Fellows Complications

Complications in the Cath Lab

Dr Adie Horak
Vincent Pallotti Hospital


ISUZU
SQUIZZLE.COM


Koreus.com
SQUIZZLE.COM


156
steakandcheese.com

SQUIZZLE.COM


AIR FRANCE

Complications

- Complications are going to occur

Complications

- Complications are going to occur
- What can happen

Complications

- Complications are going to occur
- What can happen
- How and Why do they happen

Complications

- Complications are going to occur
- What can happen
- How and Why do they happen
- How do we avoid them

Complications

- Complications are going to occur
- What can happen
- How and Why do they happen
- How do we avoid them
- How do we deal with them

An Approach to PCI

Have a PLAN

Have a Plan

- 1. Why are you doing the Procedure ?

Have a Plan

- 1. Why are you doing the Procedure ?
- 2. What are you going to do ?

Have a Plan

- 1. Why are you doing the Procedure ?
- 2. What are you going to do ?
- 3. How are you going to do it ?

Have a Plan

- 1. Why are you doing the Procedure ?
- 2. What are you going to do ?
- 3. How are you going to do it ?
- 4. What do you expect the result to be ?

Have a Plan

- 1. Why are you doing the Procedure ?
- 2. What are you going to do ?
- 3. How are you going to do it ?
- 4. What do you expect the result to be ?
- 5. How will this benefit the patient ?

Have a Plan

- 1. Why are you doing the Procedure ?
- 2. What are you going to do ?
- 3. How are you going to do it ?
- 4. What do you expect the result to be ?
- 5. How will this benefit the patient ?
- 6. What could go wrong ?

Have a Plan

- 1. Why are you doing the Procedure ?
- 2. What are you going to do ?
- 3. How are you going to do it ?
- 4. What do you expect the result to be ?
- 5. How will this benefit the patient ?
- 6. What could go wrong ?
- 7. What will happen to the patient ?

Have a Plan

- 1. Why are you doing the Procedure ?
- 2. What are you going to do ?
- 3. How are you going to do it ?
- 4. What do you expect the result to be ?
- 5. How will this benefit the patient ?
- 6. What could go wrong ?
- 7. What will happen to the patient ?
- 8. How will you deal with complications ?

Have a Plan

- 1. Why are you doing the Procedure ?
- 2. What are you going to do ?
- 3. How are you going to do it ?
- 4. What do you expect the result to be ?
- 5. How will this benefit the patient ?
- 6. What could go wrong ?
- 7. What will happen to the patient ?
- 8. How will you deal with complications ?
- 9. Is it worth the Risk ?

Have a Plan

Do this for EVERY patient and EVERY PCI

If you don't know where you are going.....

.....It doesn't matter which road you take

Pogo

Complications are not uncommon

- Procedural Failure
- Perforation
- Guide Catheter Dissection
- No Reflow
- Bleeding
- Thrombosis
- Renal Failure
- Device Loss
- Myocardial Infarction
- Death

Avoiding Procedural Failure

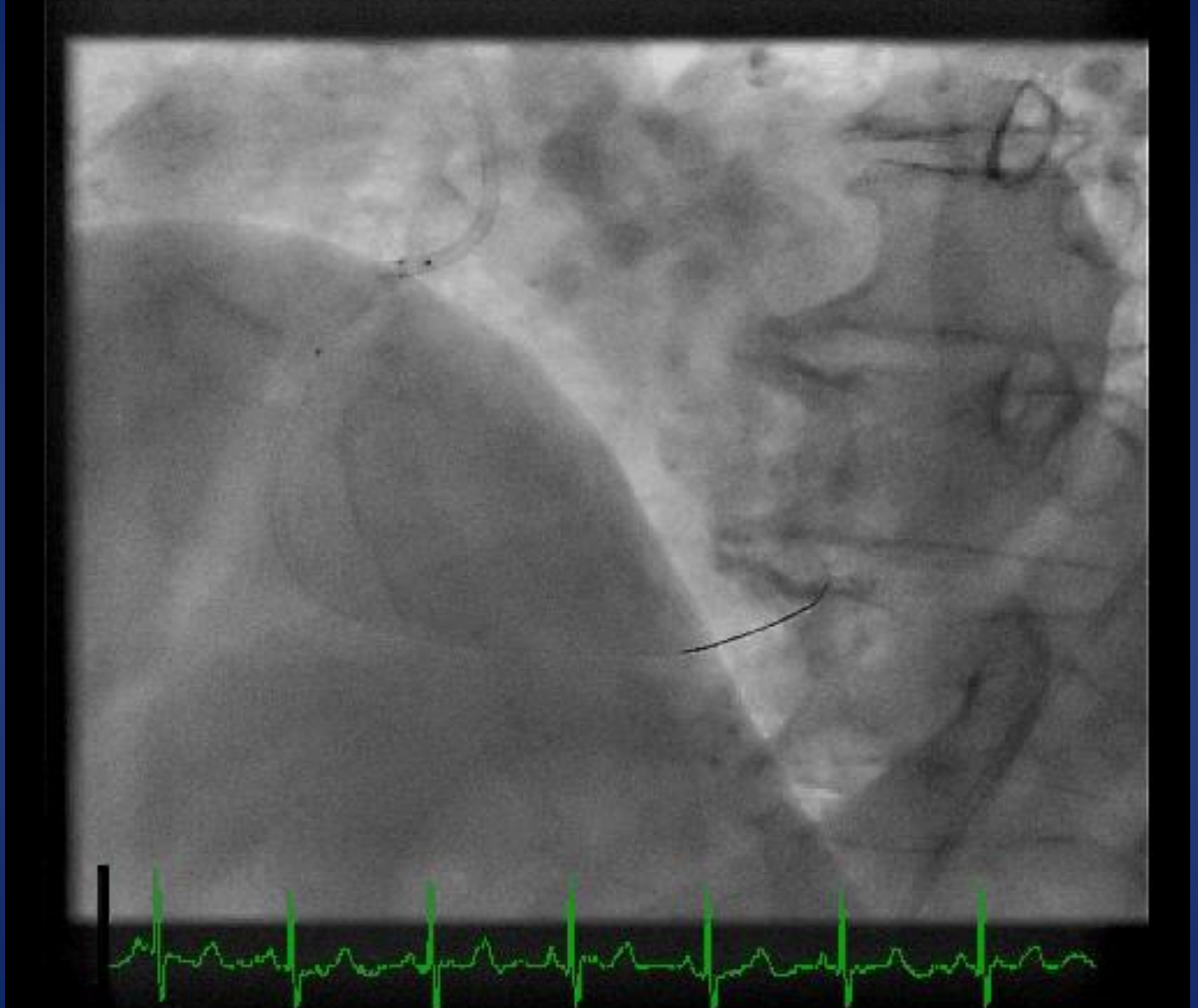
The success rate of PCI is related to :

