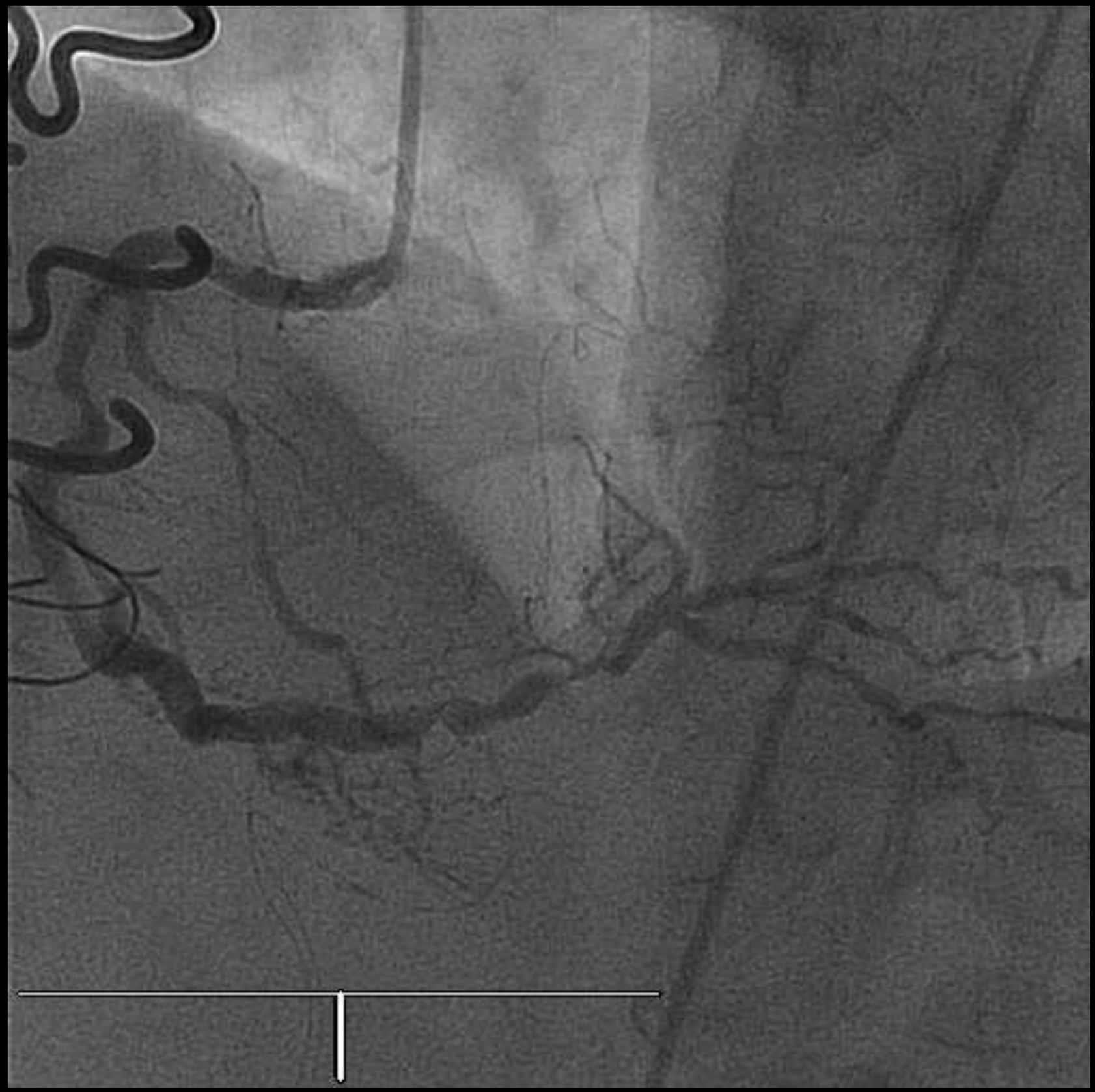
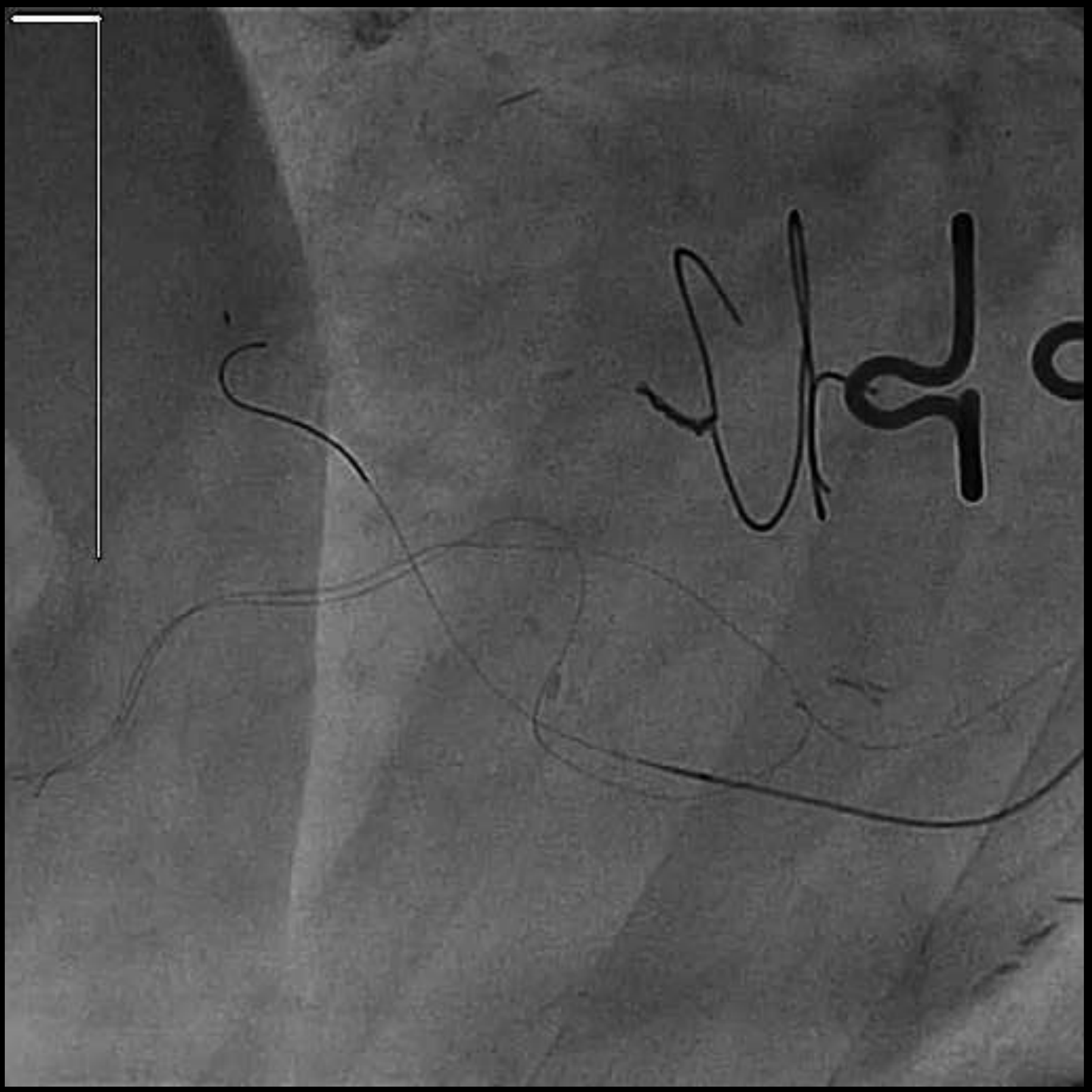
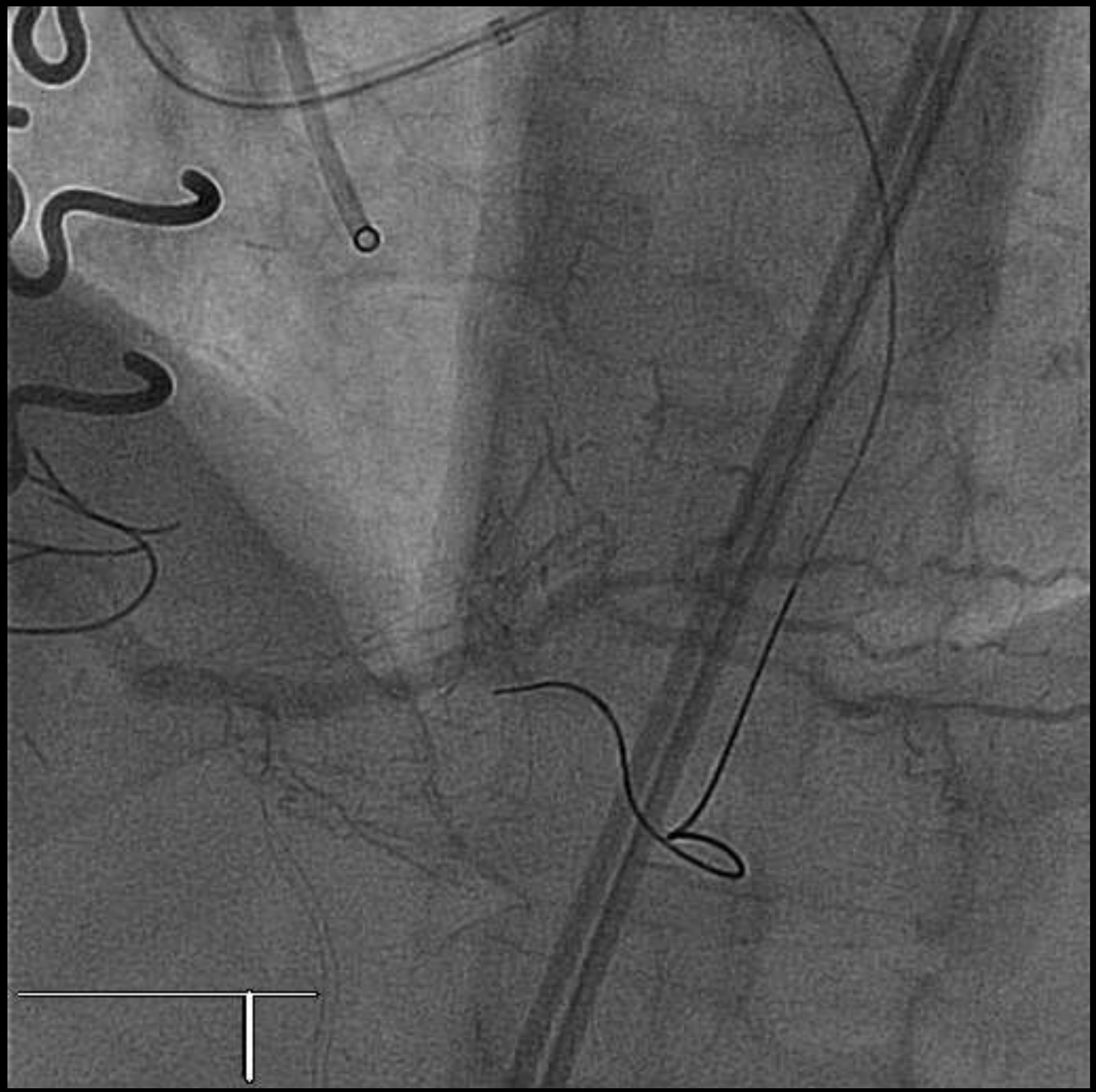
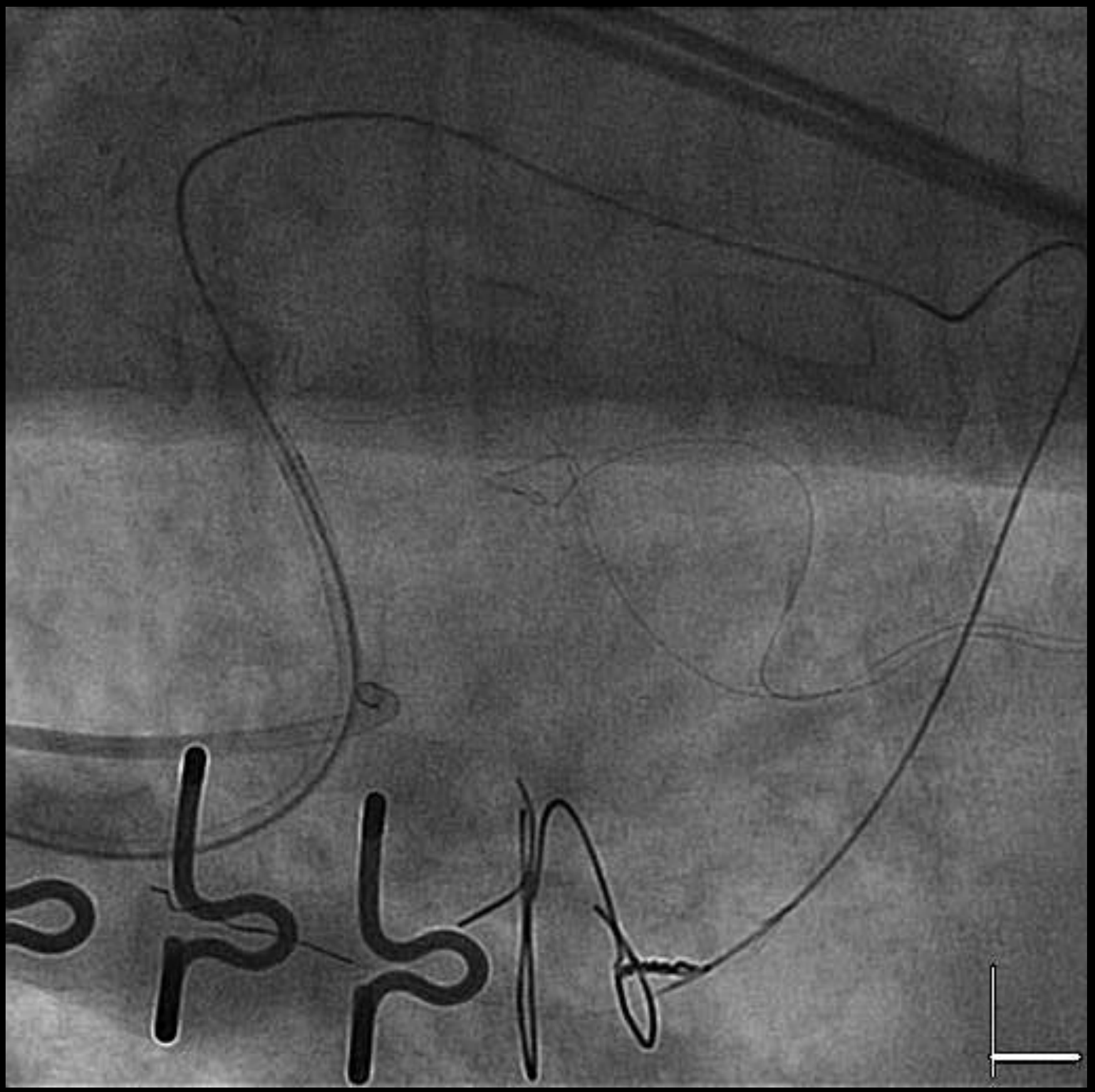
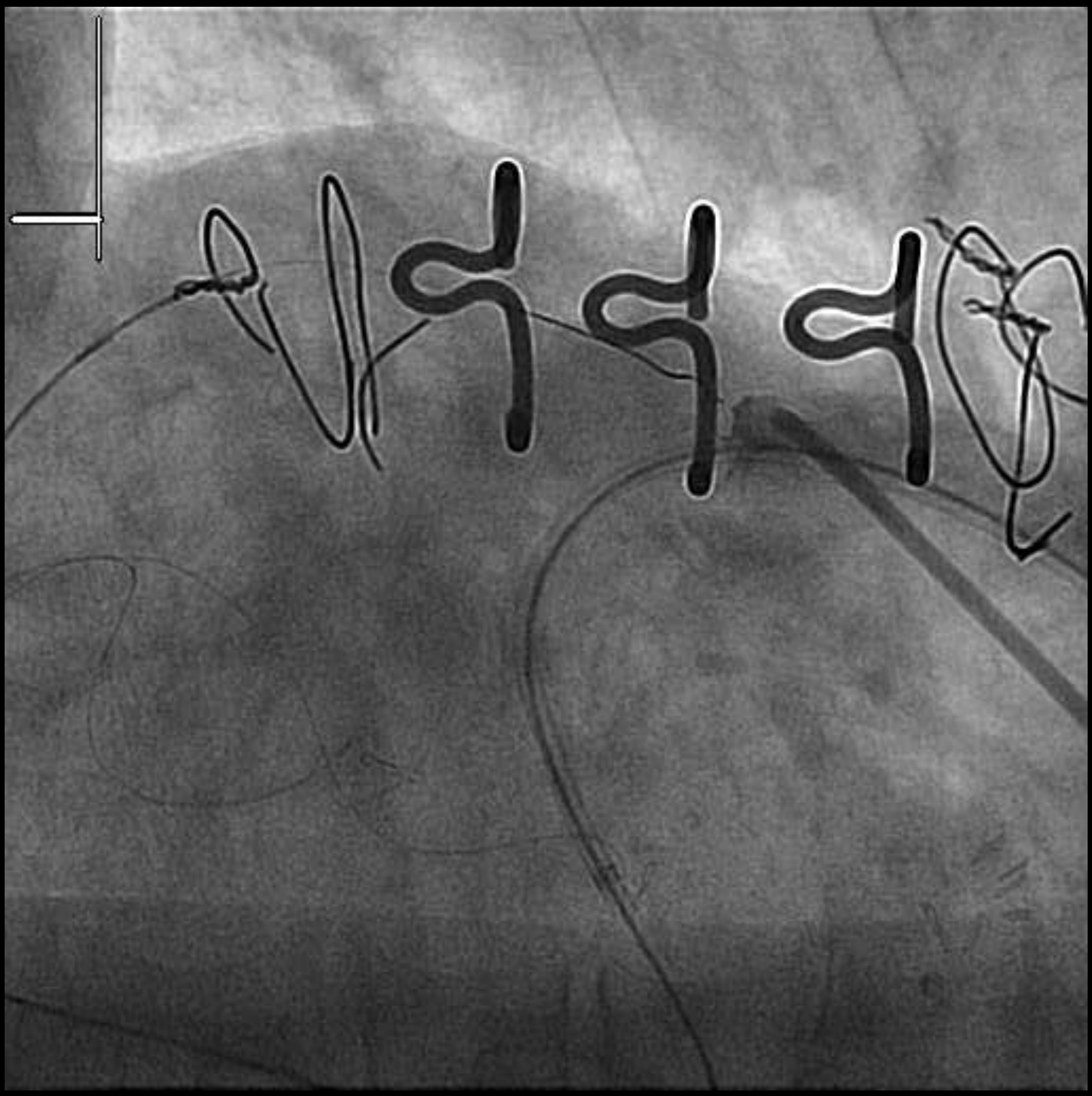


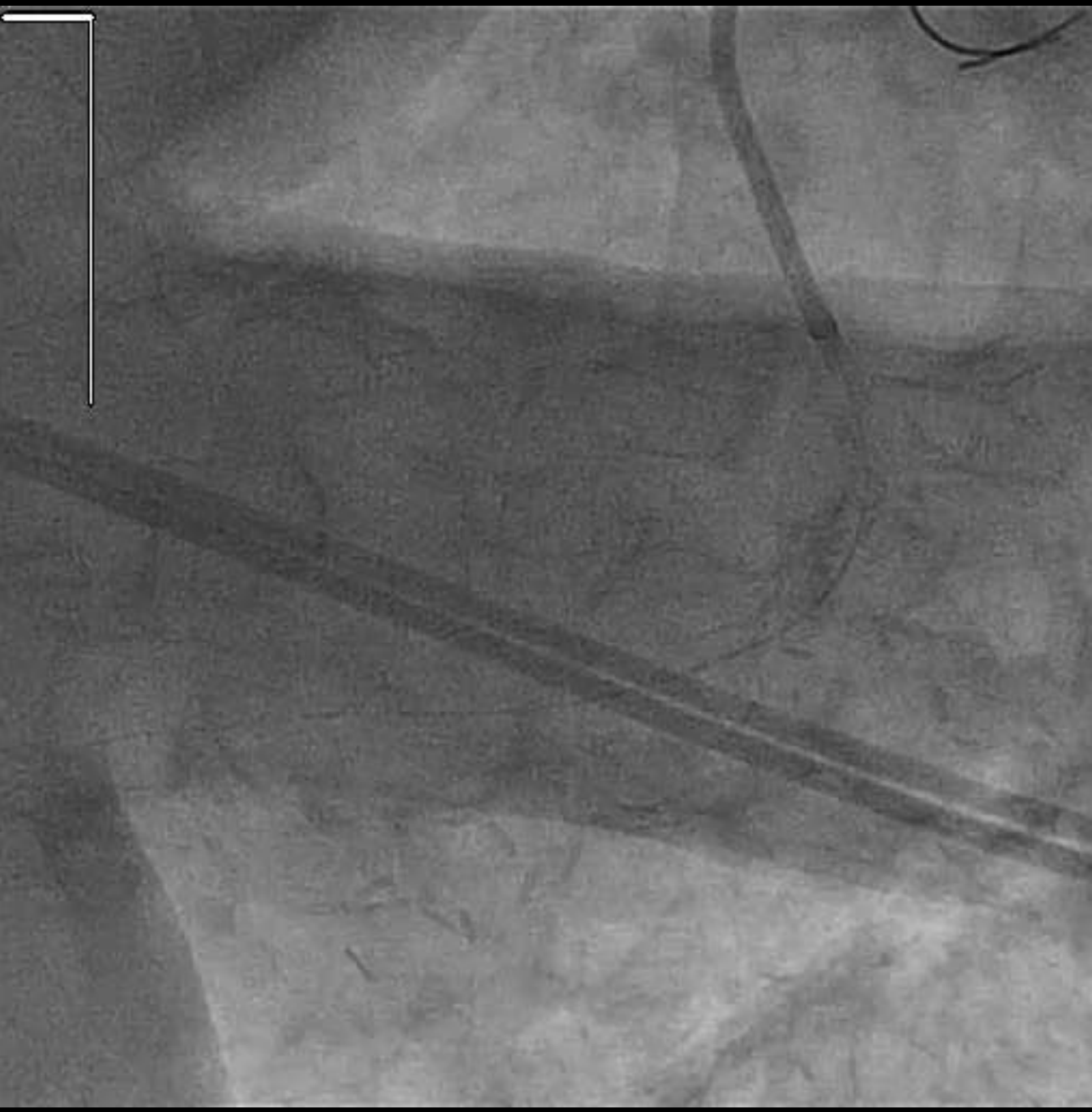


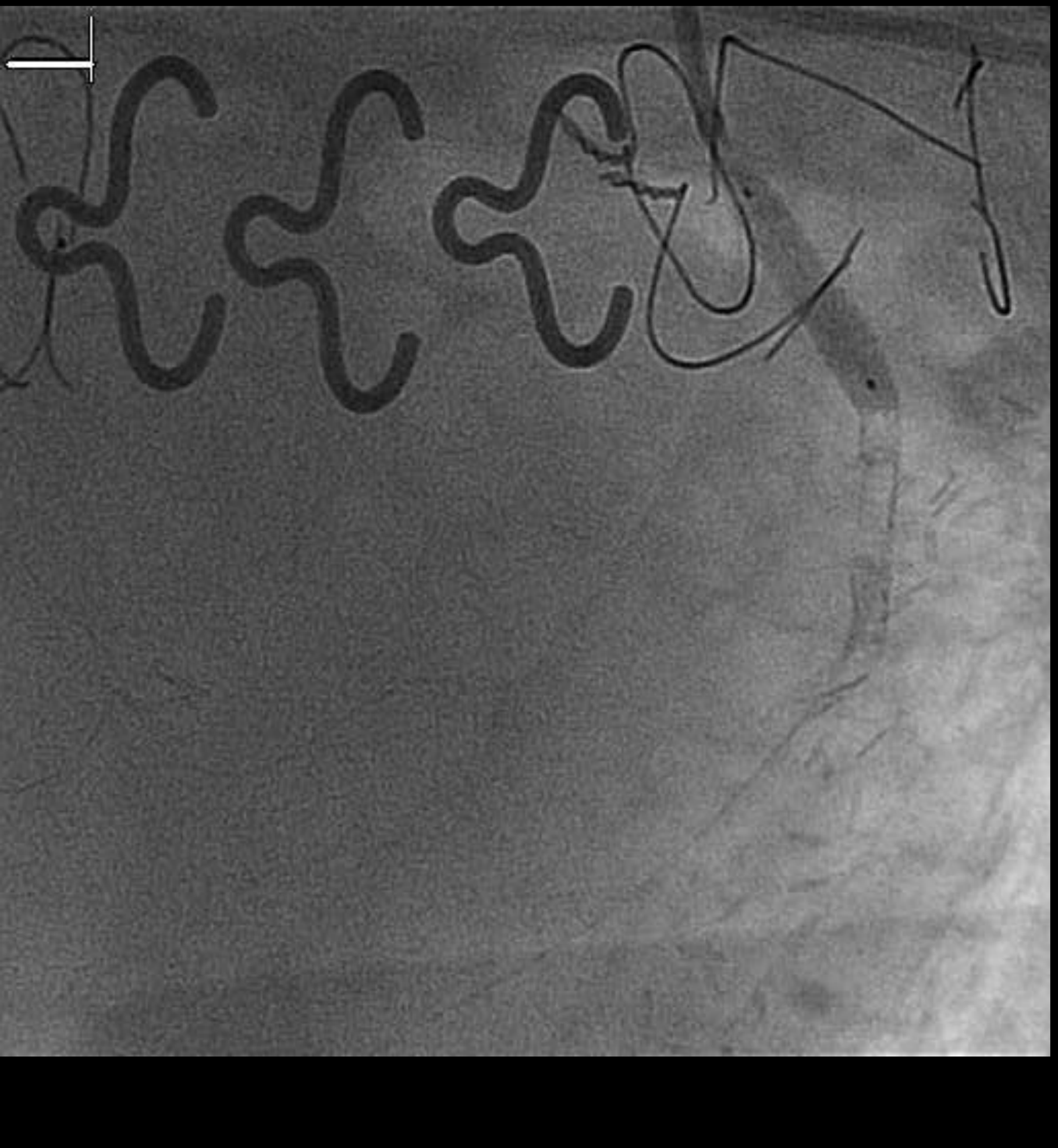


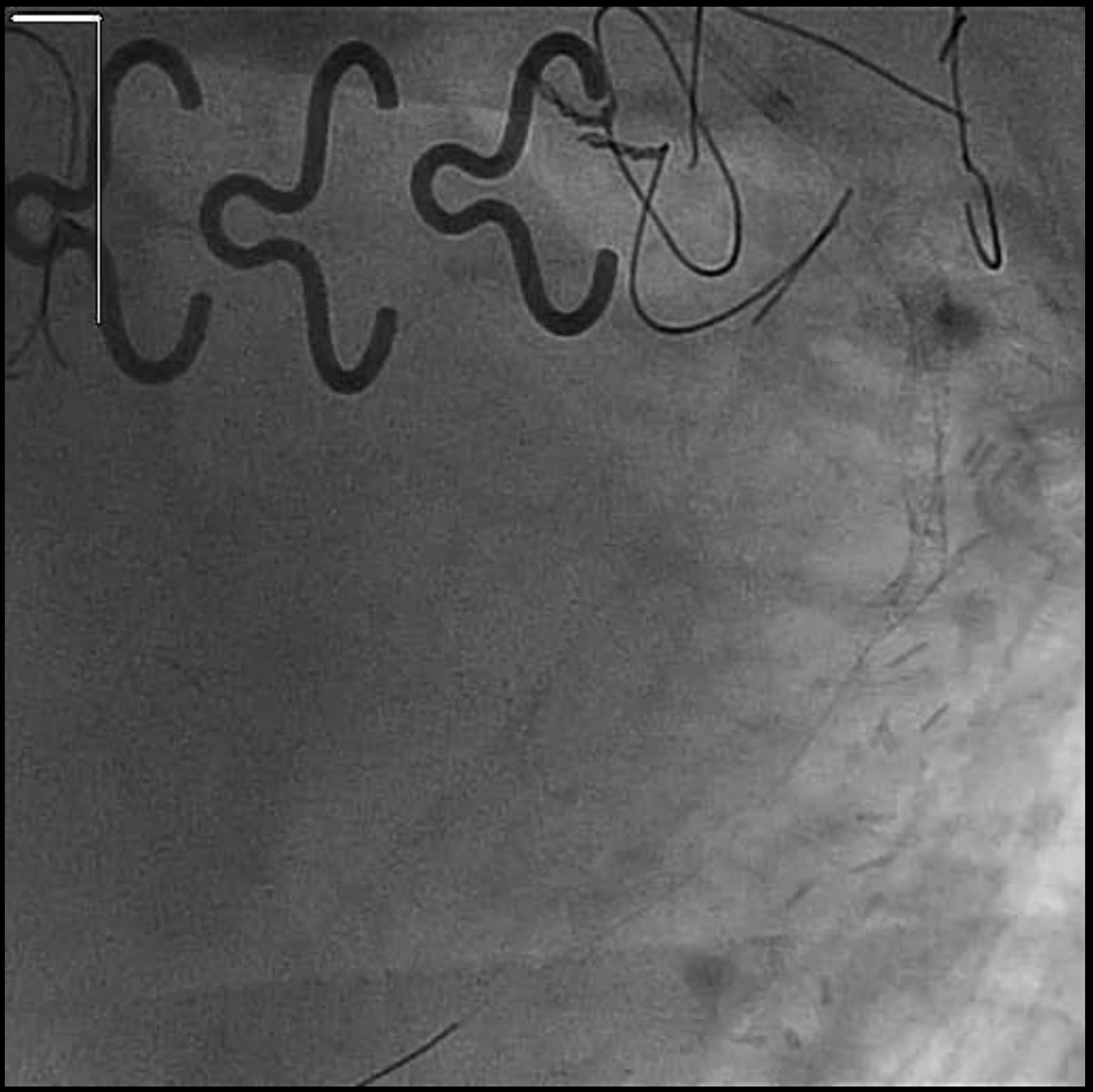




- Guiding not short enough.