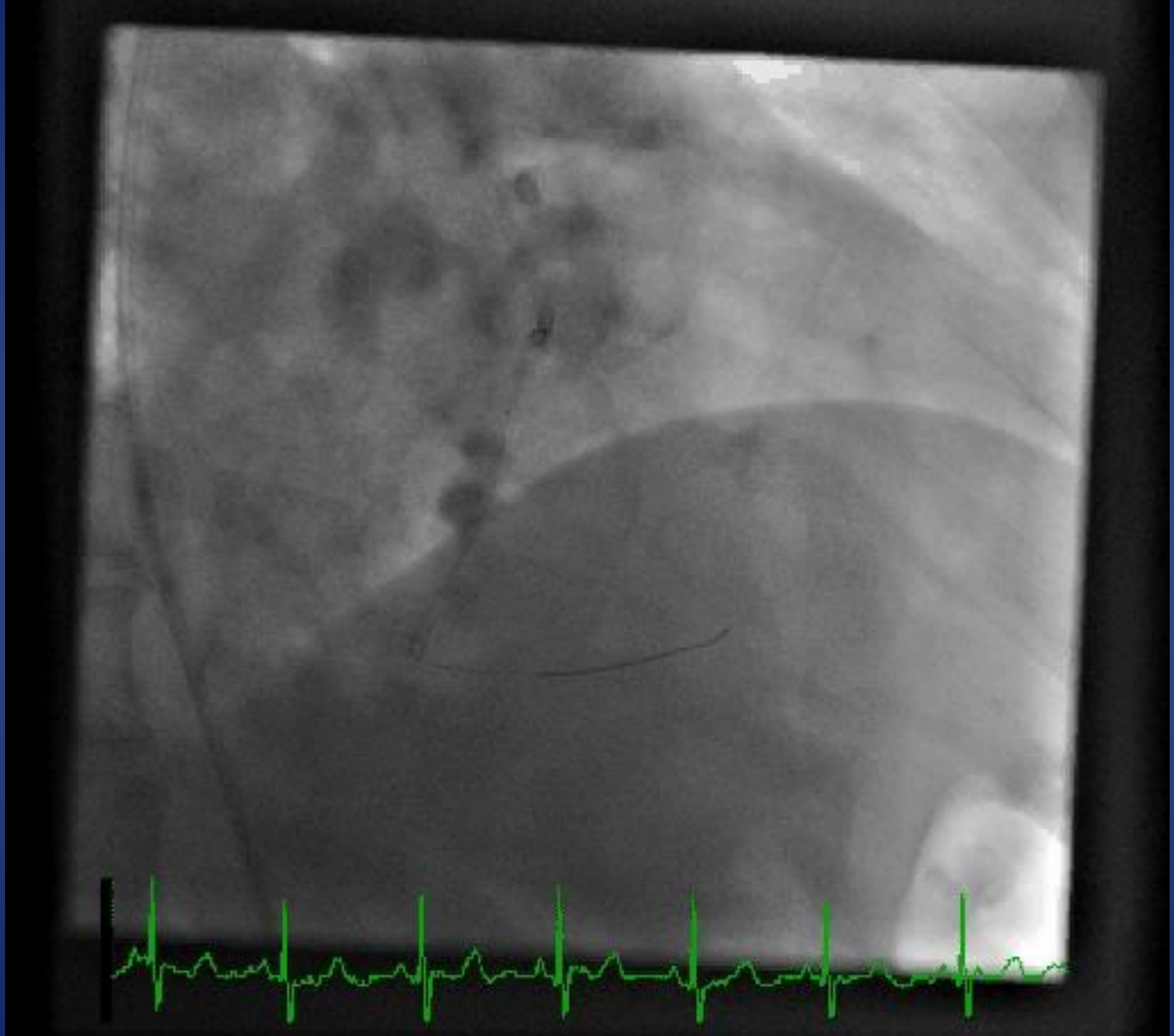
- **Angiographic lesion morphology**

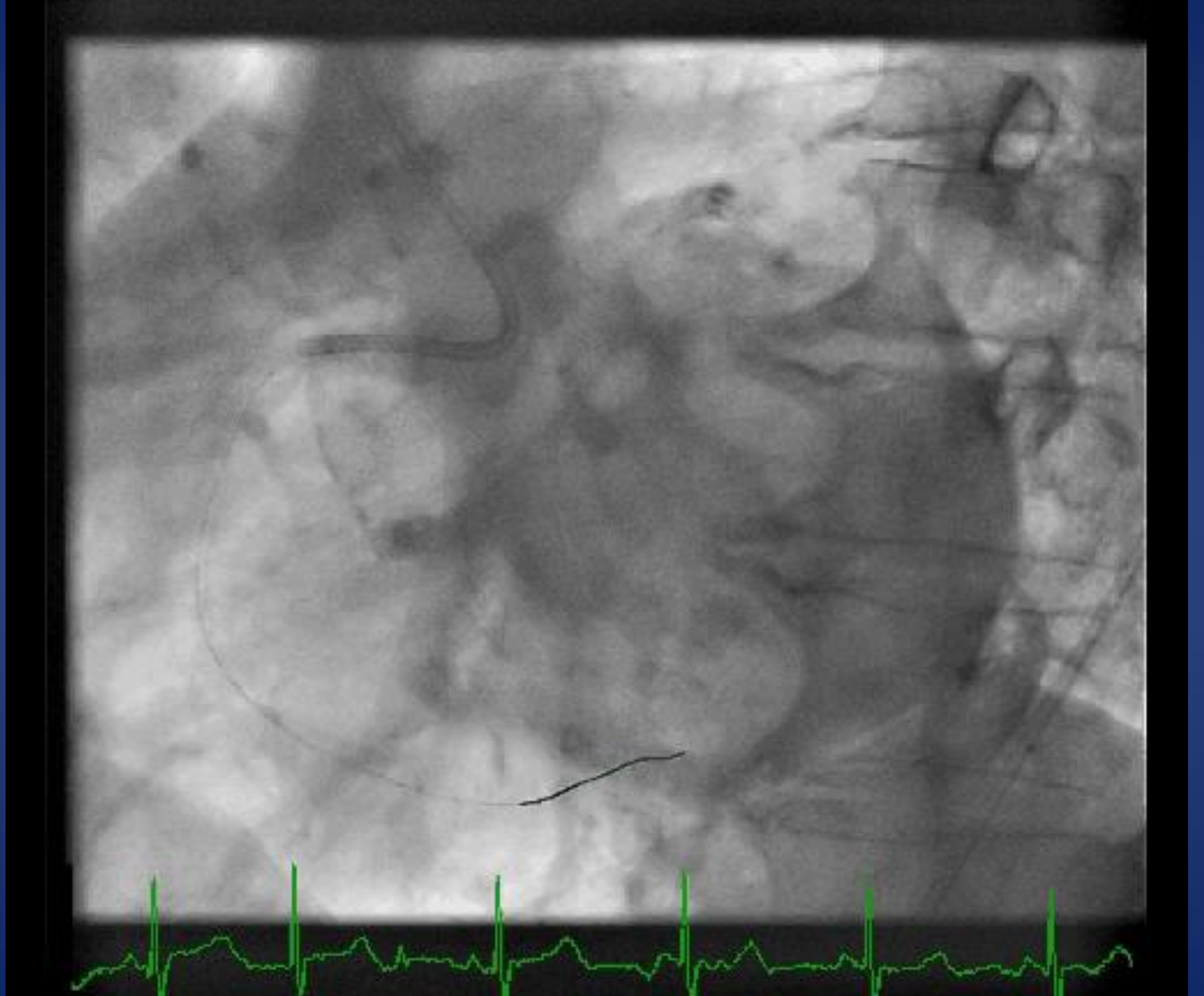
  Careful reading of diagnostic angiography !!
- **Procedural related factors**
- **Patient related factors**
- **Skills of the operator**
- **Superior knowledge of the procedure and devices**

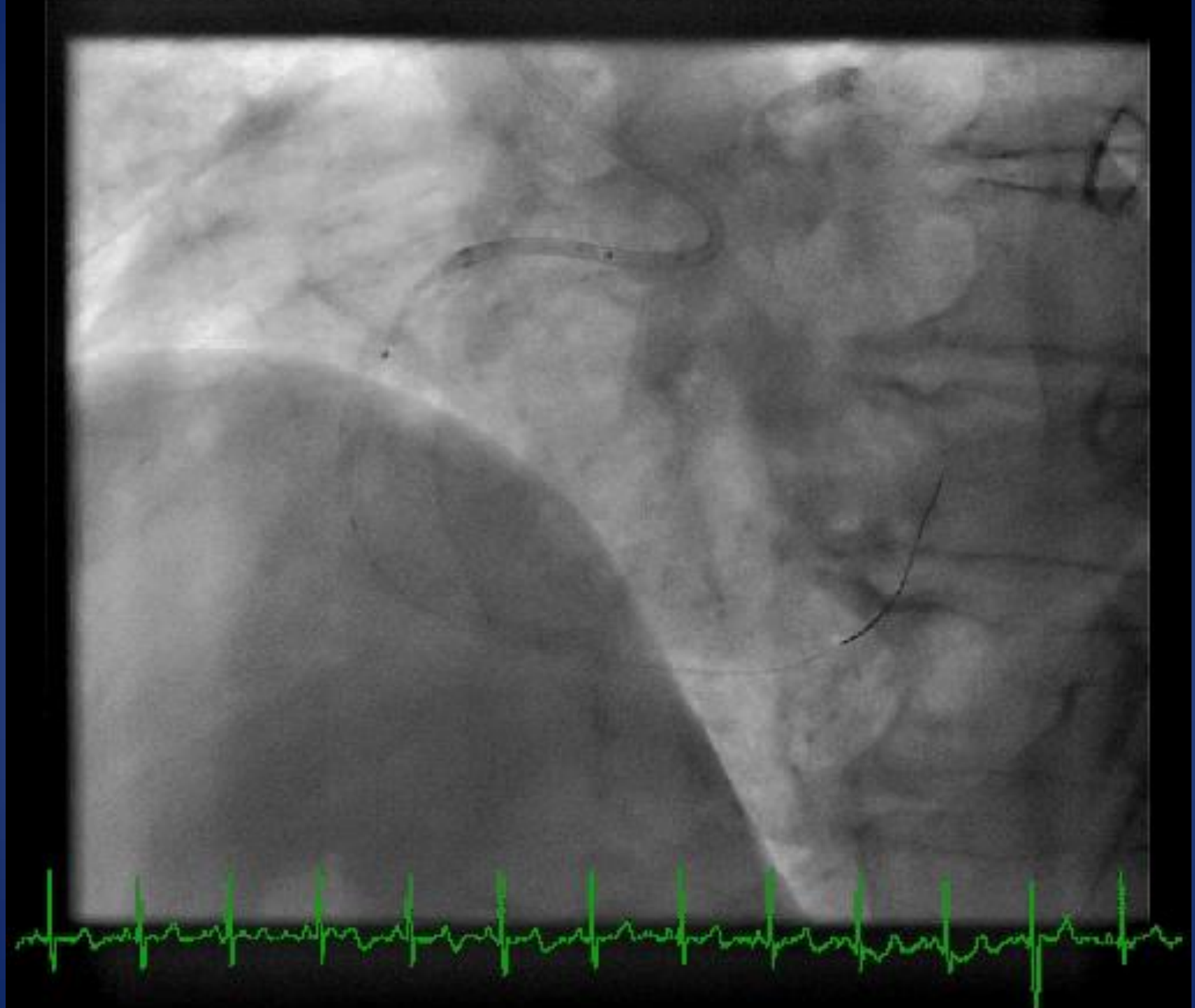
Stent Delivery

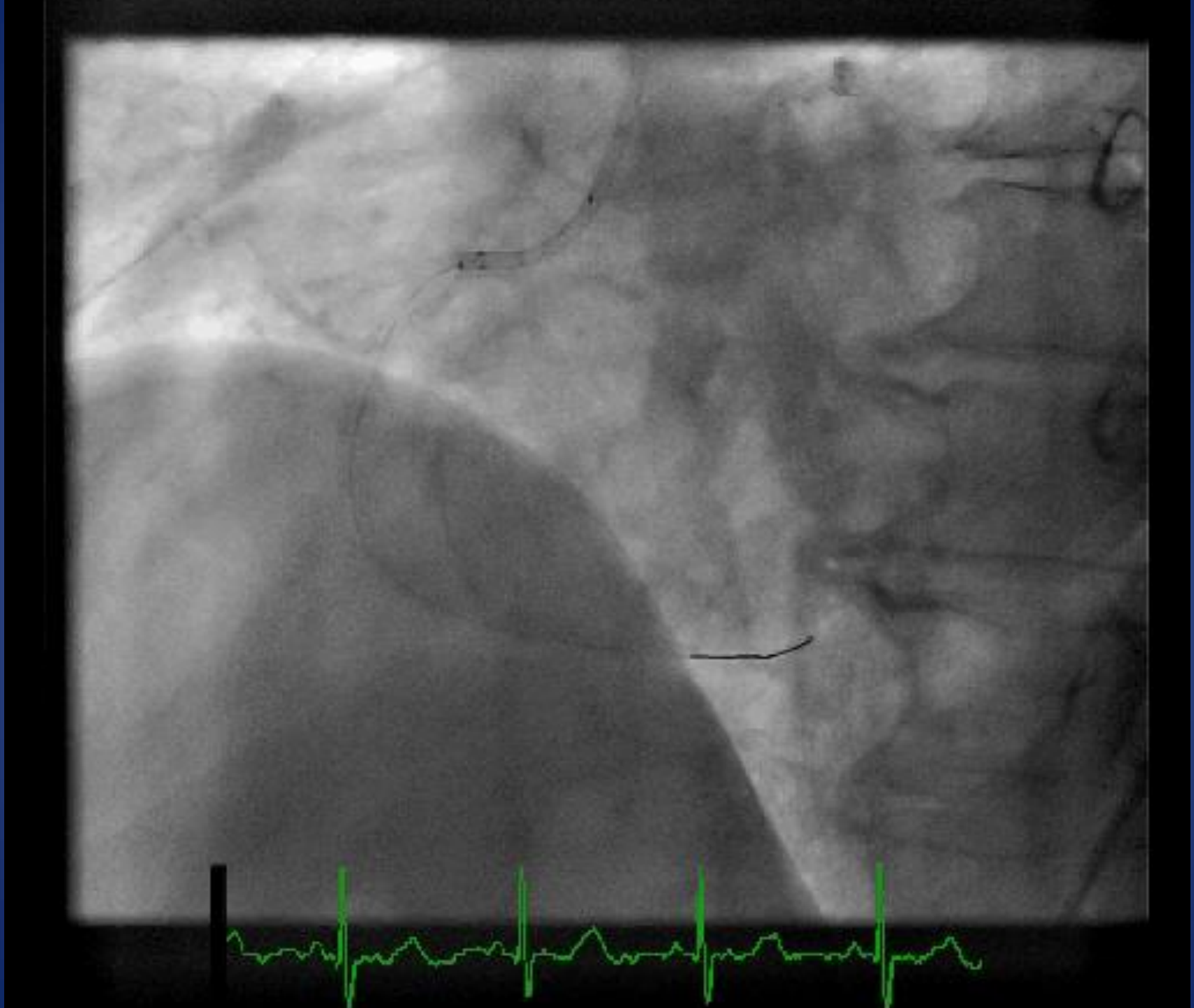
- The Stent / Balloon “will not go”