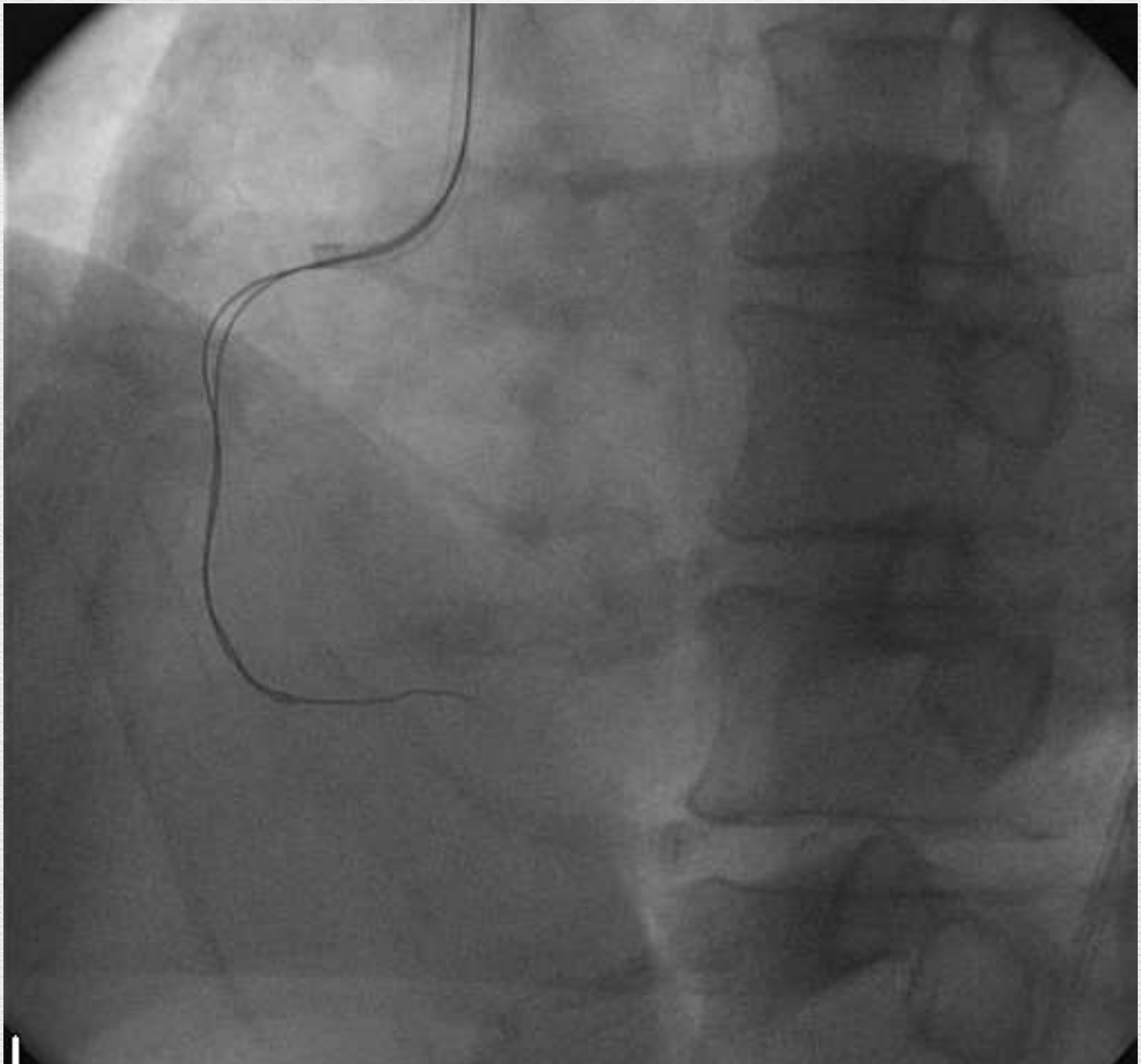


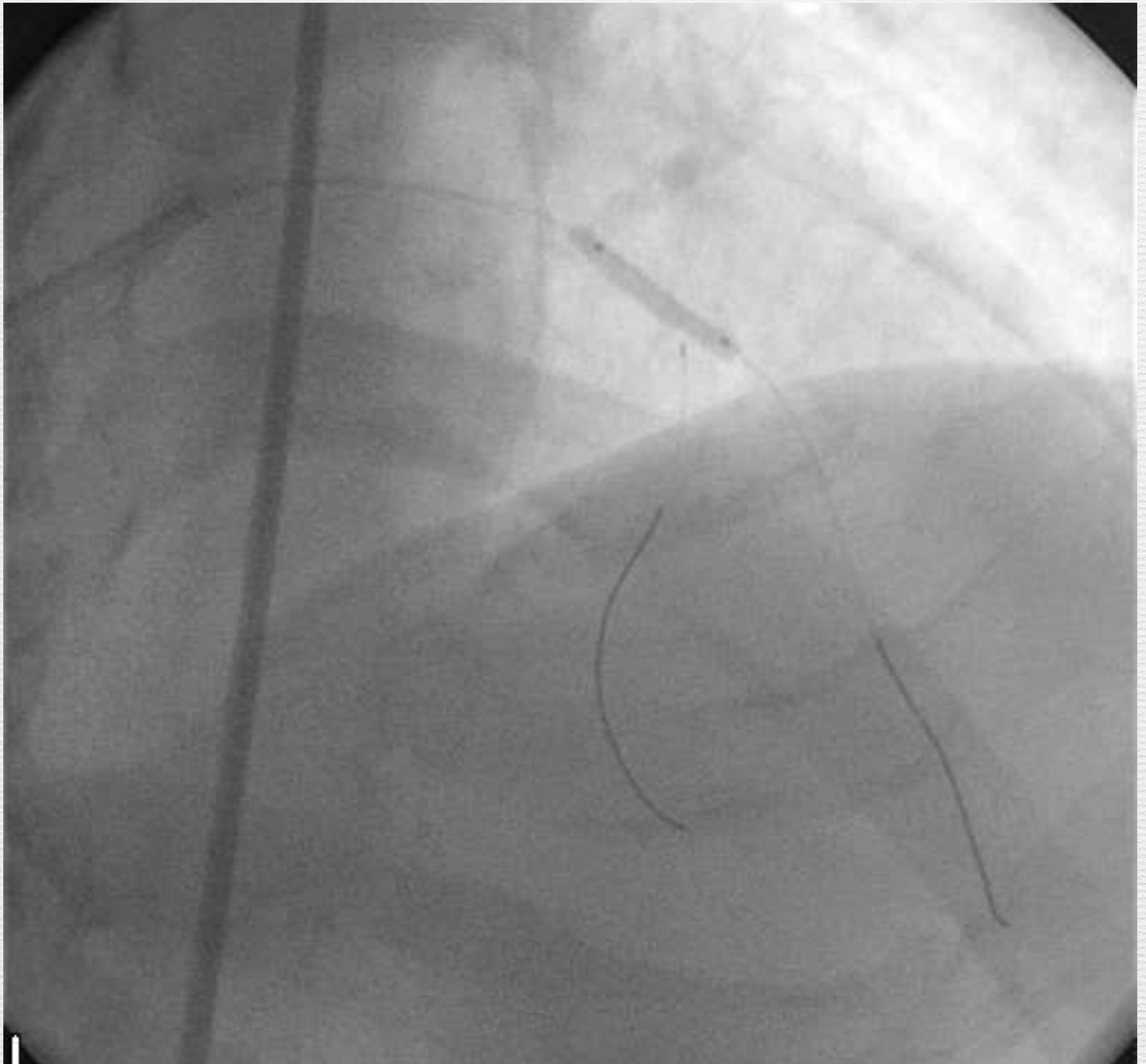
AIR EMBOLISM WITH TRAPPING BALLOON

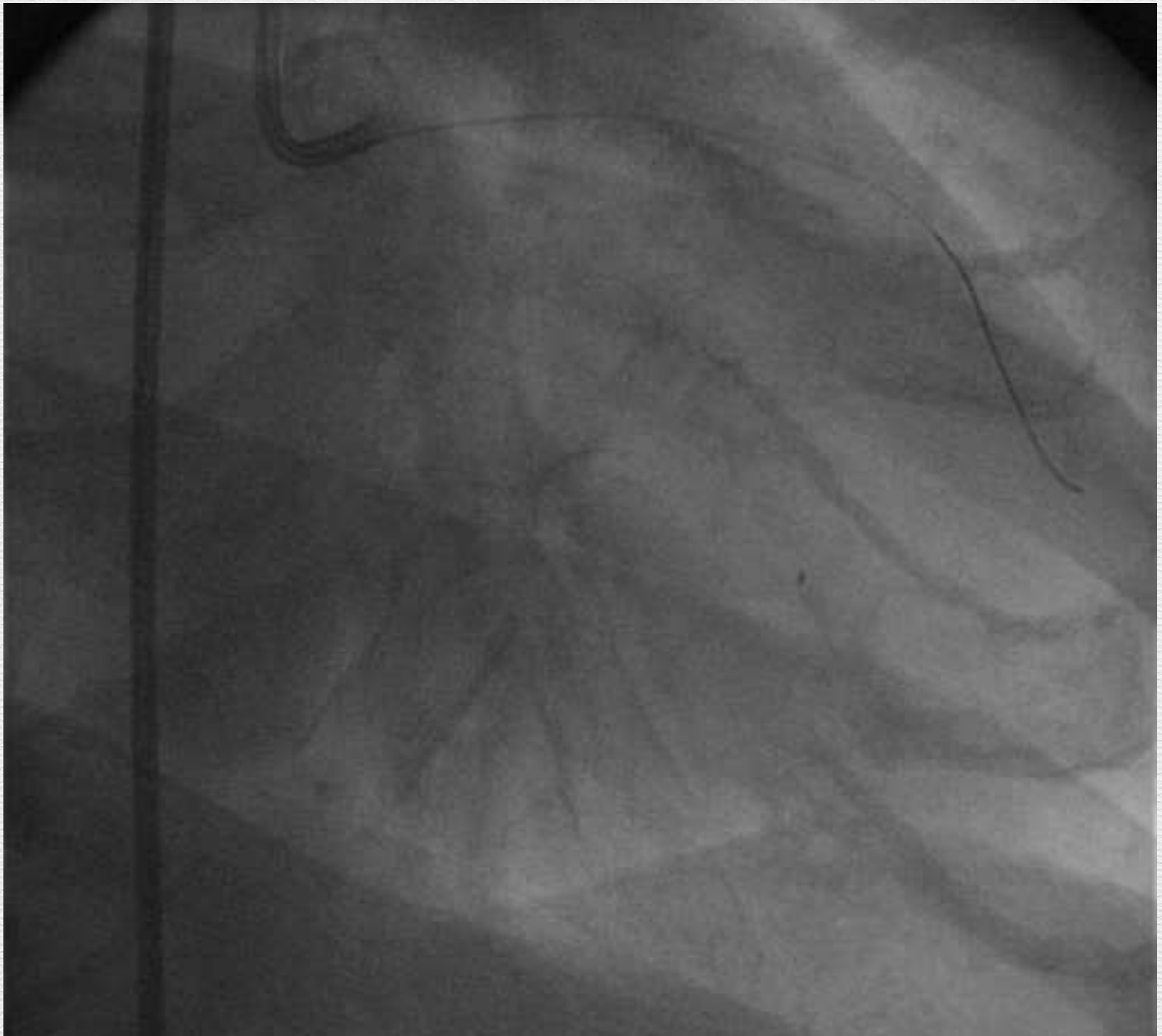
- Usually use 2.5 mm balloon to trap devices.
- Must de air the guiding afterwards.
- Donor artery air embolism is extremely dangerous.

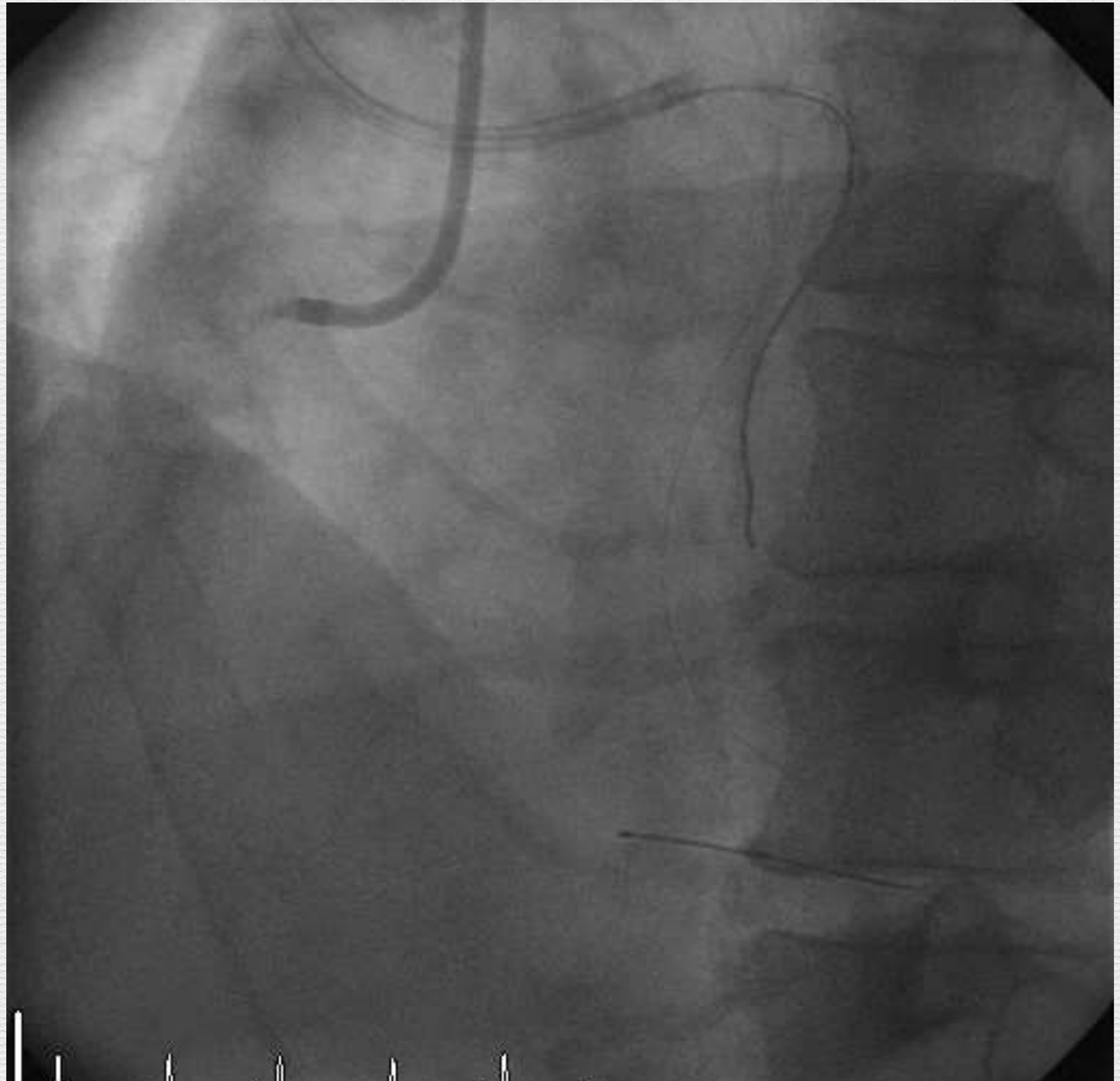
ERRONEOUS RETROGRADE WIRE POSITION

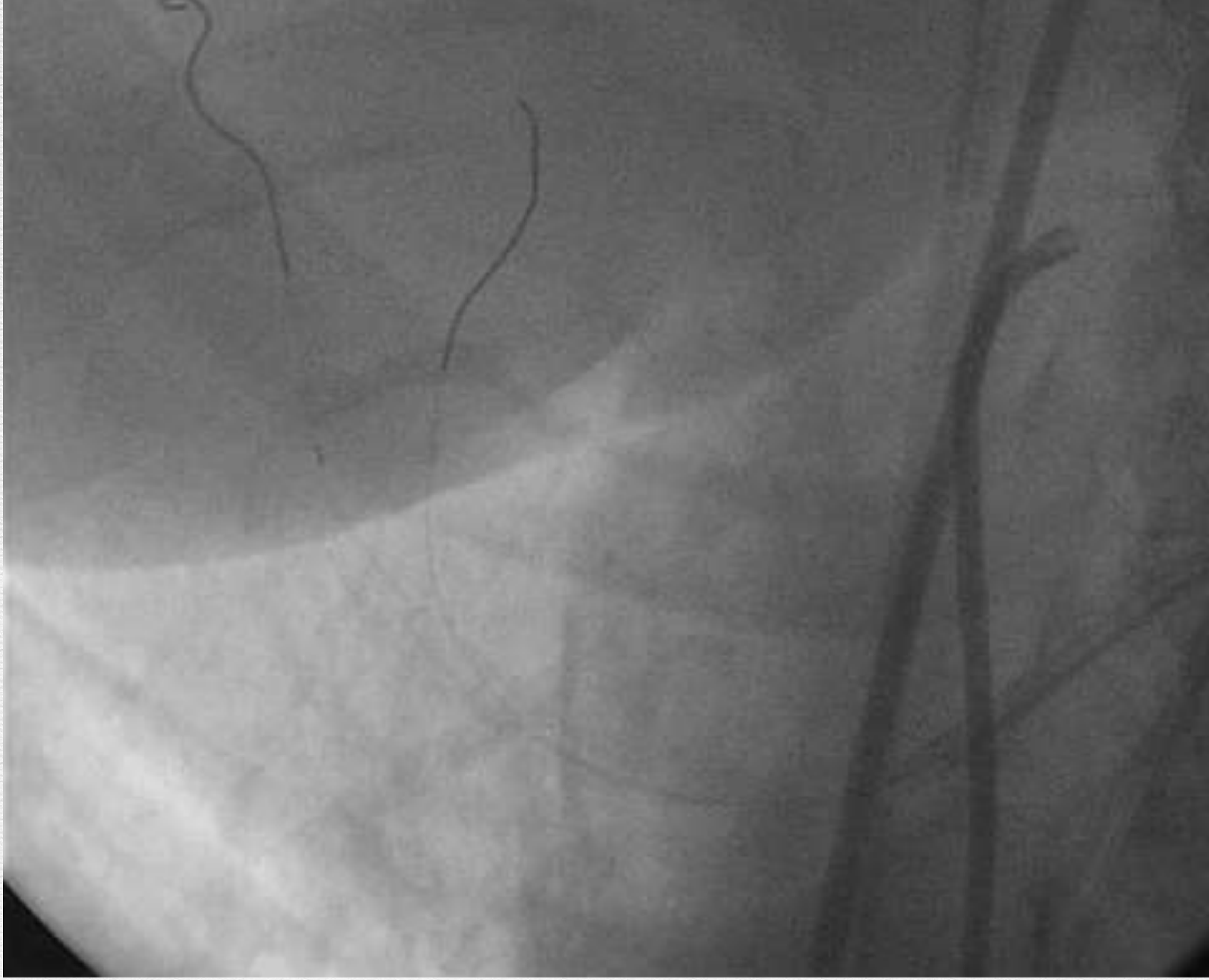
- Channel perforation.

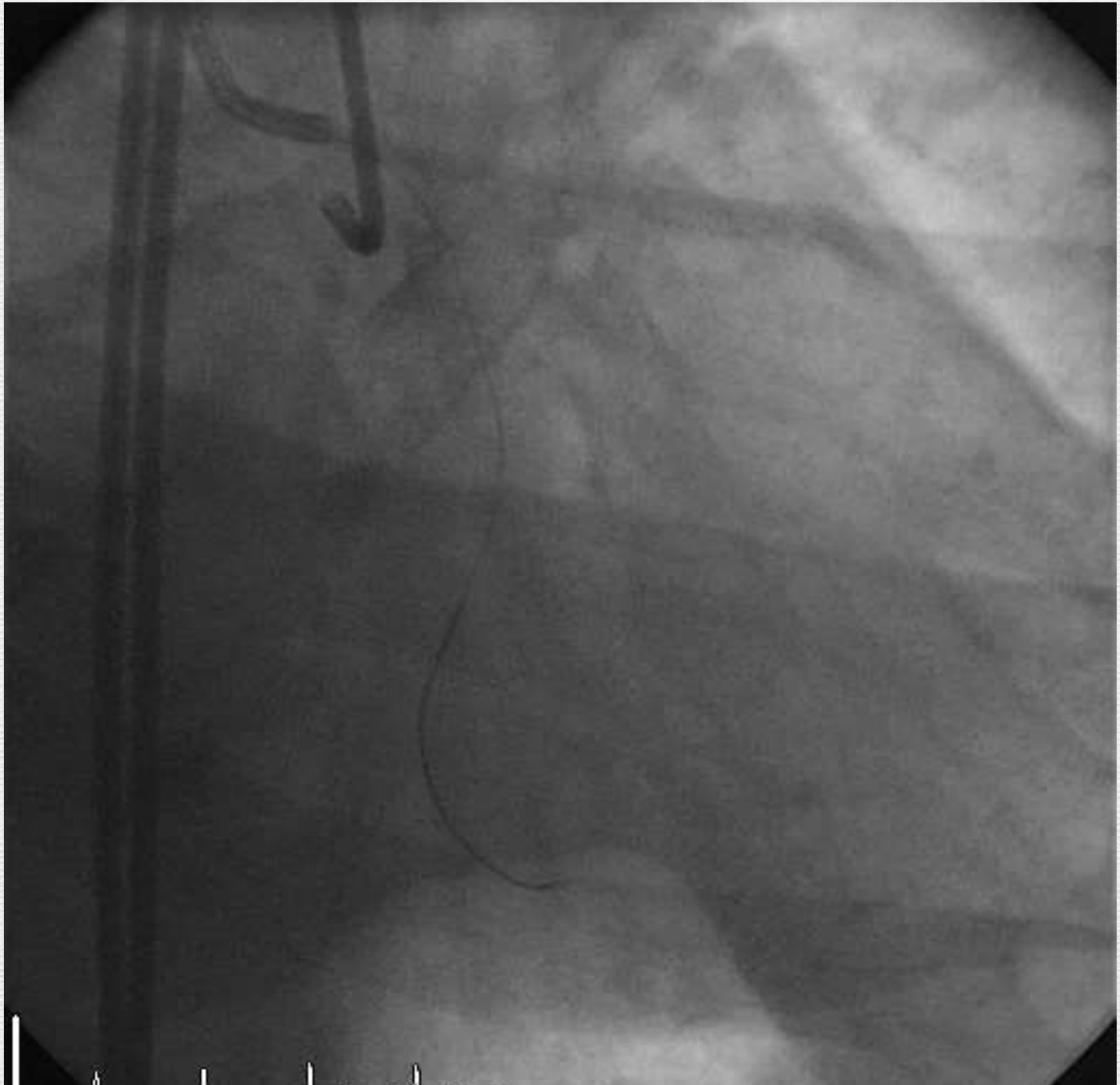


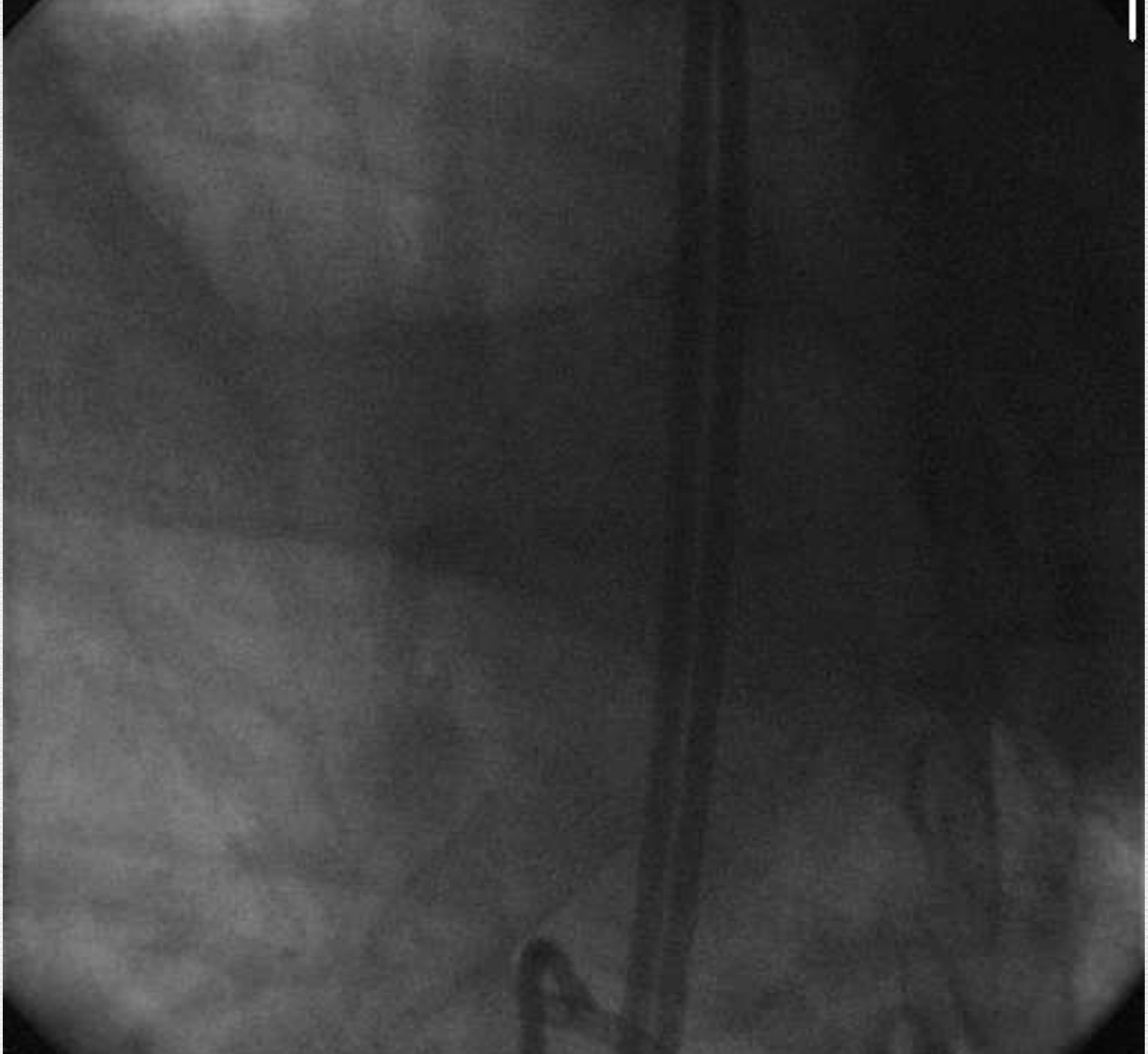


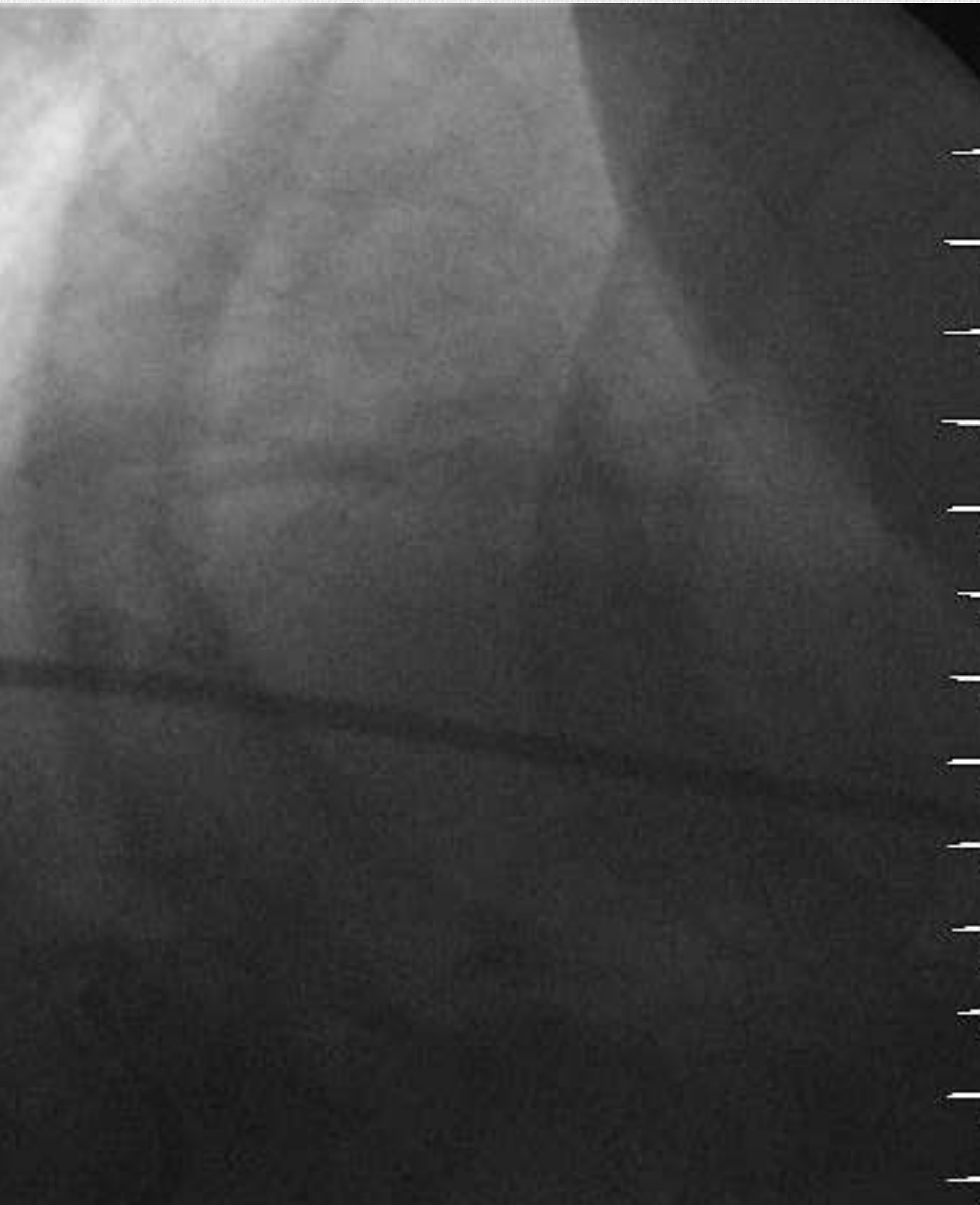












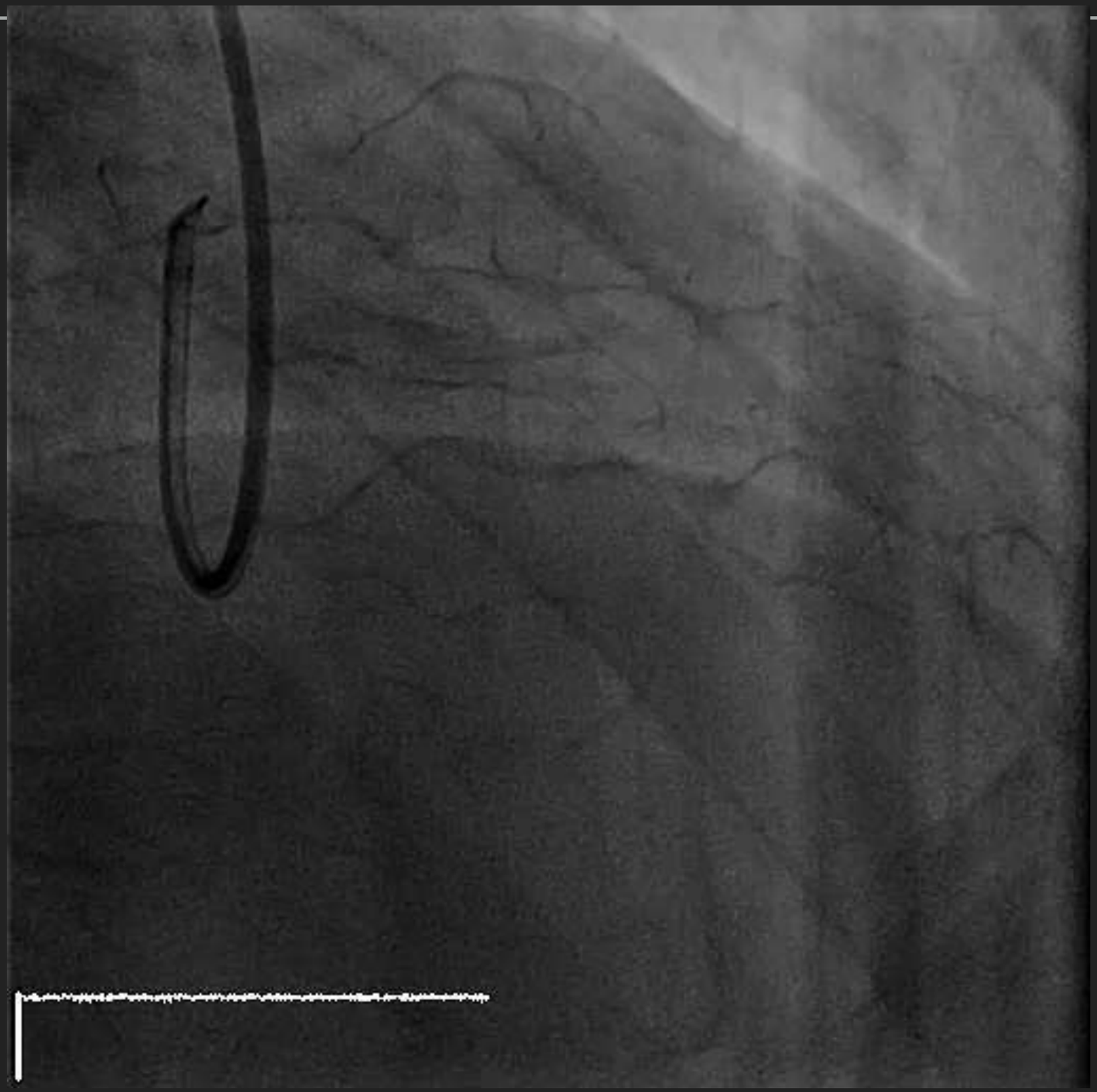
TEXT

ALWAYS CHECK RETROGRADE WIRE POSITION BEFORE CROSS CORSAIR

TEXT

DANGERS OF STENT REVERSE CART.