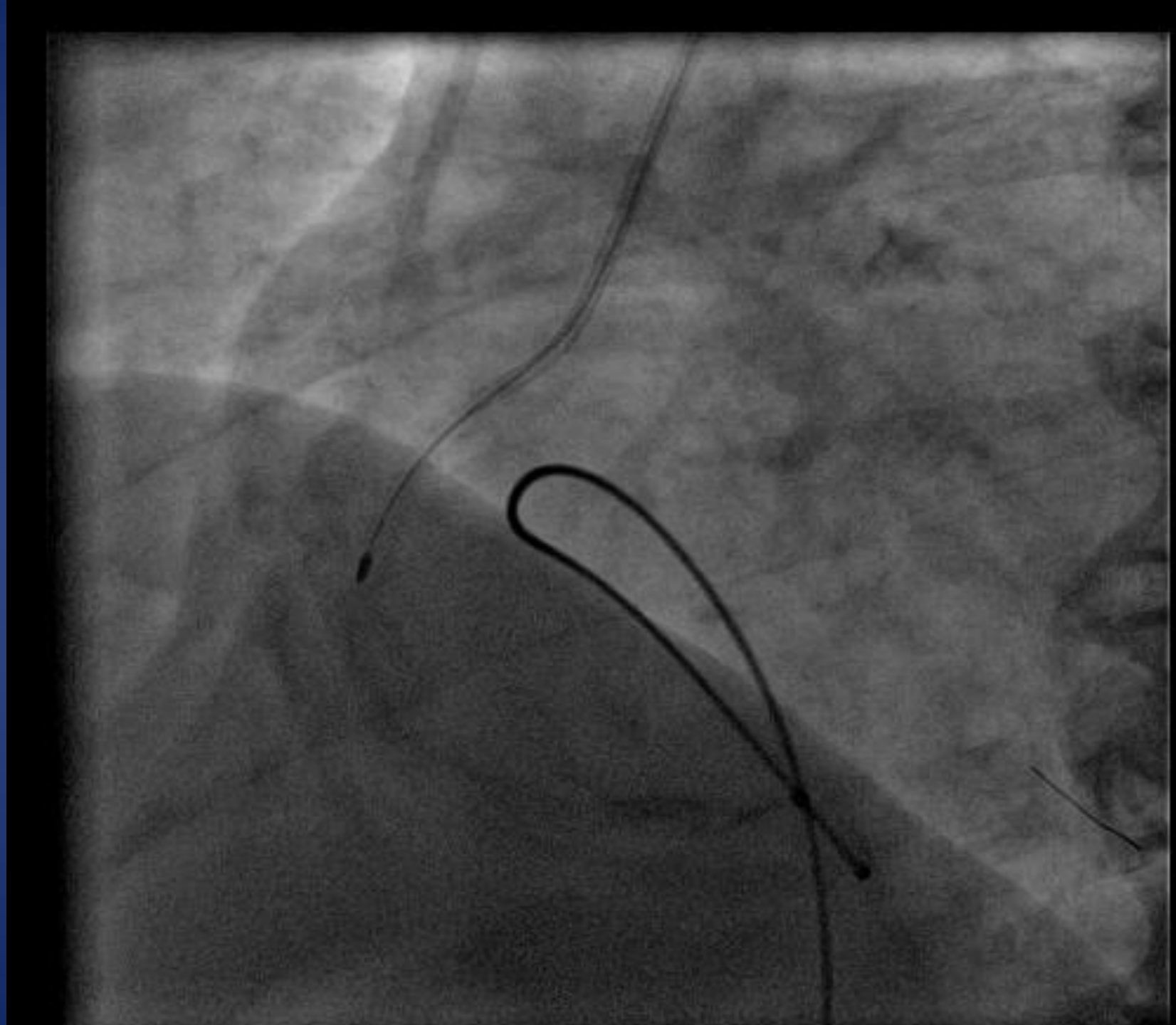


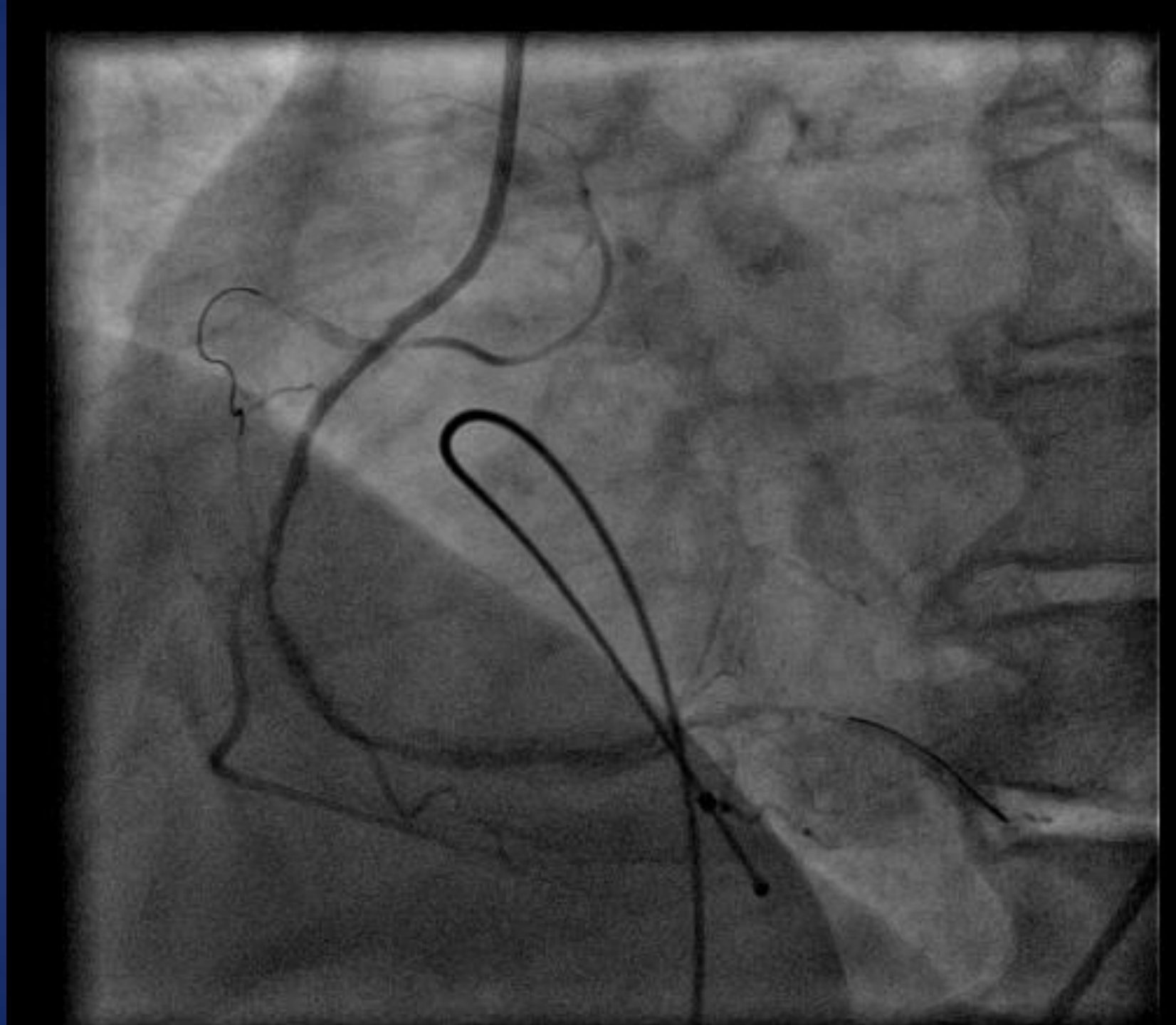


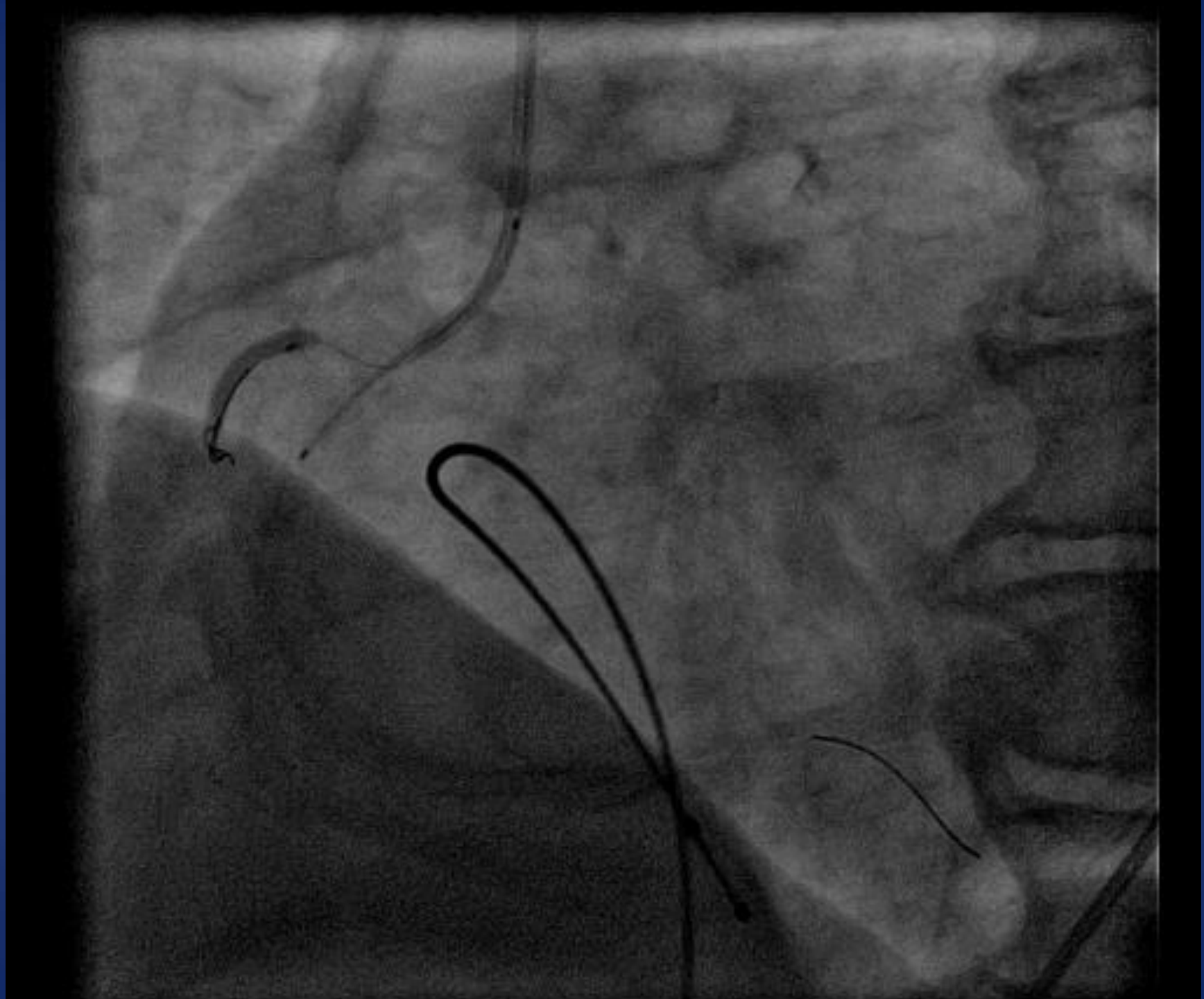


Procedural difficulty

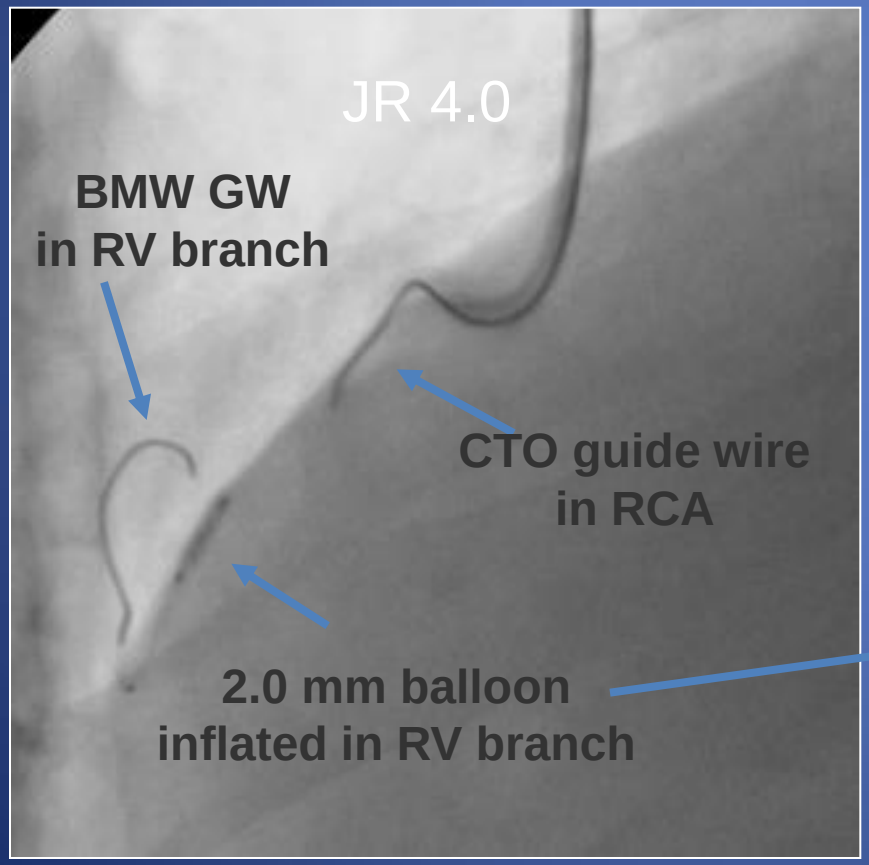
- Mr A M 60yrs
- BP
- Cholesterol
- Ex smoker
- NSTEMI