TEXT



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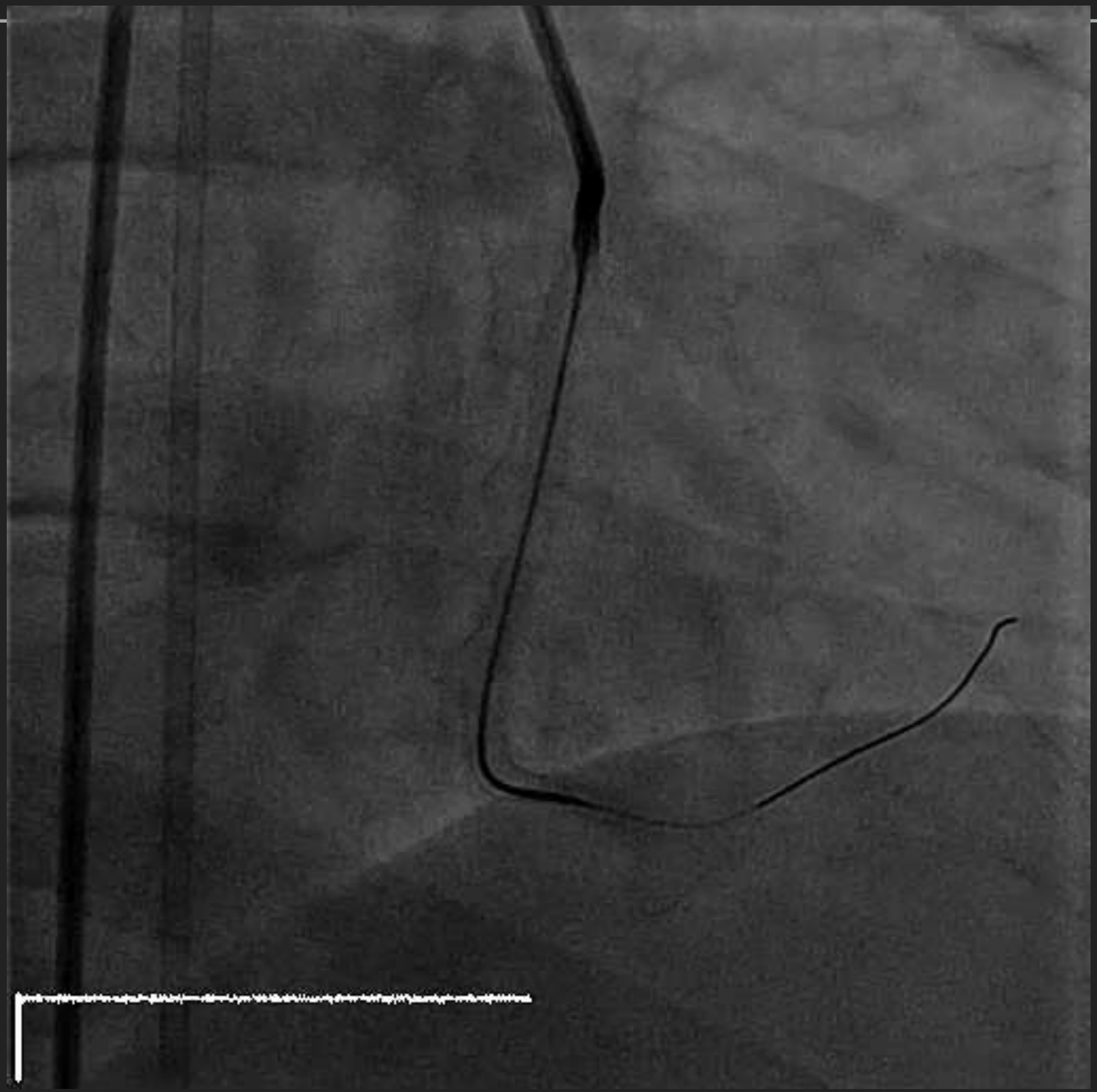

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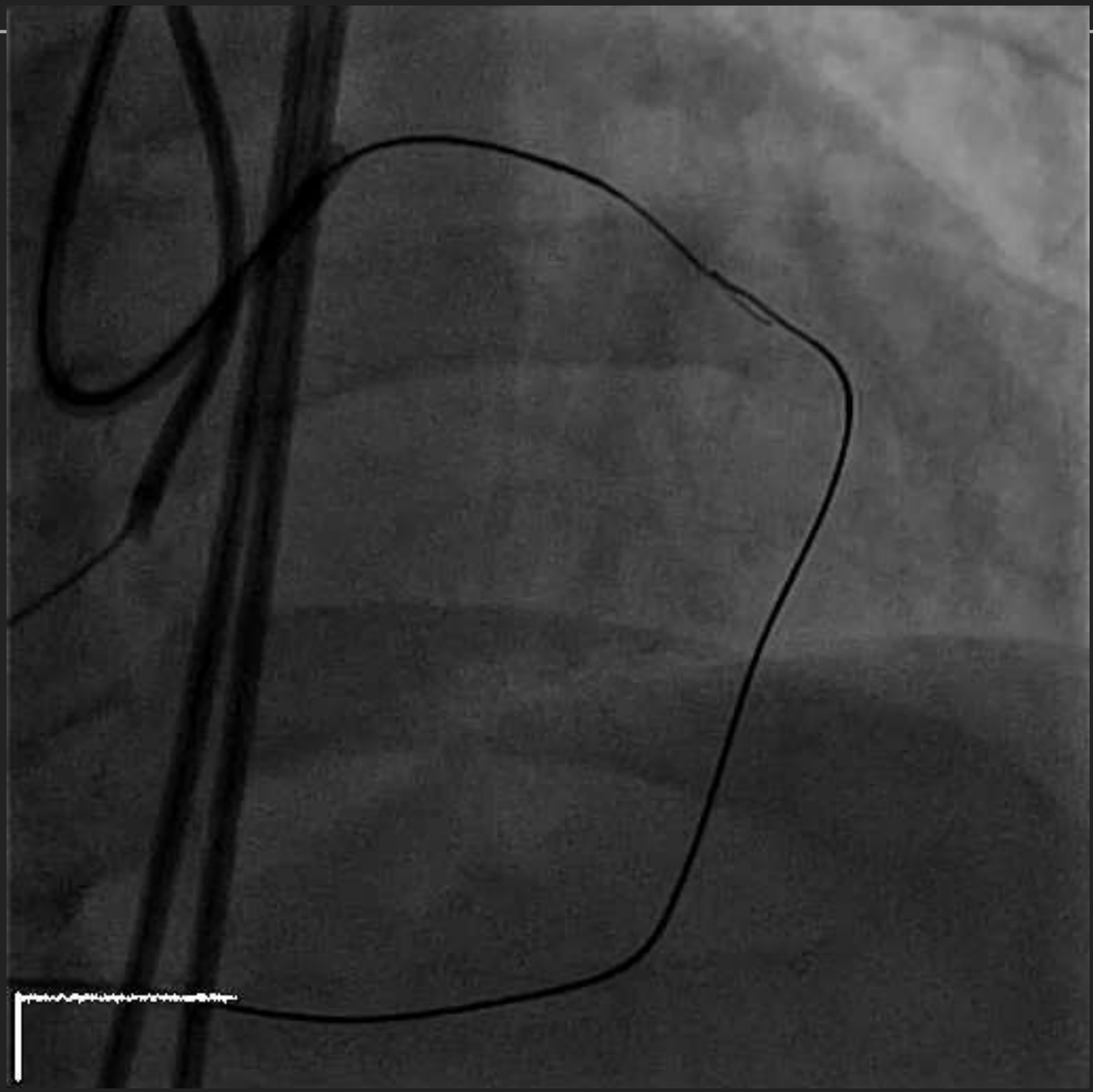

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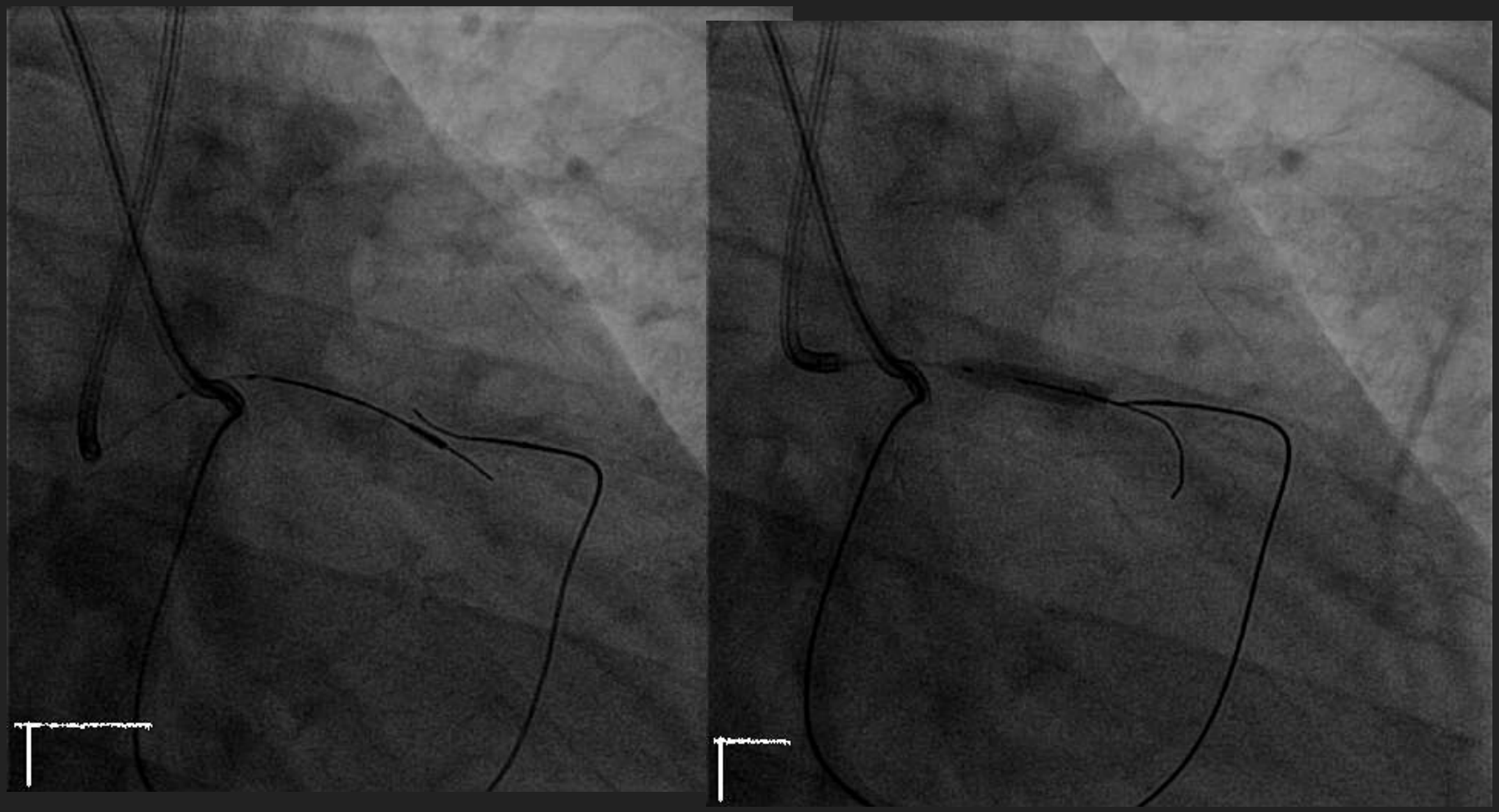

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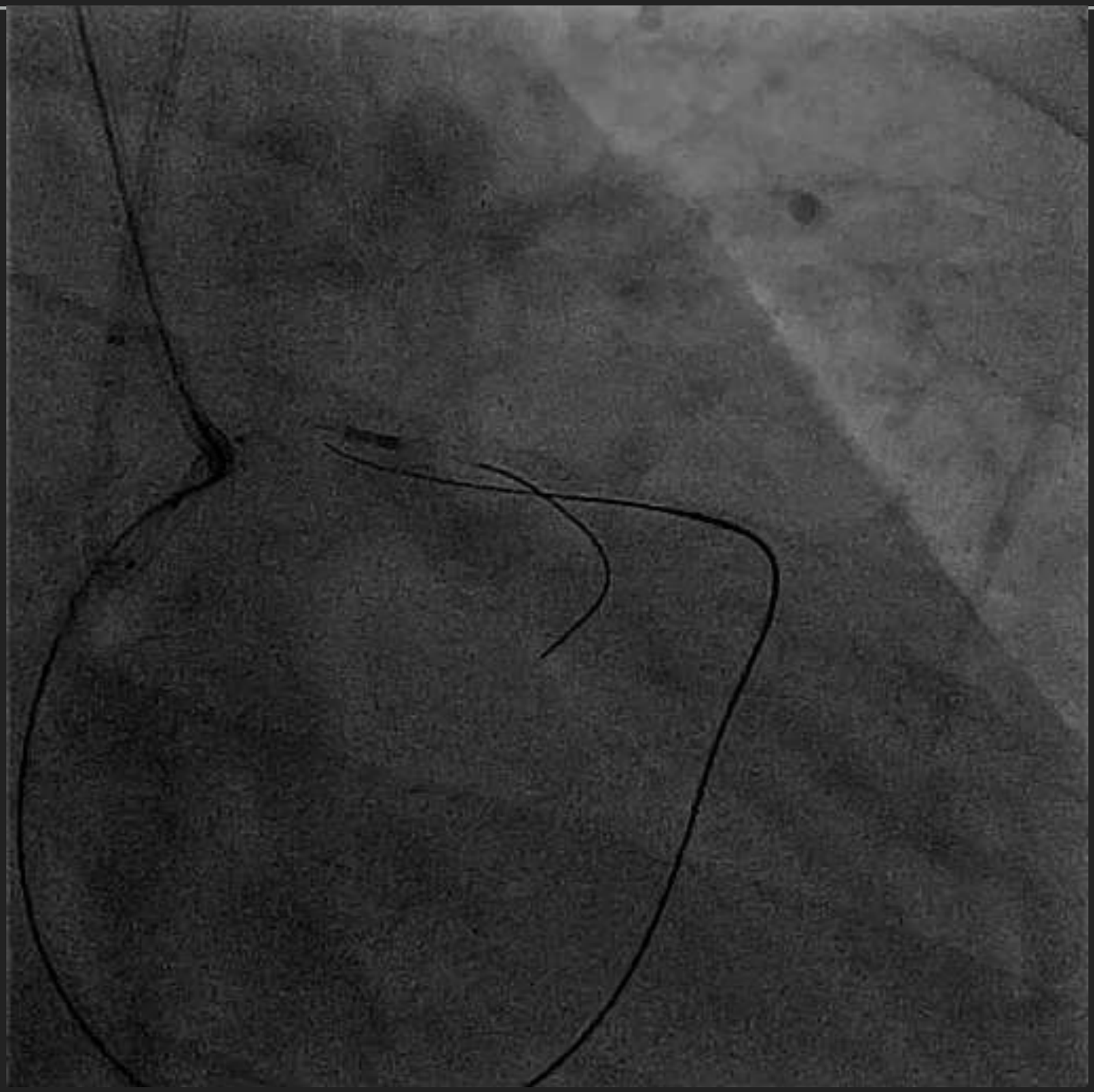

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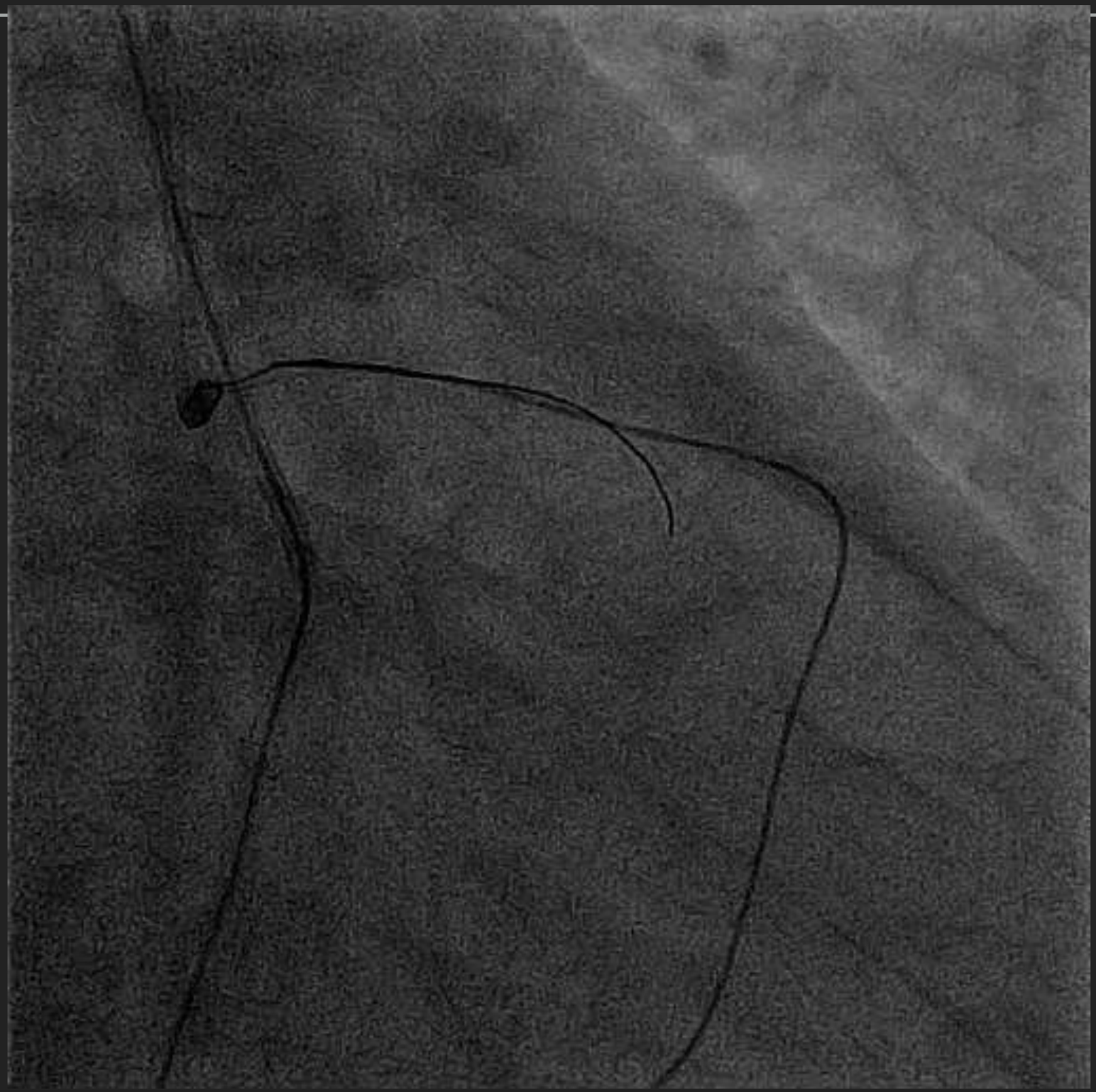