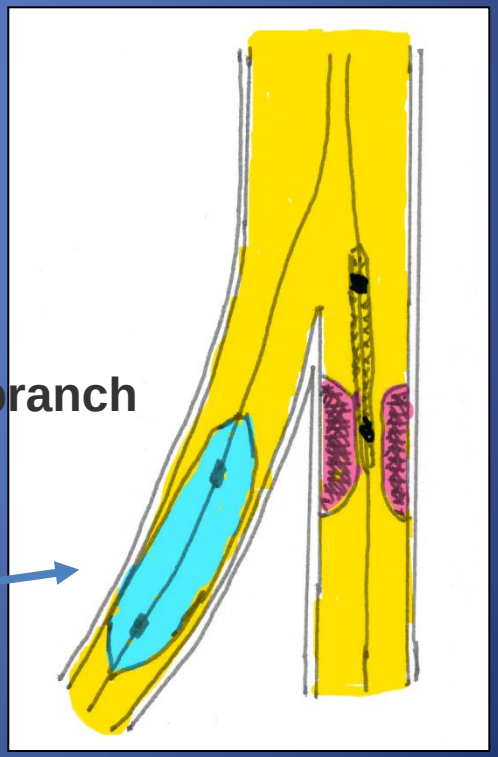


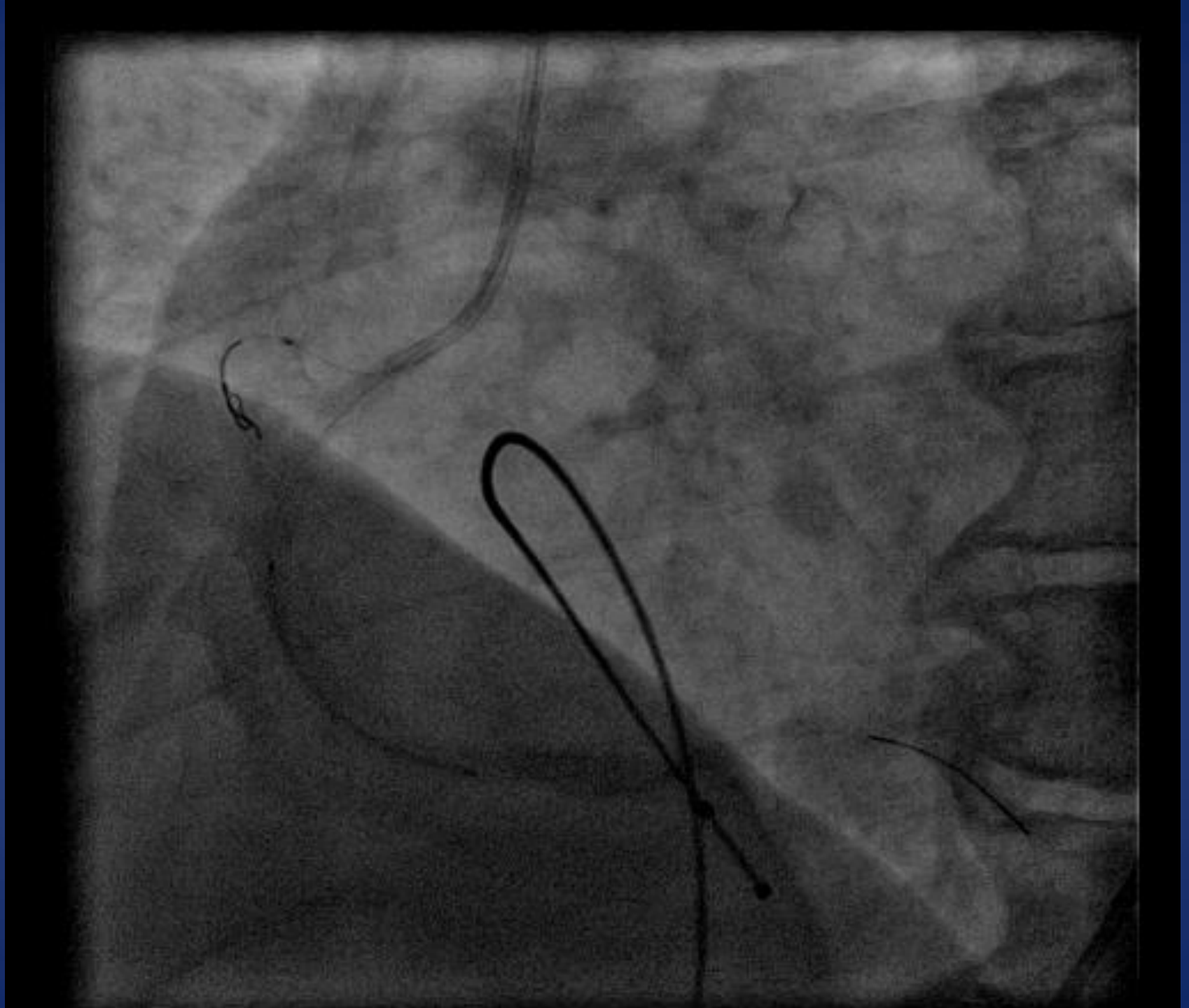


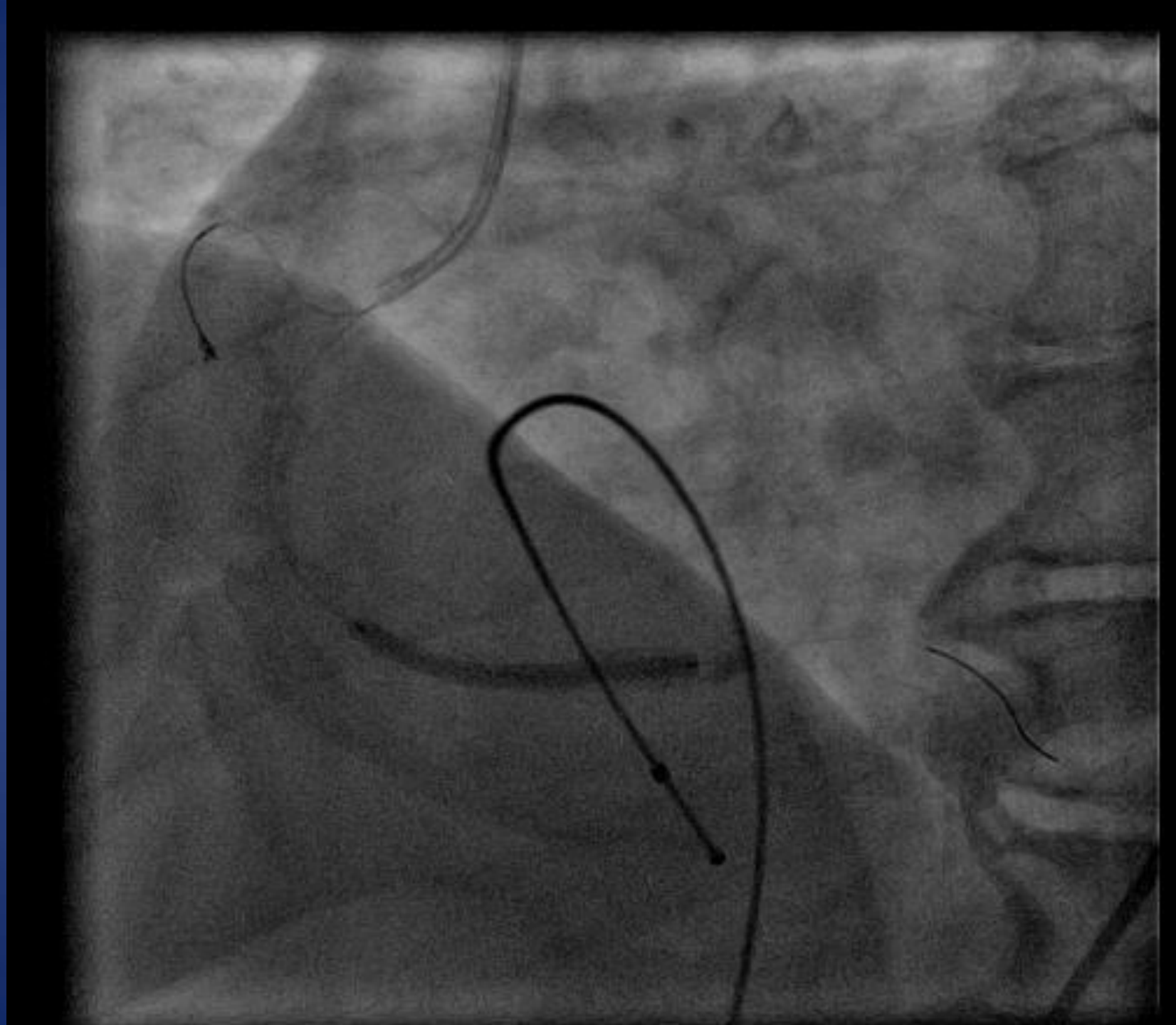


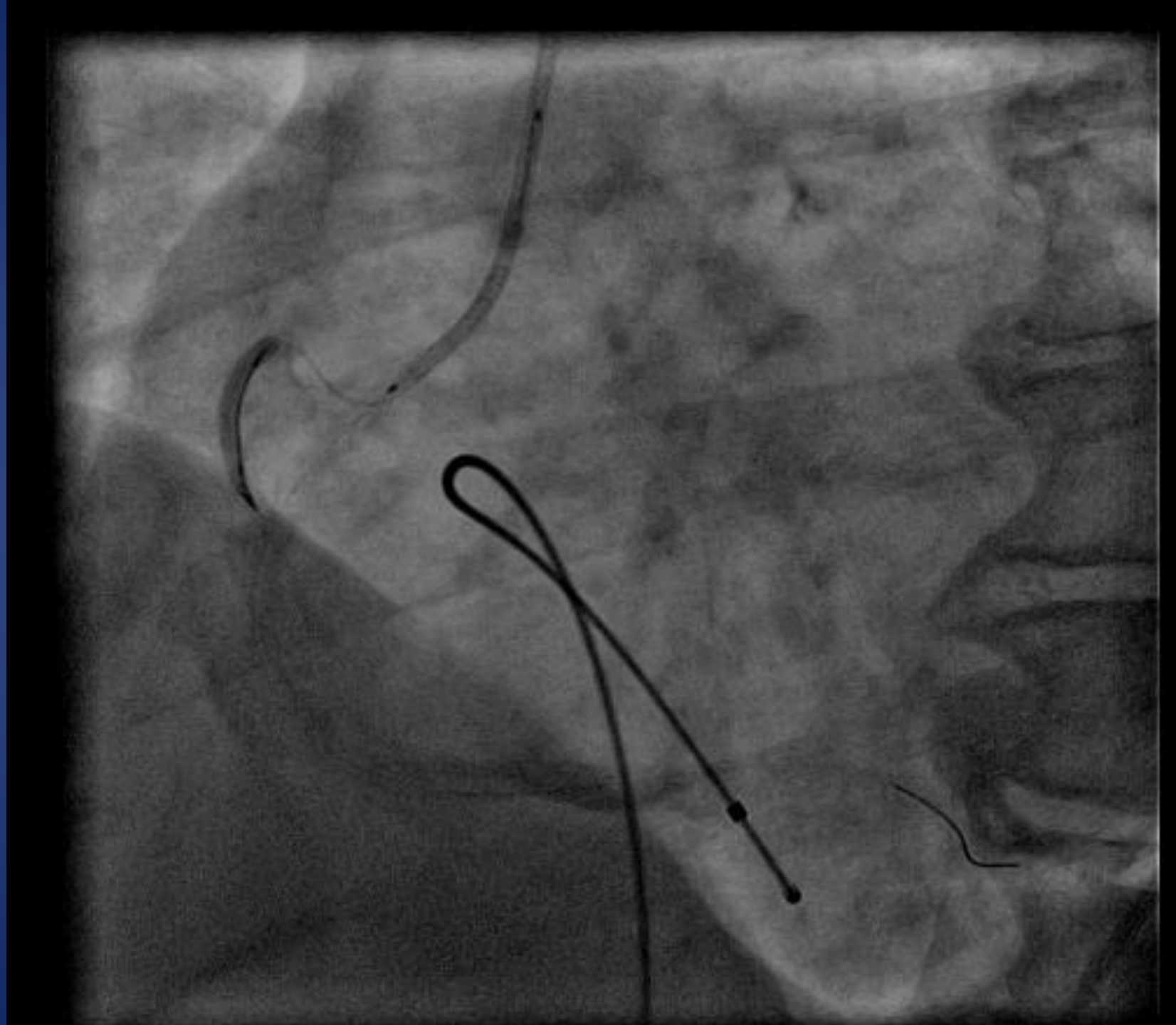
RCA with proximal disease : JR4 + “Anchoring” Technique