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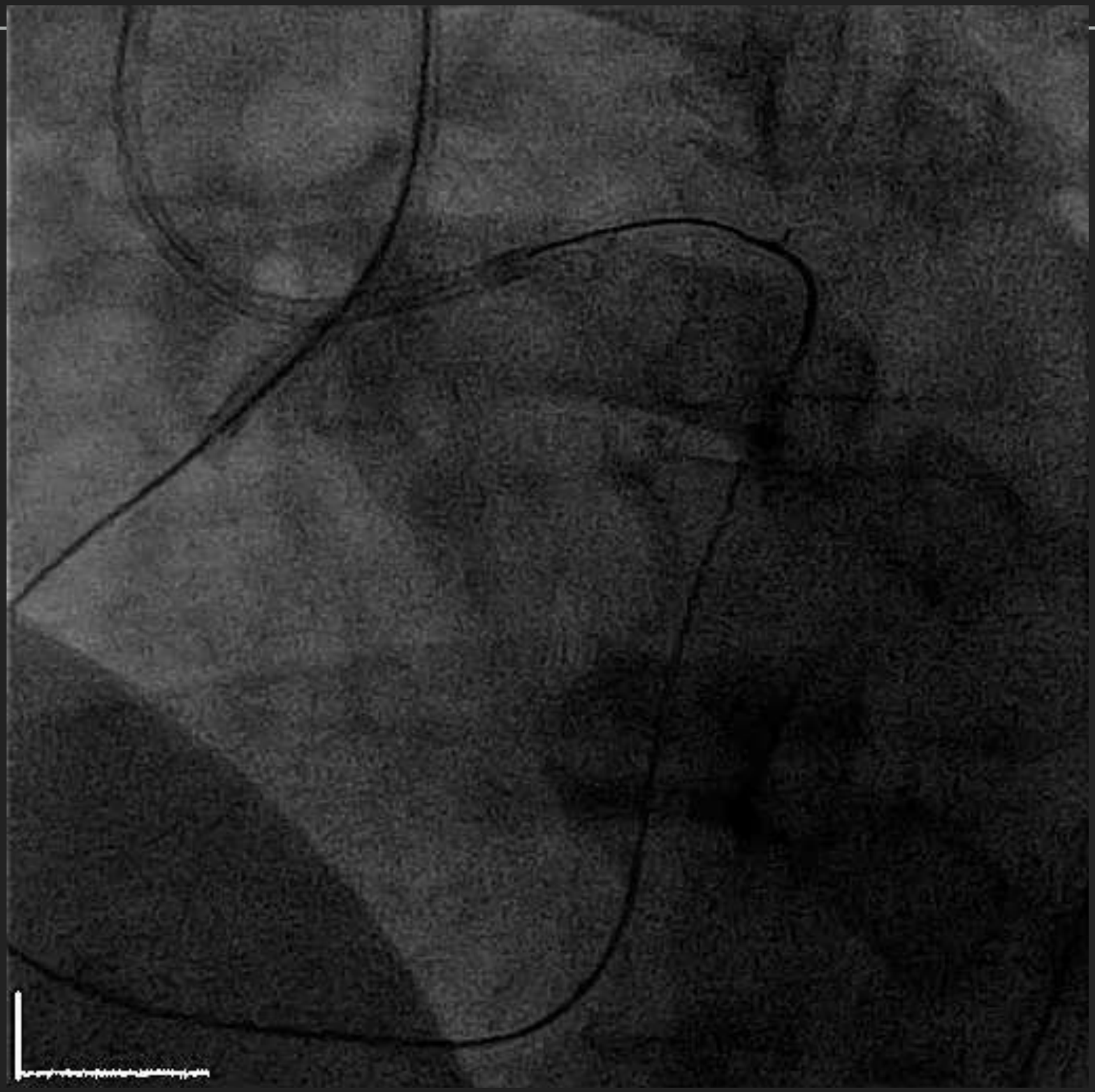
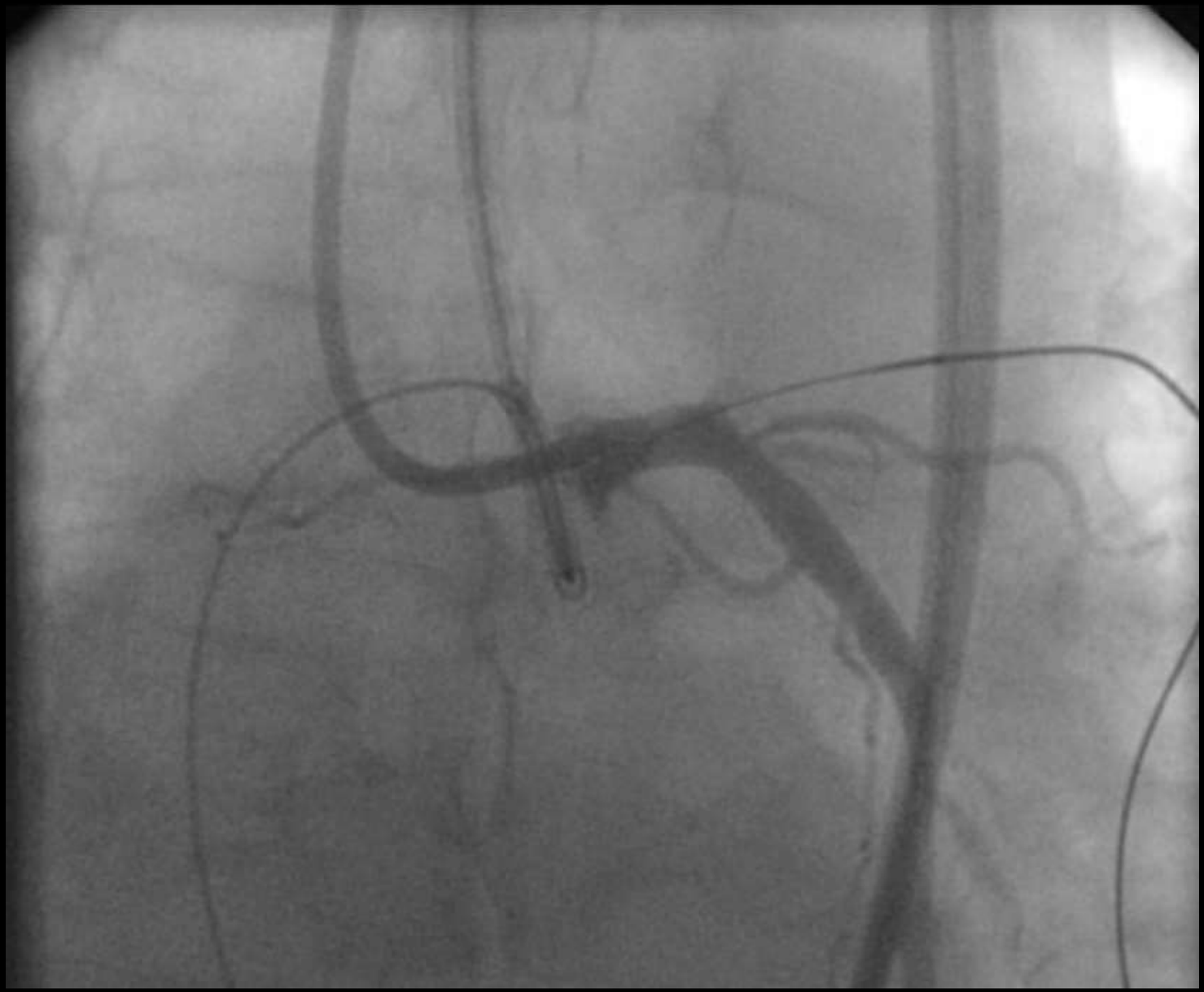


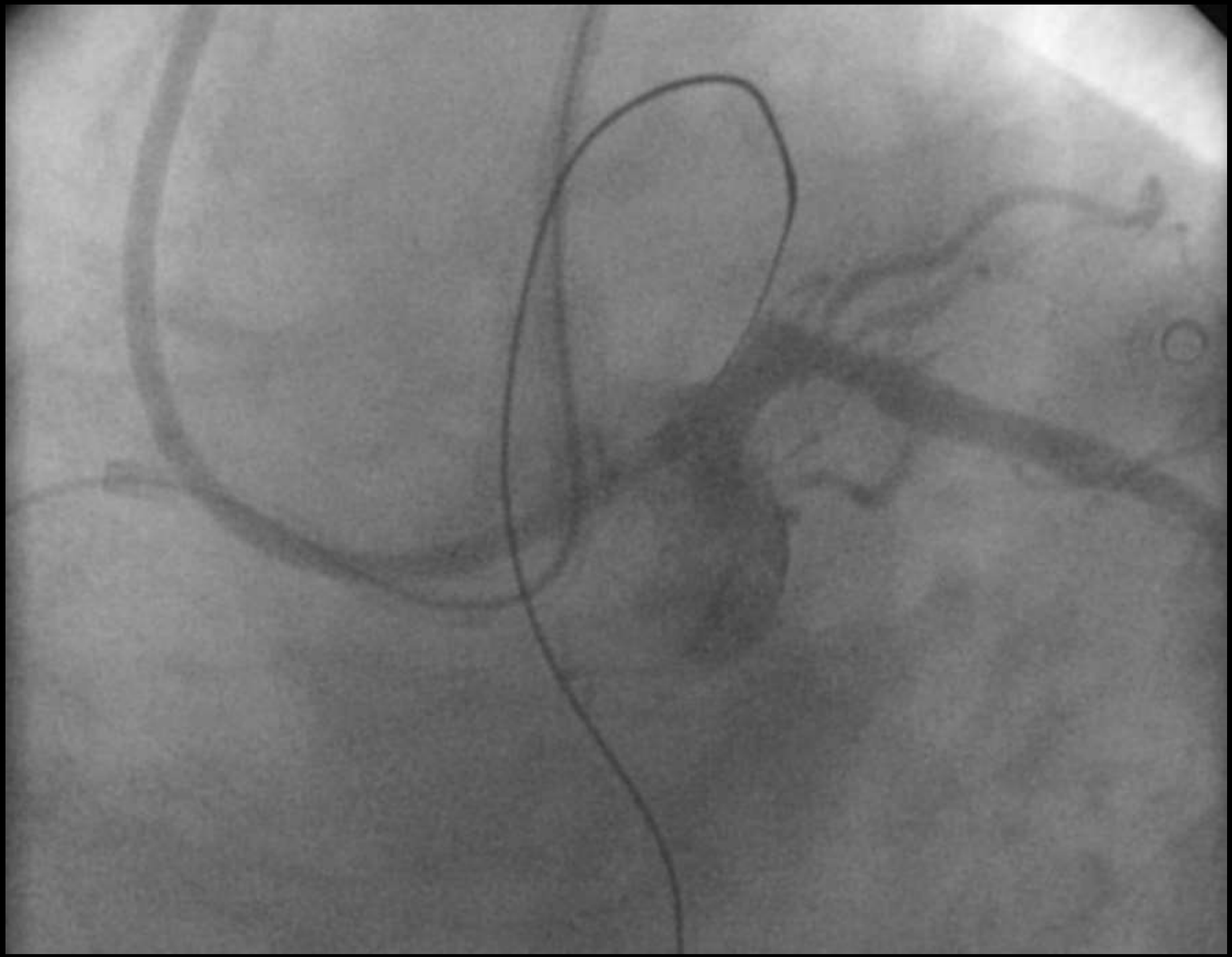
STENT REVERSE CART

- Should be a very very last resort.
- Must have IVUS to confirm both connection between antegrade and retrograde wires as well as IVUS to confirm true lumen position of retrograde wire throughout the length of the stented segment.

TEXT

SUBINTIMAL PATH OF RETROGRADE WIRE

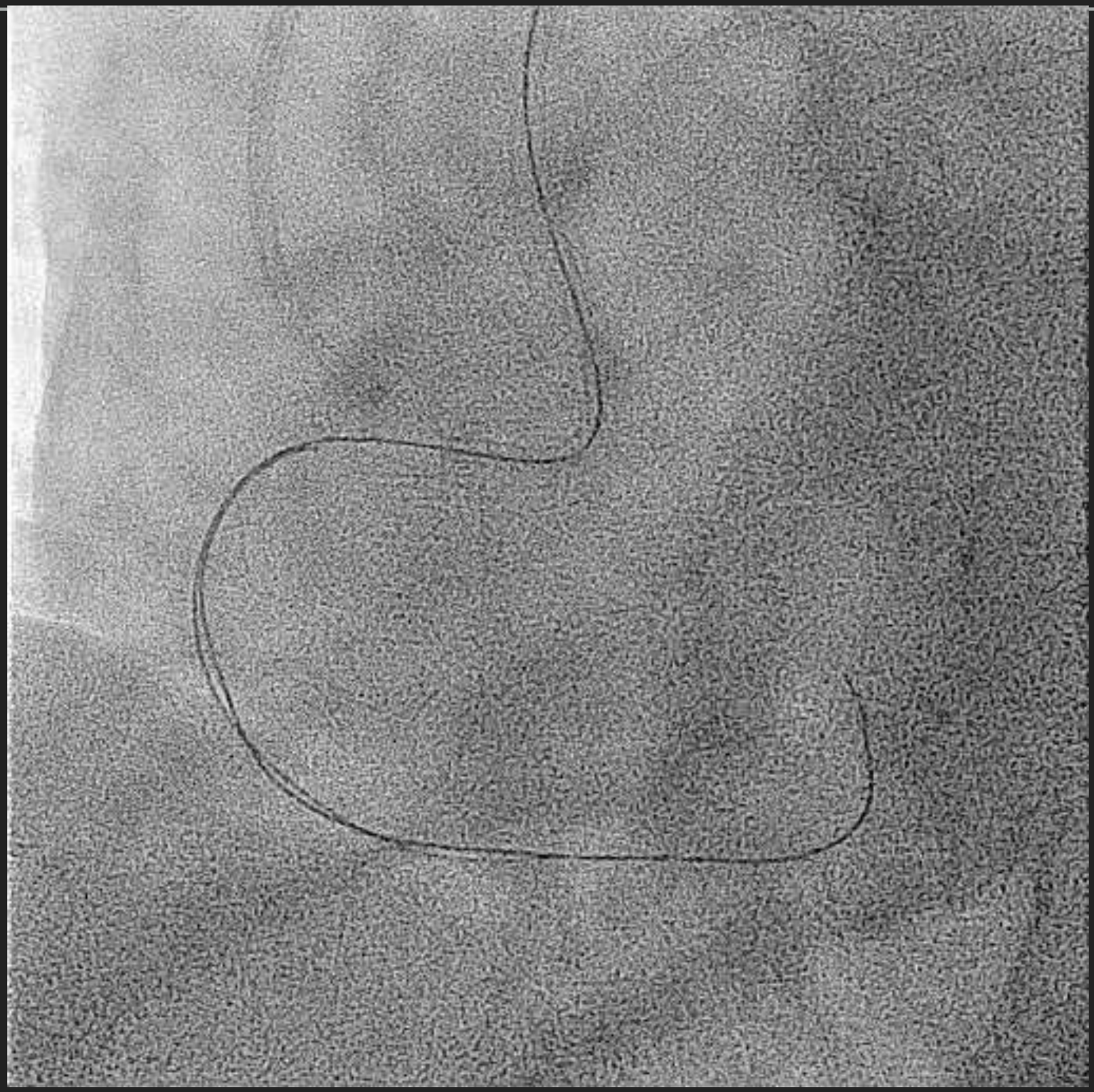




SNARING OF RETROGRADE WIRES.

- Snaring of retrograde wires like Stent reverse CART should be last resort.
- Usual procedure -> Retrograde CTO wire cross CTO -> wire into antegrade guiding catheter -> Anchor retrograde wire with balloon-> push retrograde micro catheter accross CTO into antegrade guiding -> externalize.