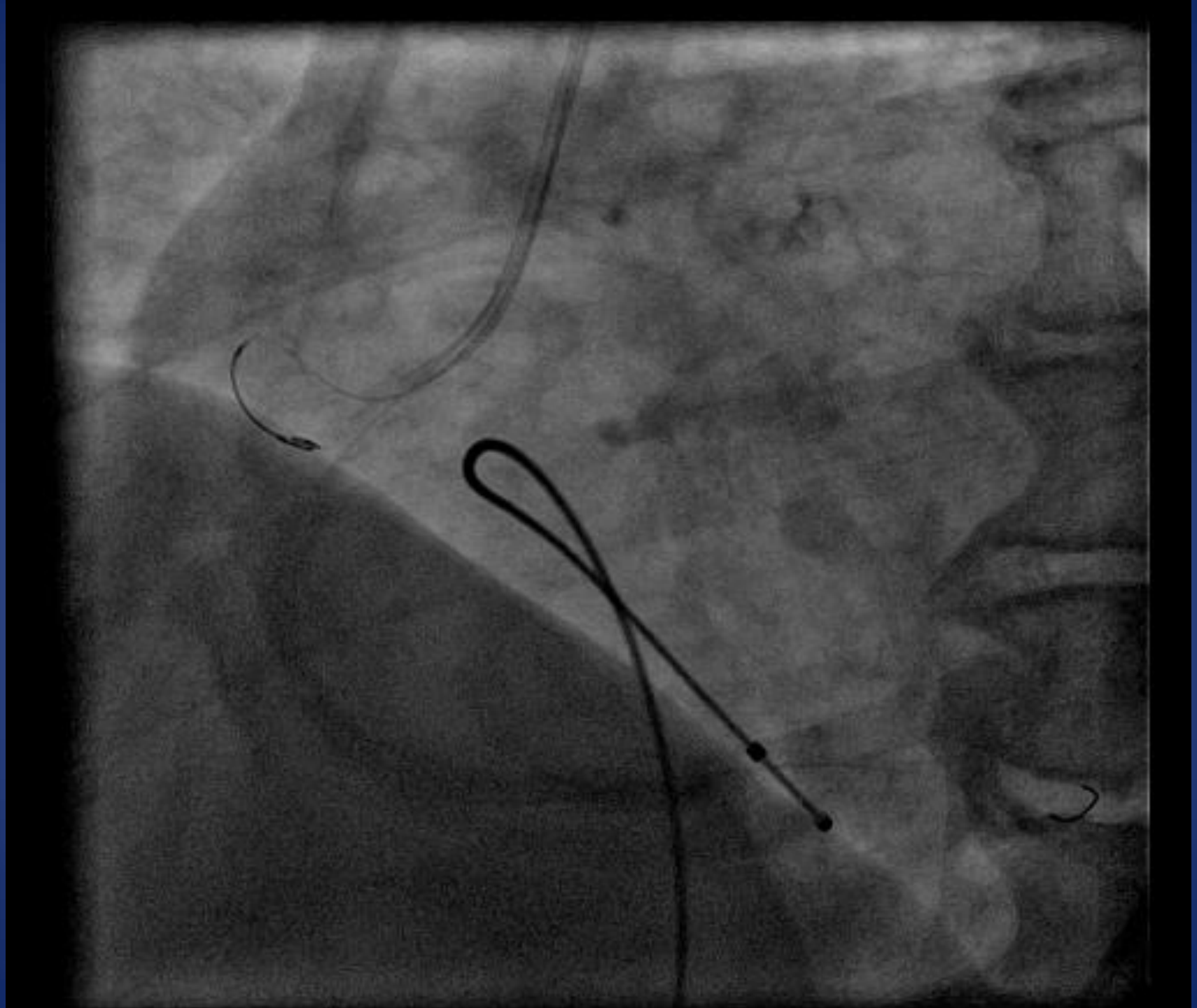


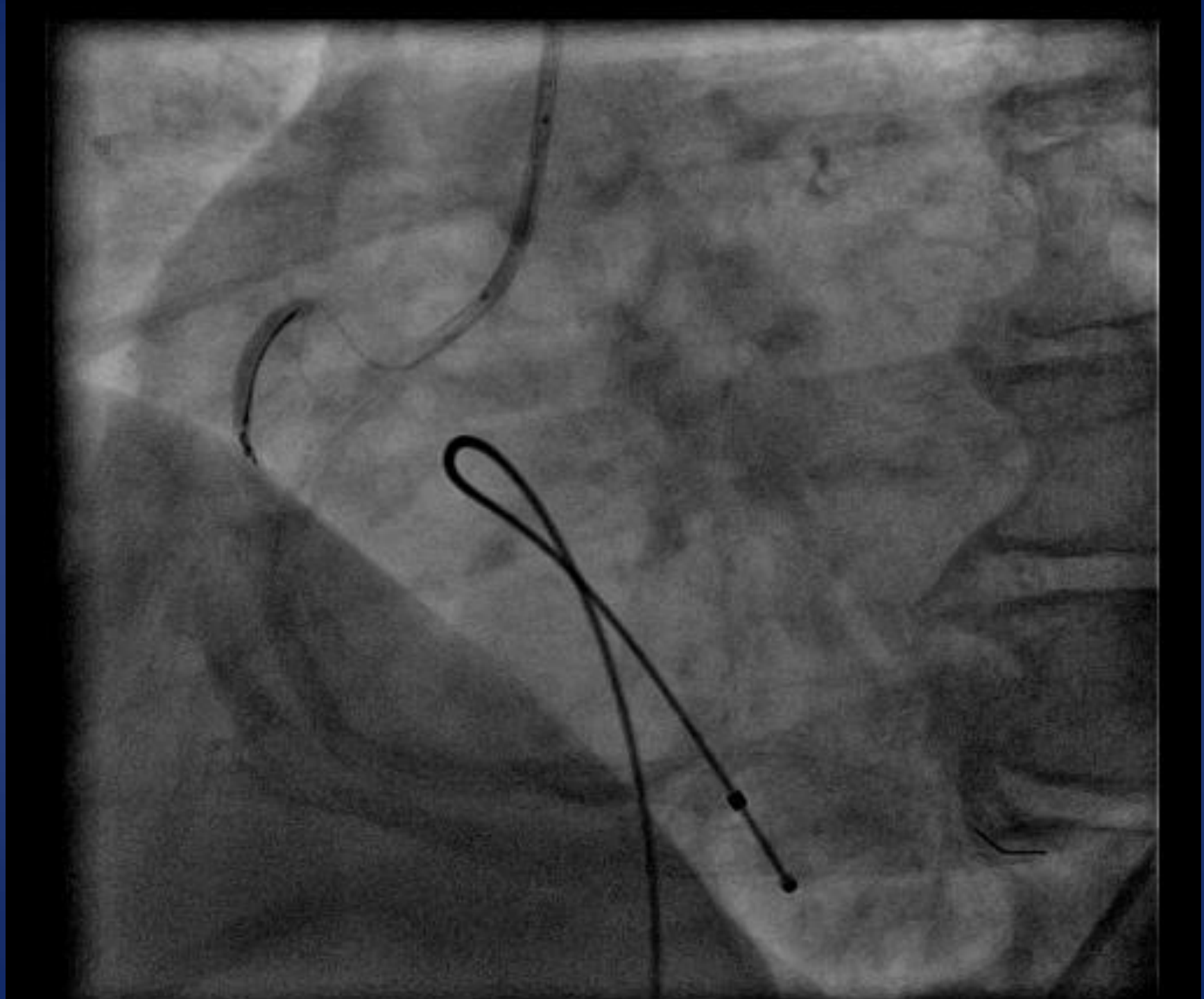


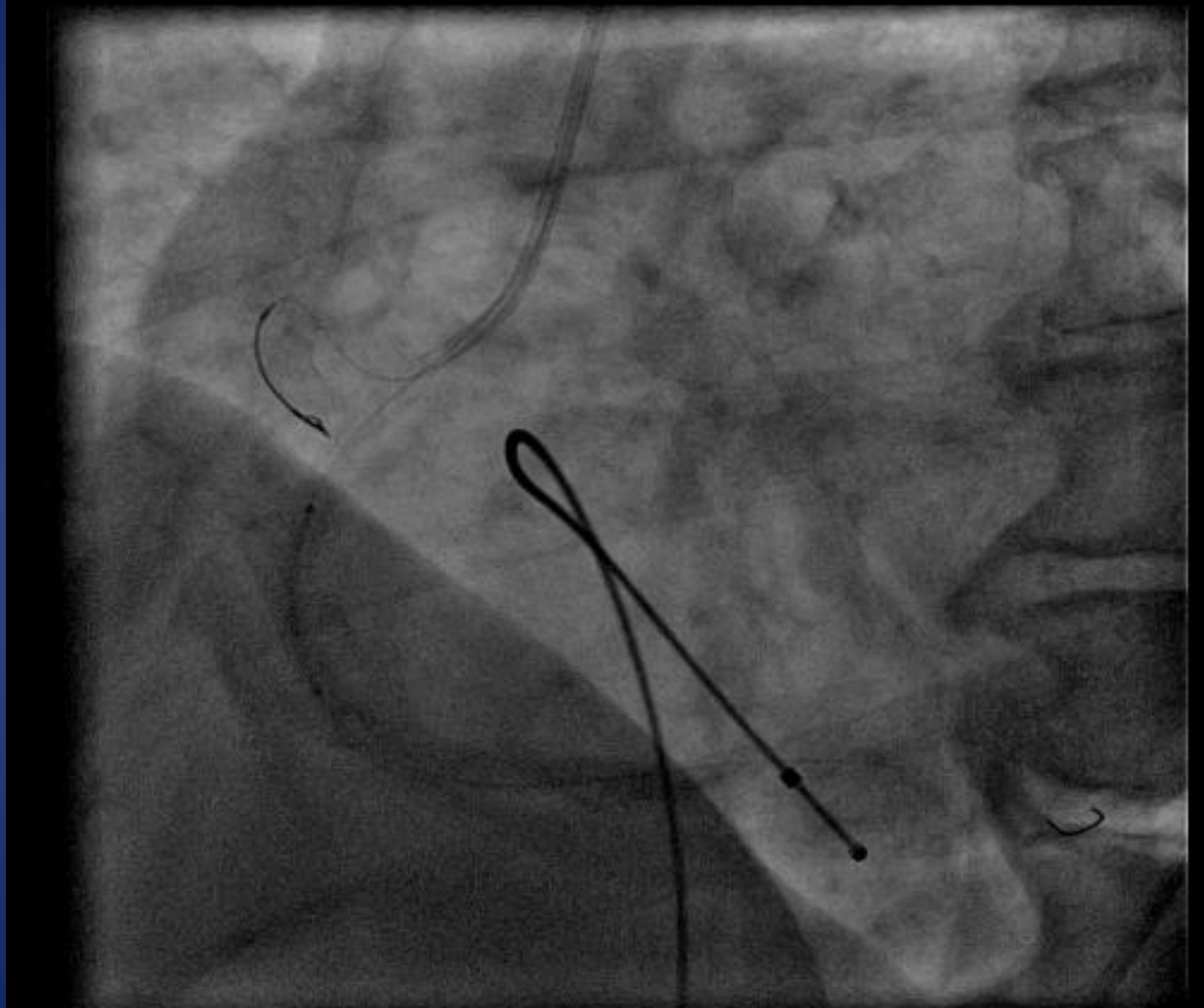


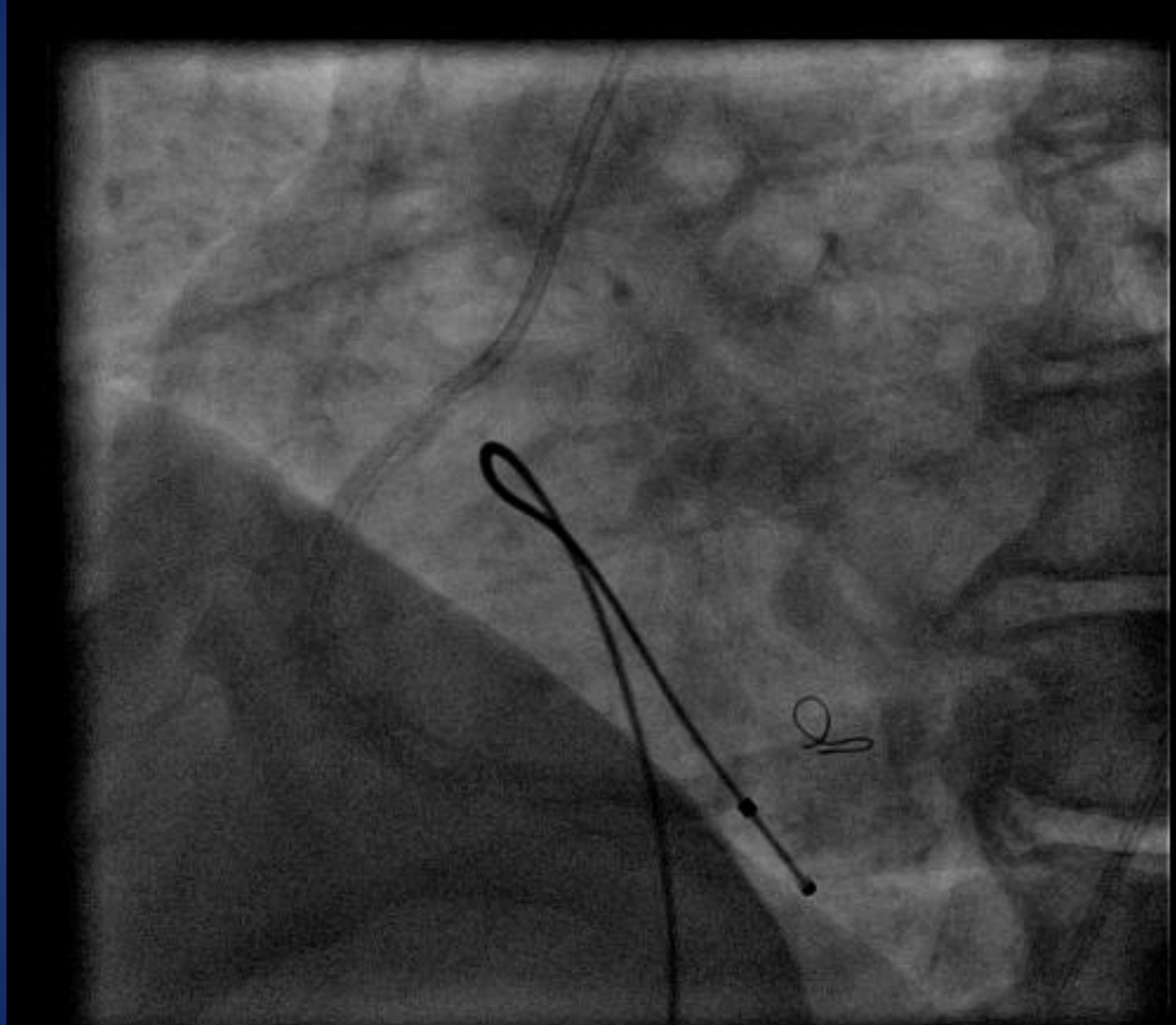






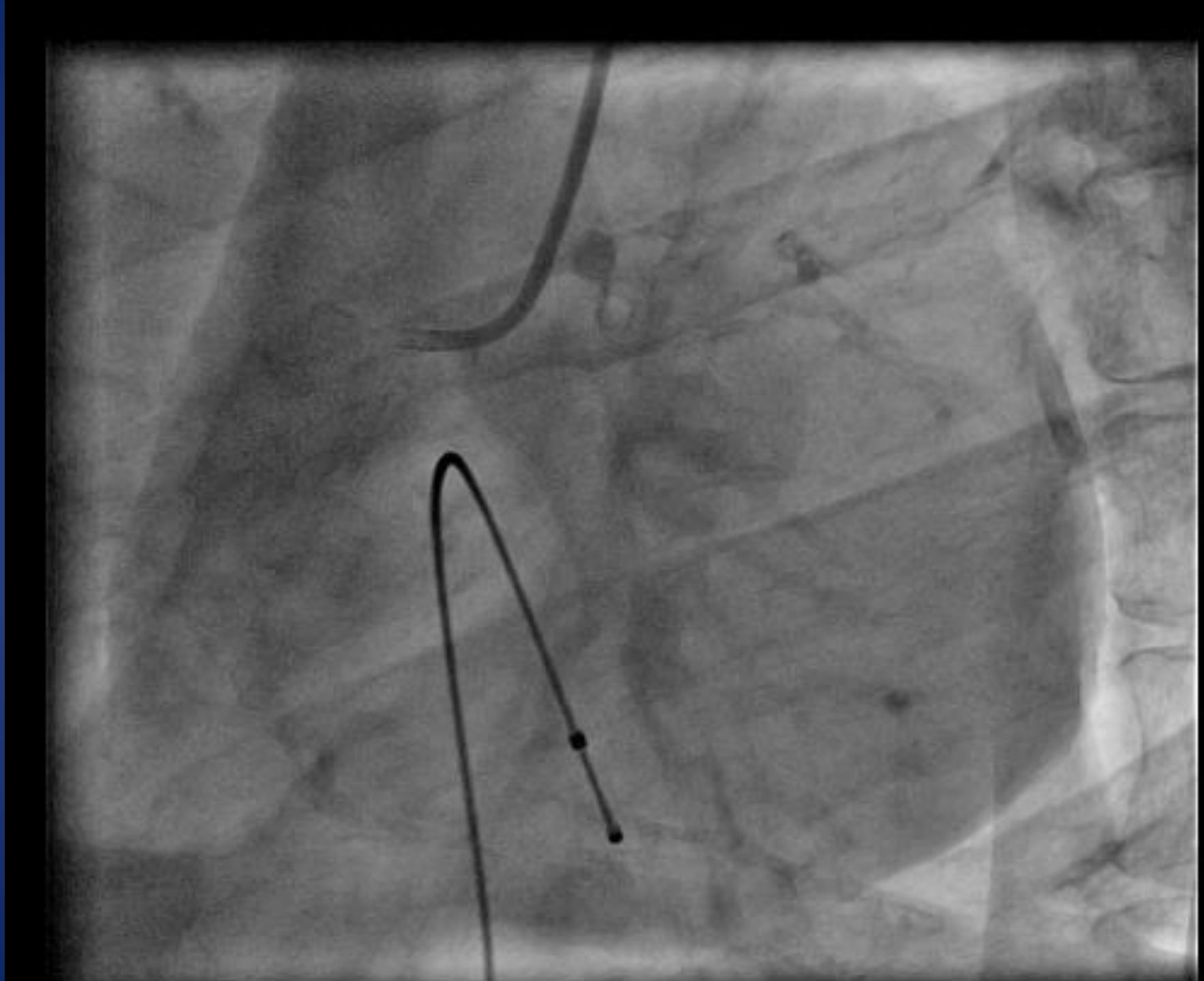


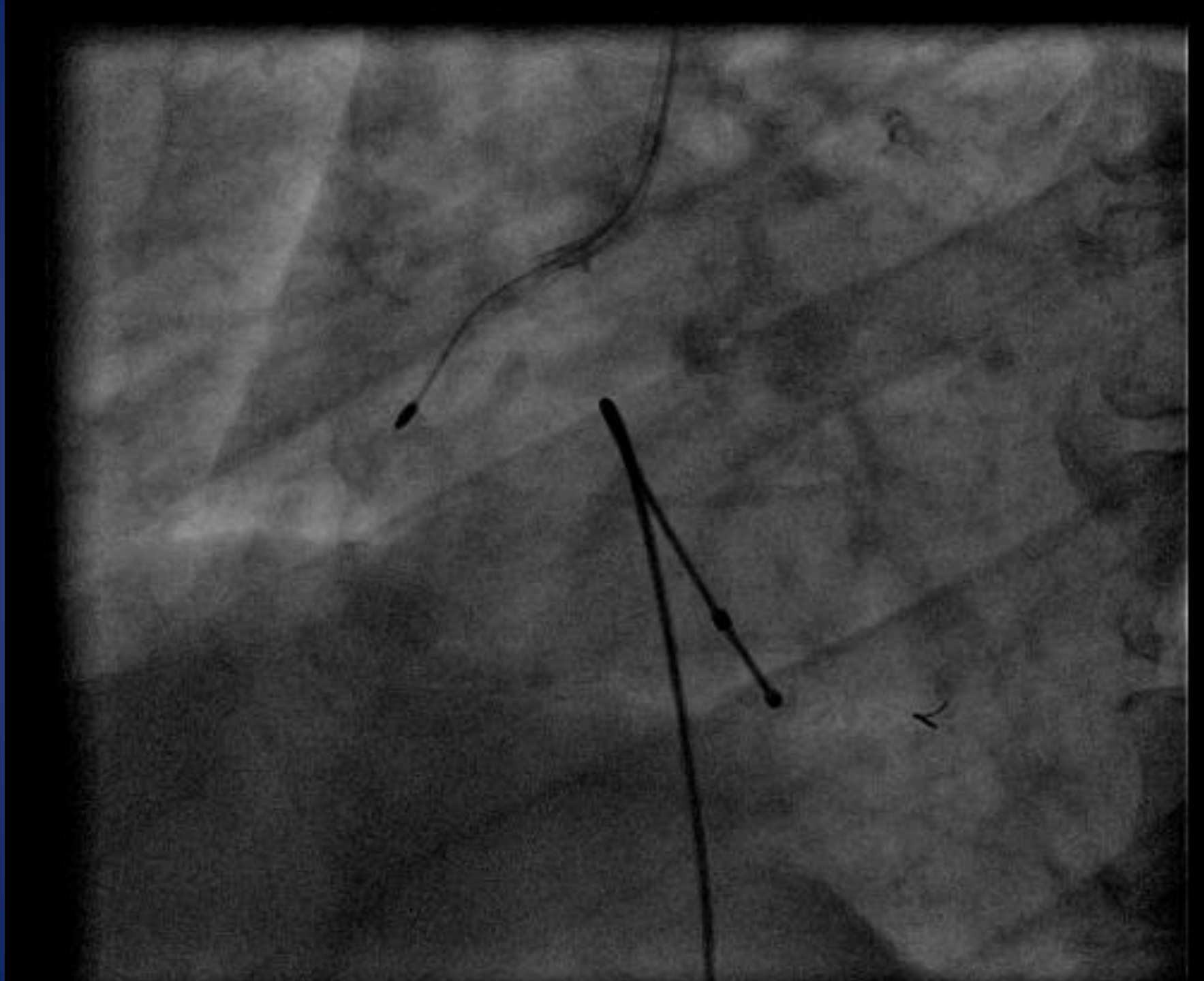