TEXT



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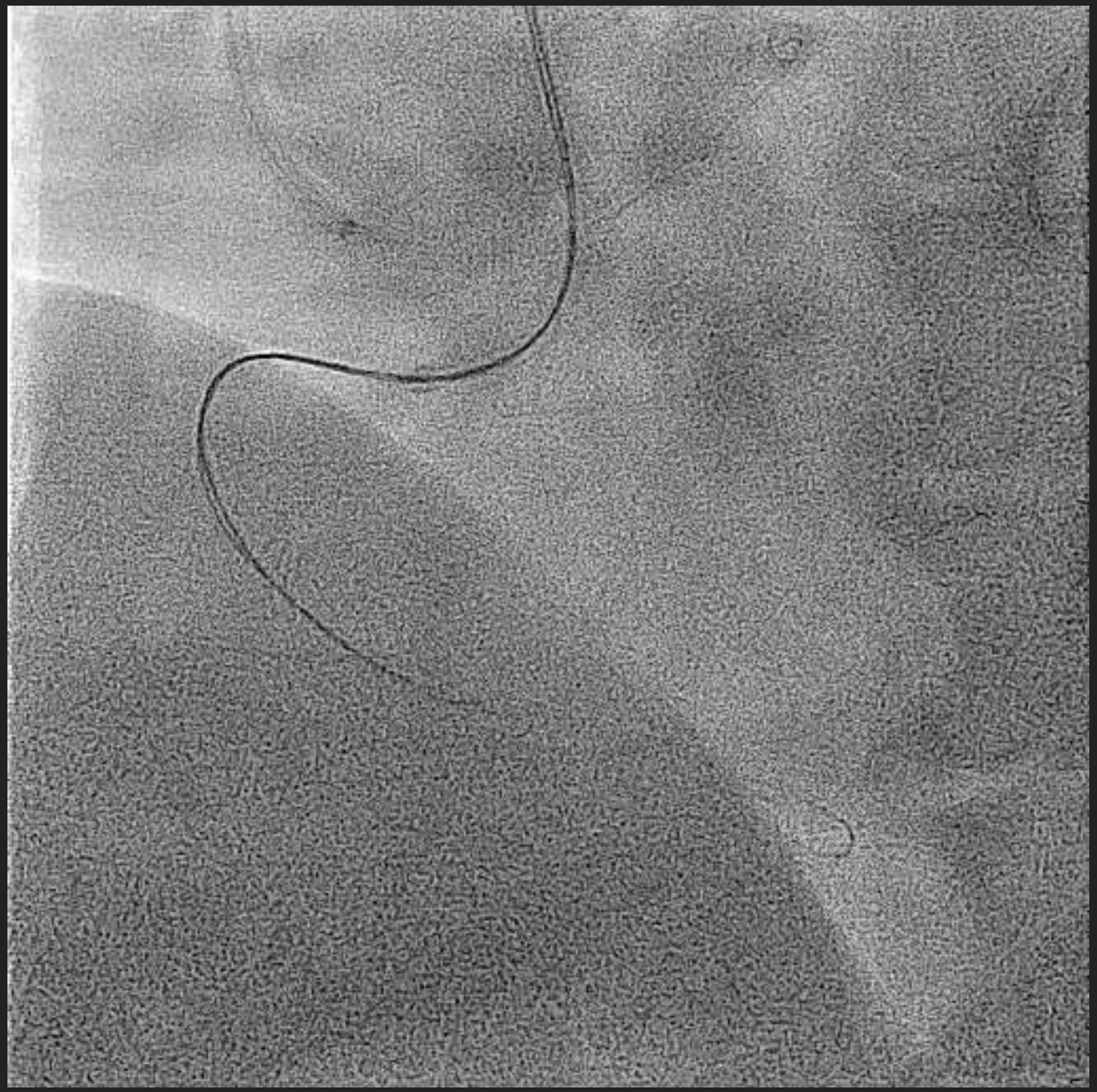

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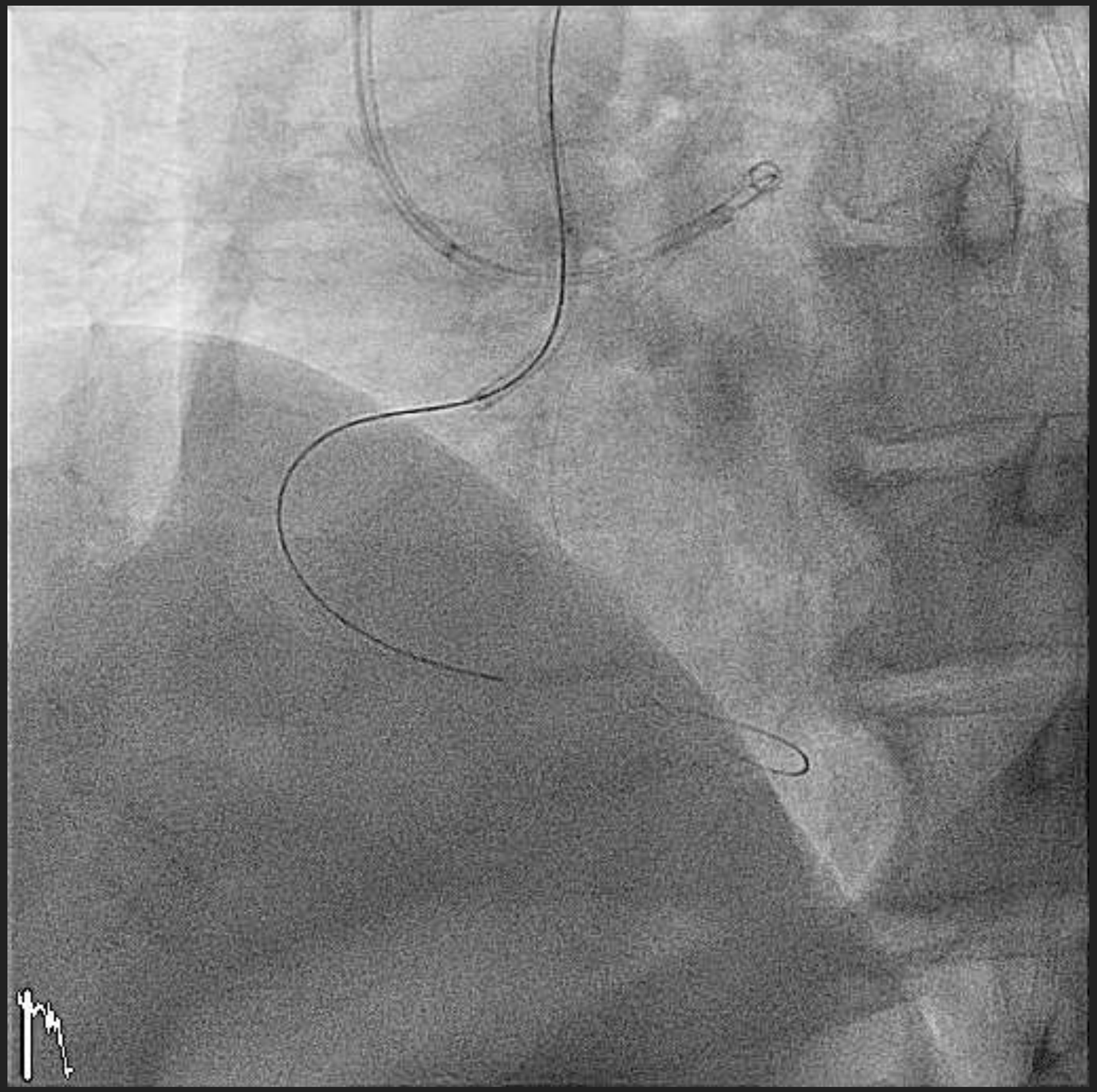

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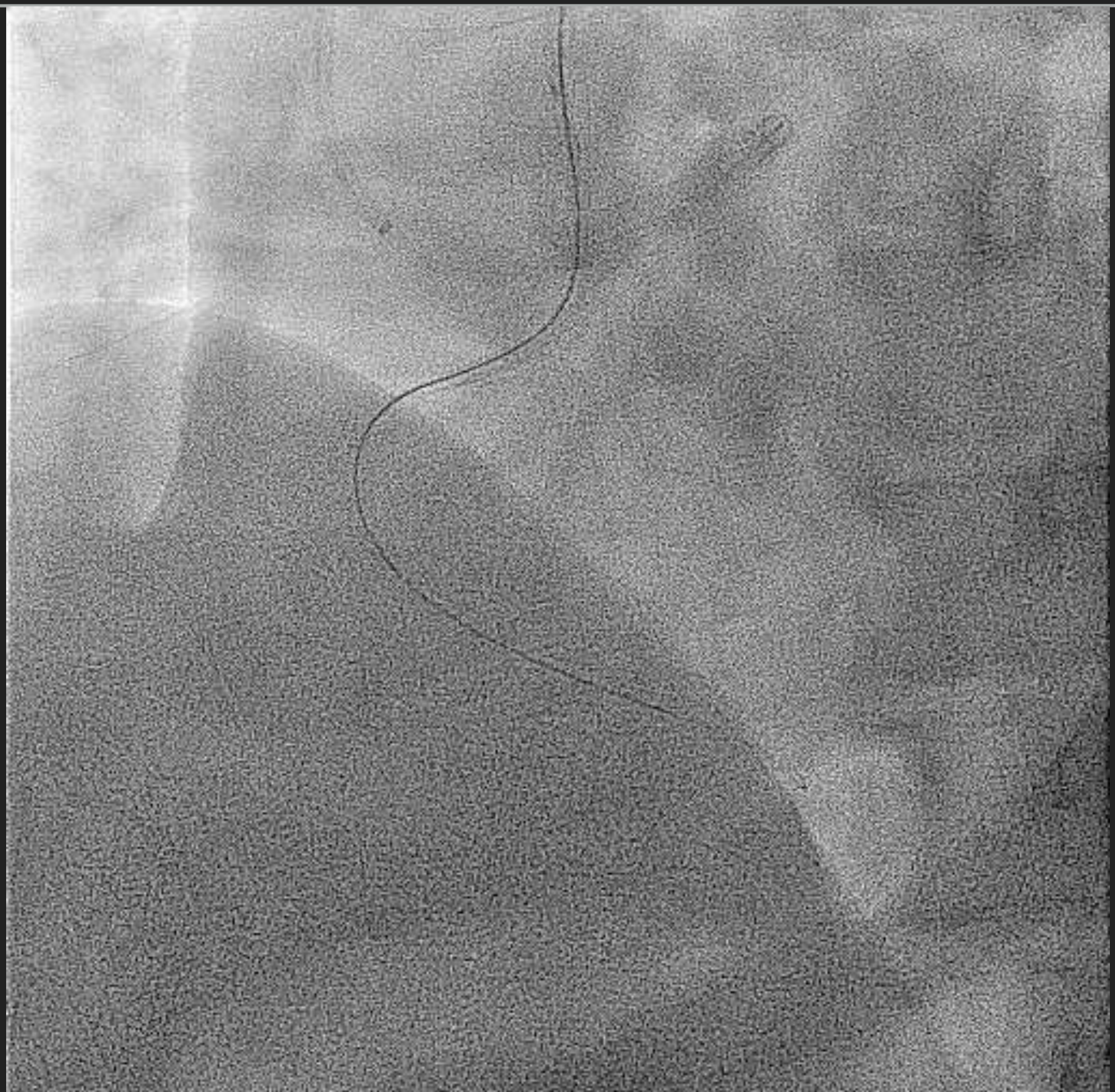

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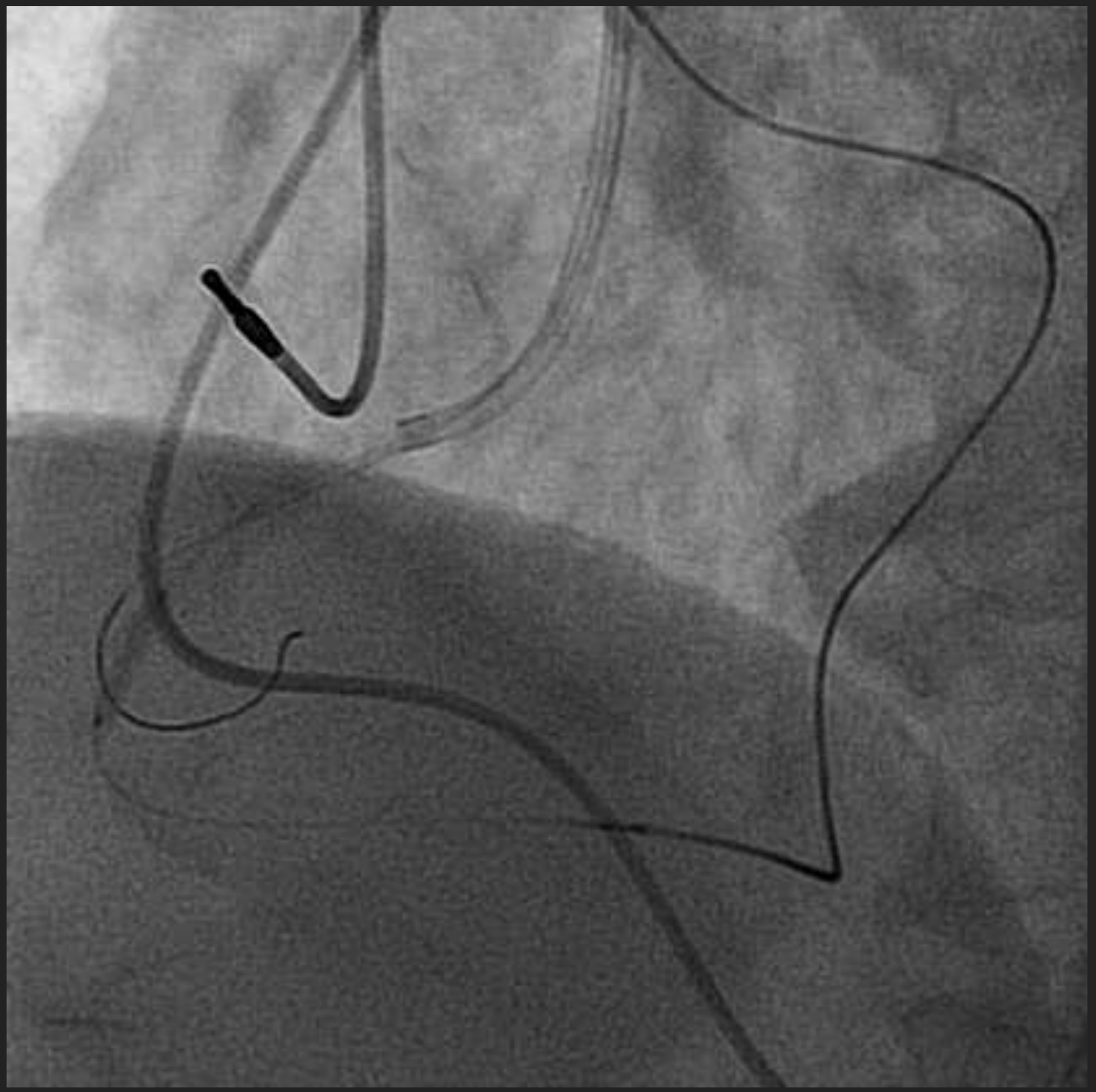


TEXT

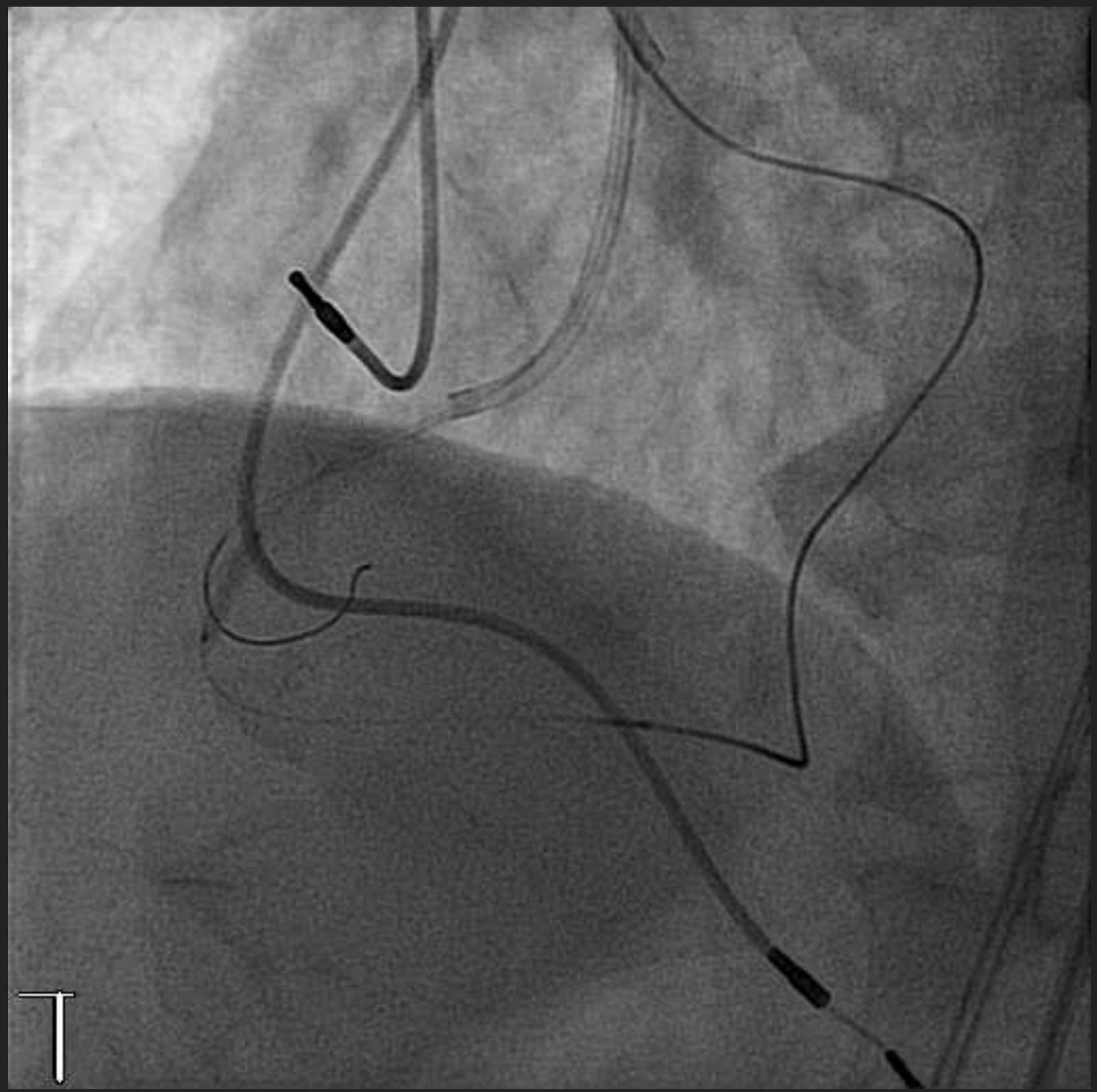
WHEN DO WE CONSIDER SNARING? ARE THERE OTHER OPTIONS?