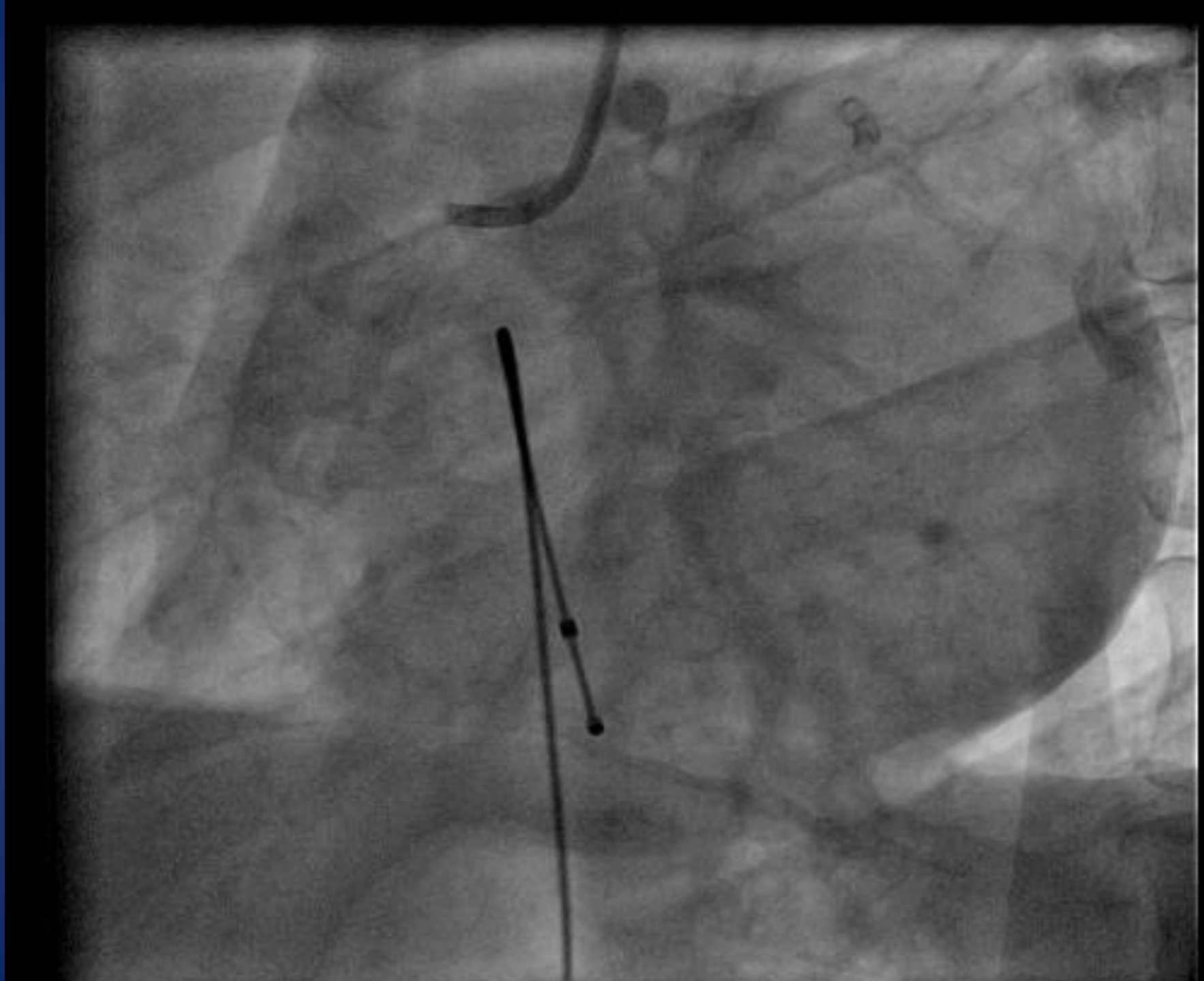


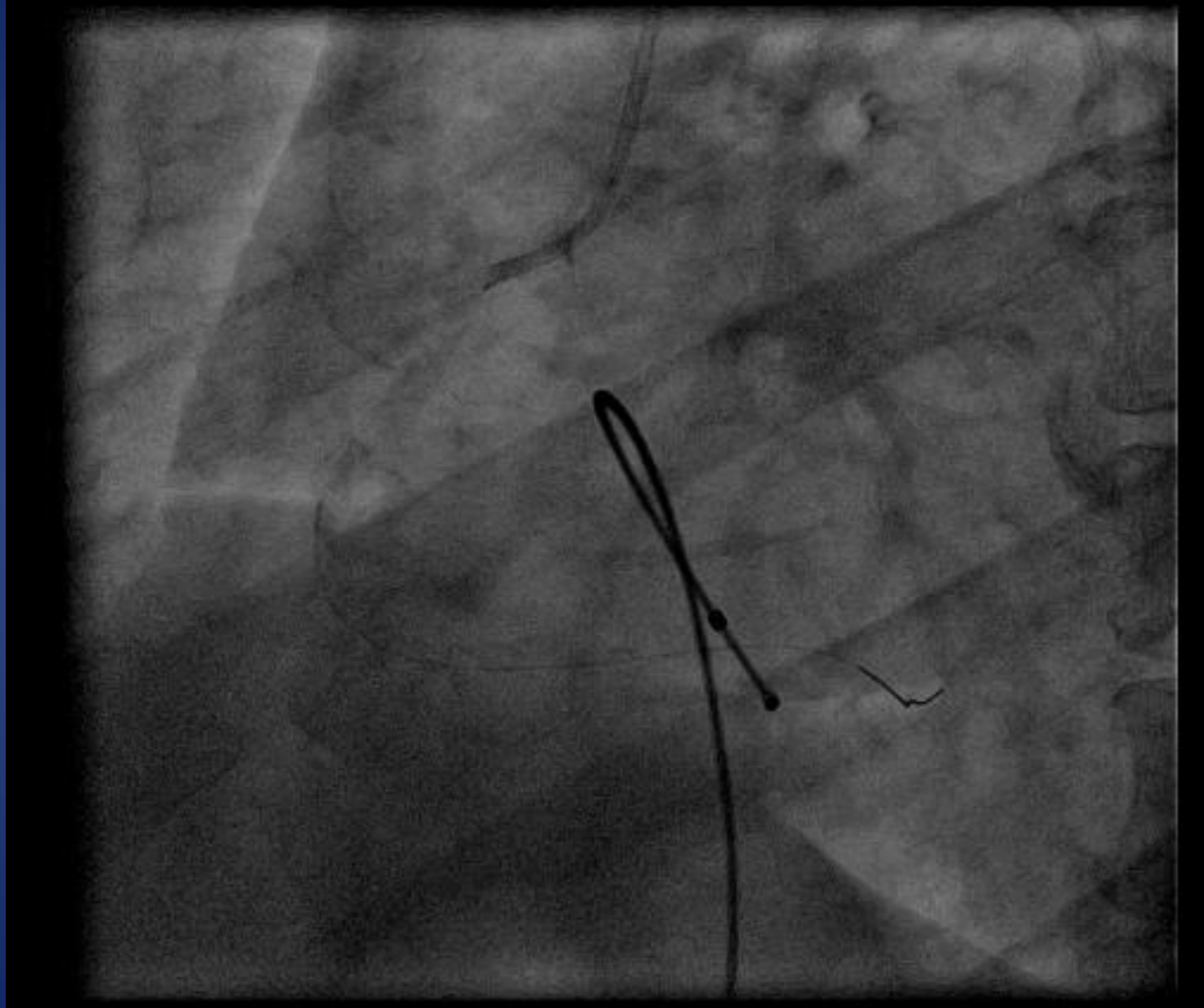
Stent will not deliver