- CTO wire crossed CTO but cannot wire into guiding -> Alternatives -> push up to aortic arch for support to push retrograde corsair across CTO -> then switch to soft directable wire to wire guiding.
- Alternatives -> Use balloon to anchor the CTO wire in proximal part of vessel and push retrograde corsair across CTO.
- Alternatives -> Push guideliner into proximal vessel and wire guideliner with retrograde CTO wire.
- Alternatives -> Just snare the retrograde wire in aorta but do not pull back into guiding catheter (this action may produce a bend that cannot be released). Use this support to push retrograde corsair across CTO.
- retrograde Corsair crossed but cannot wire guiding catheter -> alternatives -> guideliner, -> can snare RG3 all the way out.

RETROGRADE GUIDING SUCKING IN DURING RETROGRADE CORSAIR RETRIEVAL.

- Always put guiding up to aorta when back out corsair.

TEXT



HYDRAULIC DISSECTION

- Hybrid operators remove the antegrade contrast syringe after reverse CART -> this is a good practice for us to undertake.
- If suspect perforation (from rupture balloon) -> do not inject -> just inflate a big balloon to occlude the proximal cap and use this to do reverse CART. After reverse CART -> quick stenting and then check. Often stenting after reverse CART seal off perforation.

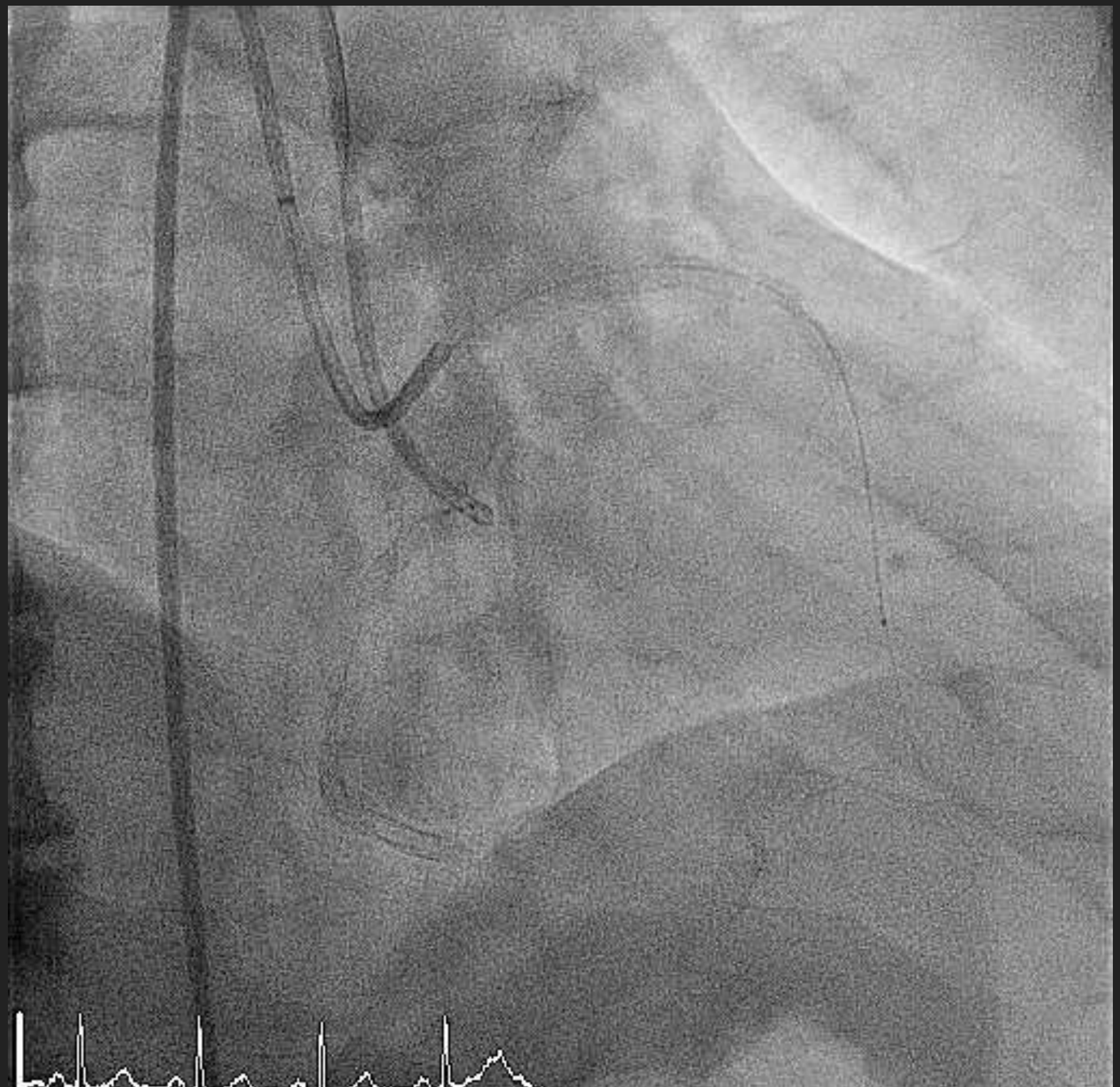
TEXT

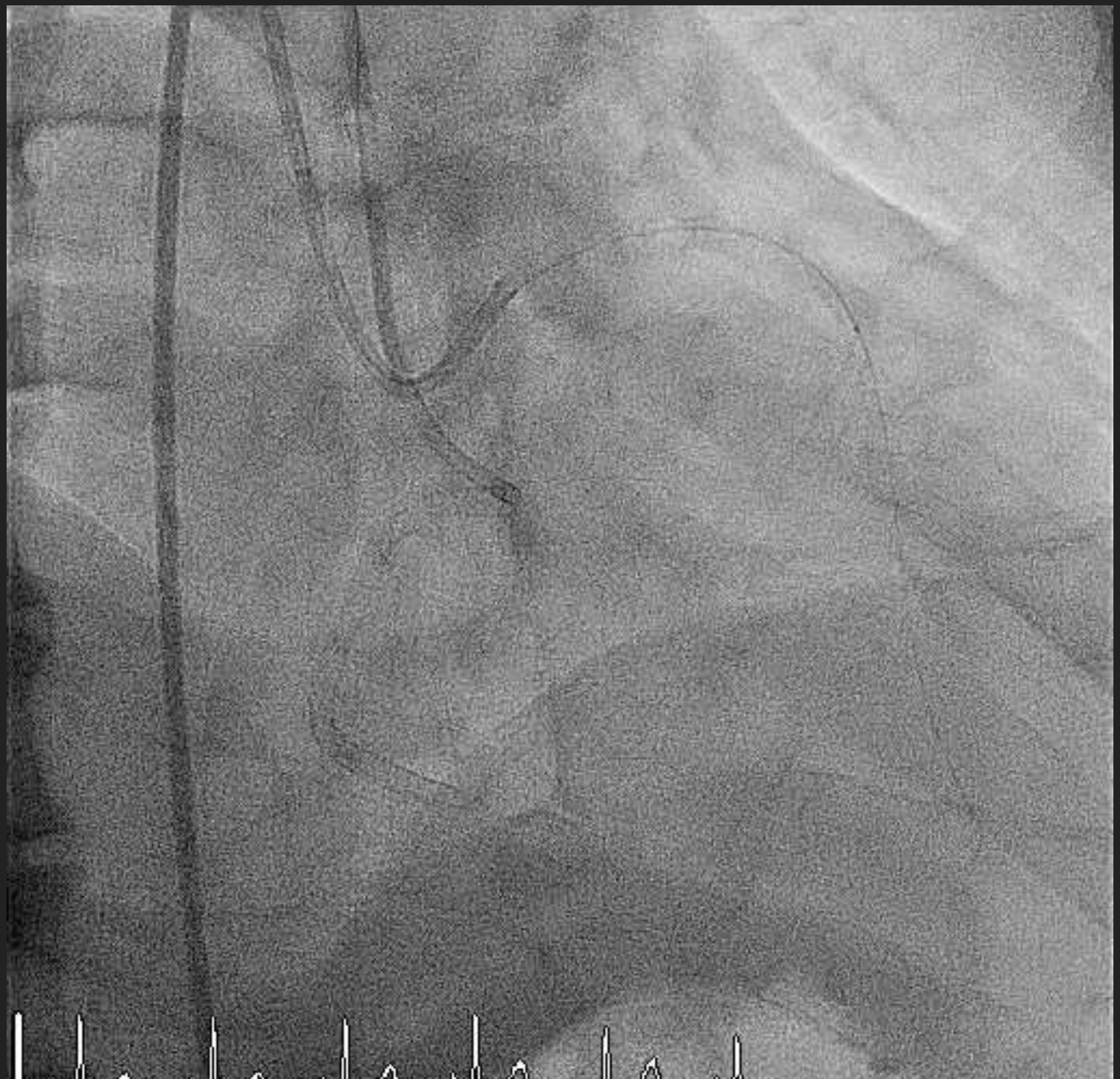
CHANNEL CHECKING AND REMOVAL.

- Recross corsair to antegrade guiding.
- Remove RG3 to antegrade guiding in ascending aorta position.
- Back out corsair to proximal donor artery.
- Contrast from Donor artery to check channel then contrast from CTO vessel to check channel.
- Recross corsair to distal CTO vessel to cover channel (if easy - if not easy just gently pull back RG3 and recheck)
- pull back RG3 to just distal to corsair and remove as one unit from channel - then final check angio.

TEXT

TEXT





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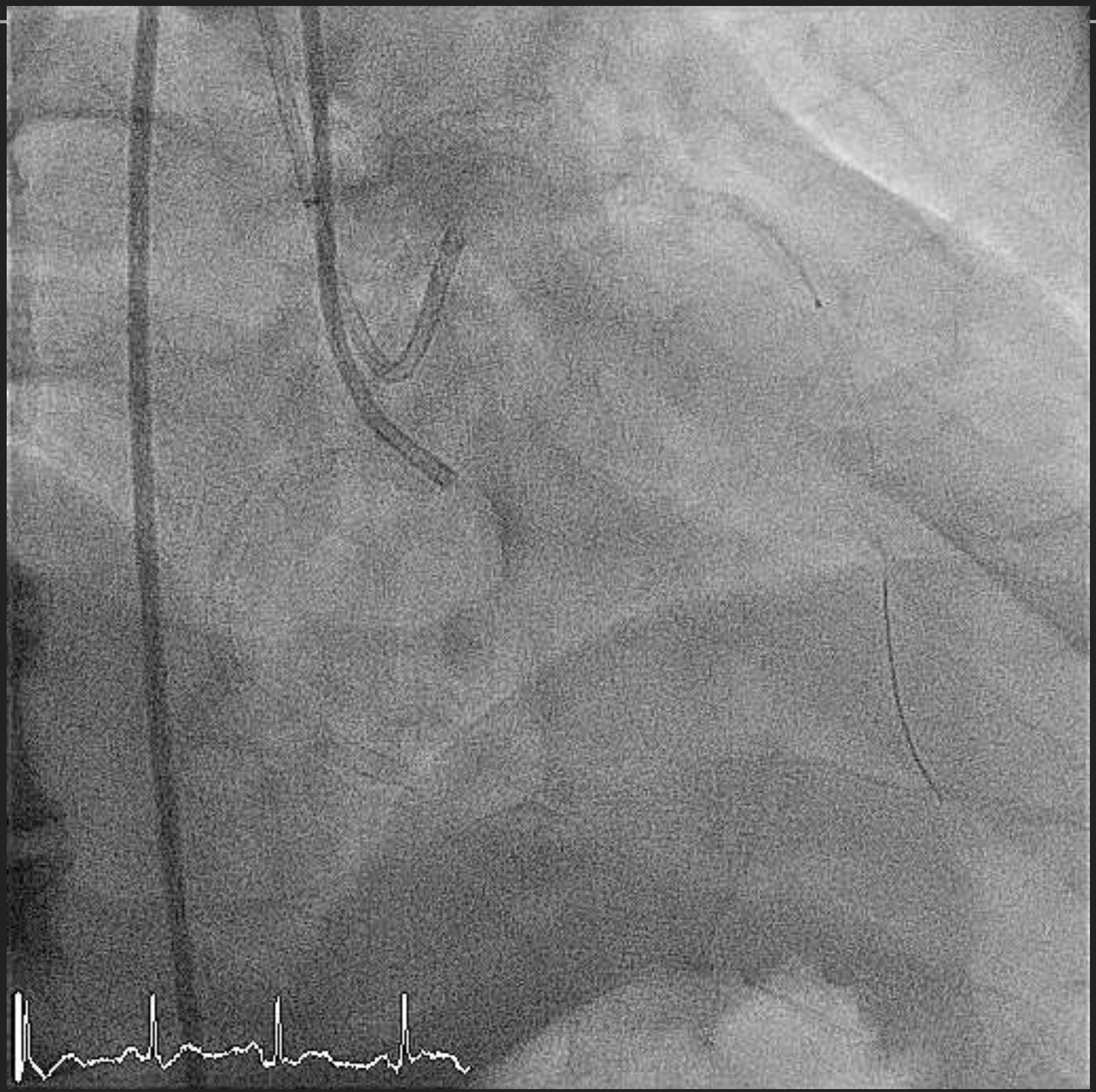

IF PERFORATION

- 1. Use trapping balloon to retrap RG3.
- 2. Push retrograde corsair back into antegrade guiding.
- 3. Take your time to prepare two 0.018 micro catheter (Progreat, Renegade, Transit).
- 4. Load Microcatheter on antegrade side and back corsair to just proximal to perforation, push antegrade side 0.018 microcath to just distal to perforation and switch retrograde side on RG3 to 0.018 microcath to retrograde side
- 5. Remove RG3 -> deliver coils to antegrade side, then retrograde side.
- 6. Put workhorse wire into both 0.018 microcath and back them off the channel to check angio. If persistent perf, push forward microcath for more coils.
- 7. Be aware of joining of septal if there is large hematoma.

TEXT

Review > Catheter Cardiovasc Interv. 2018 May 1;91(6):1101-1109. doi: 10.1002/ccd.27104. Epub 2017 May 4.

The inherent catastrophic traps in retrograde CTO PCI

Eugene B Wu [1], Etsuo Tsuchikane [2]

Affiliations + expand

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Abstract

When we learn to drive, our driving instructor tells us how to check the side mirror and turn your head to check the blind spot before changing lanes. He tells us how to stop at stop signs, how to drive in slippery conditions, the safe stopping distances, and these all make our driving safe. Similarly, when we learn PCI, our mentors teach us to seat the guiding catheter co-axially, to wire the vessel safely, to deliver balloon and stents over the wire, to watch the pressure of the guiding, in order that we perform PCI safely and evade complications. In retrograde CTO PCI, there is no such published teaching. Also many individual mentors have not had the wide experience to see all the possible complications of retrograde CTO PCI and, therefore, may not be able to warn their apprentice. As the number of retrograde procedures increase worldwide, there is a corresponding increase in catastrophic complications, many of which, we as experts, can see are easily avoidable. To breach this gap in knowledge, this article describes 12 commonly met inherent traps in retrograde CTO PCI. They are inherent because by arranging our equipment in the manner to perform retrograde CTO PCI, these complications are either induced directly or happen easily. We hope this work will enhance safety of retrograde CTO PCI and avoid many catastrophic complications for our readers and operators. © 2017 Wiley Periodicals, Inc.

Keywords: chronic total occlusion; complications; percutaneous coronary intervention; retrograde PCI.

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