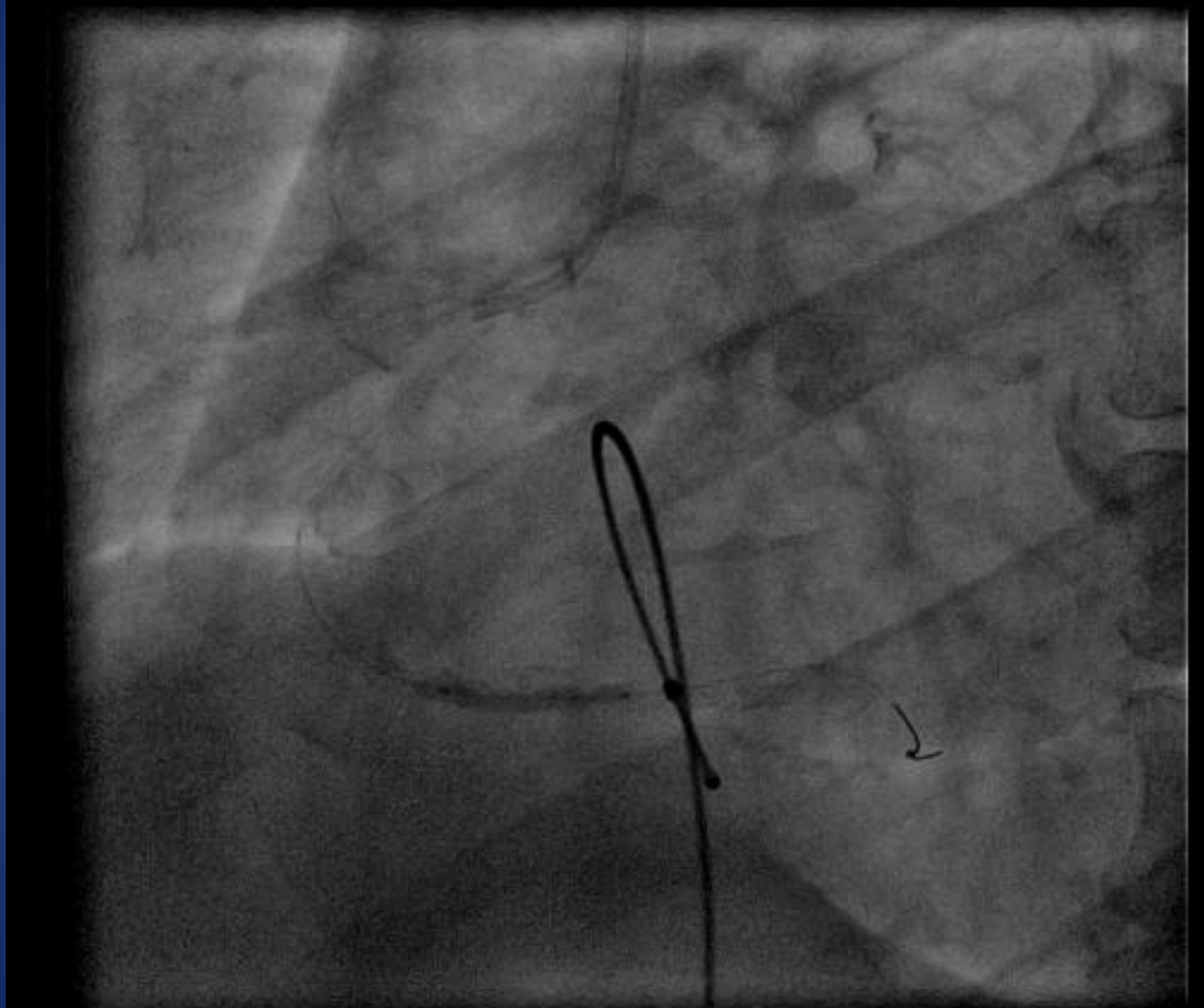
- Mr C K 64
- Pituitary surgery
- Ca Prostate
- Post-Op NSTEMI

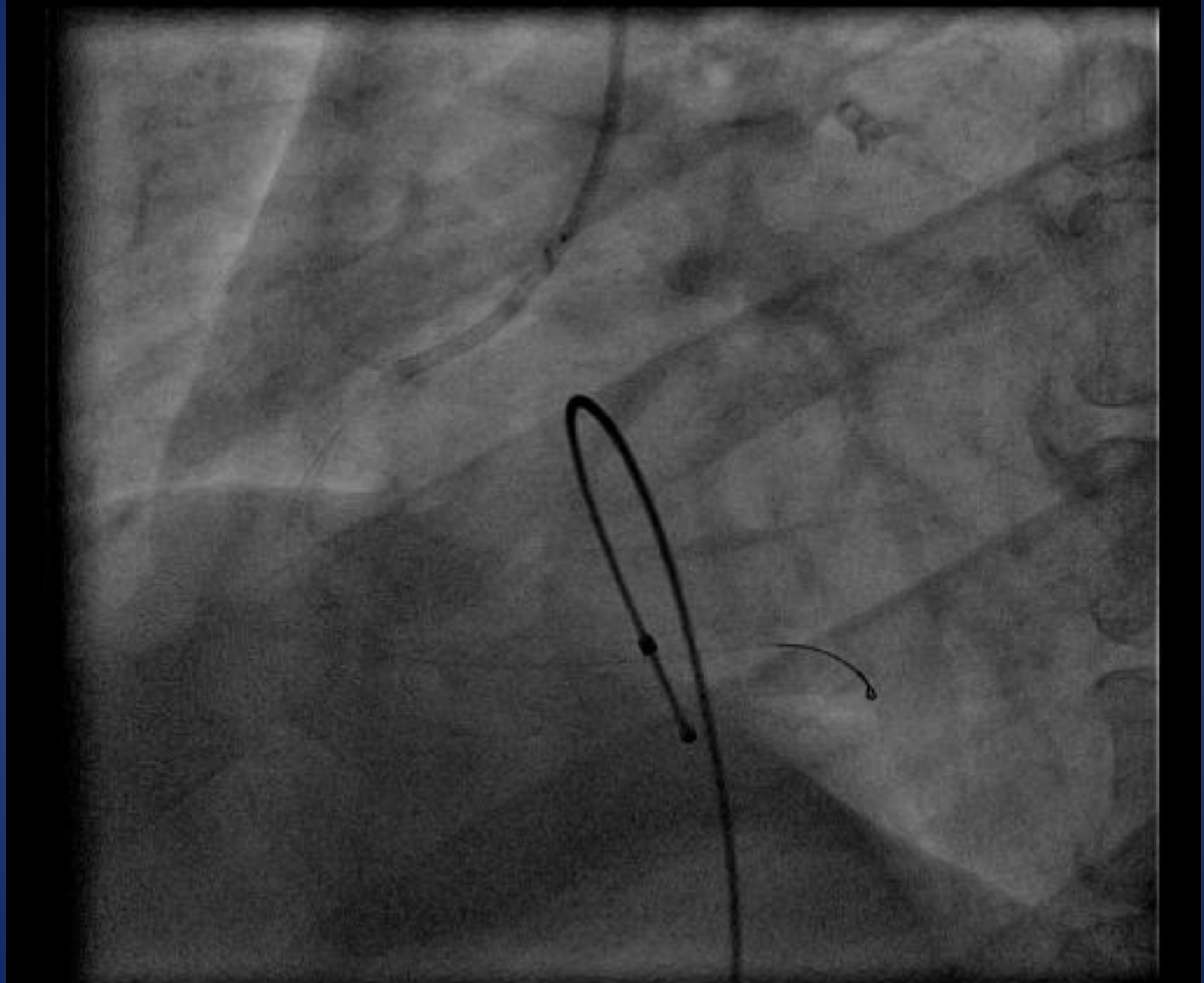


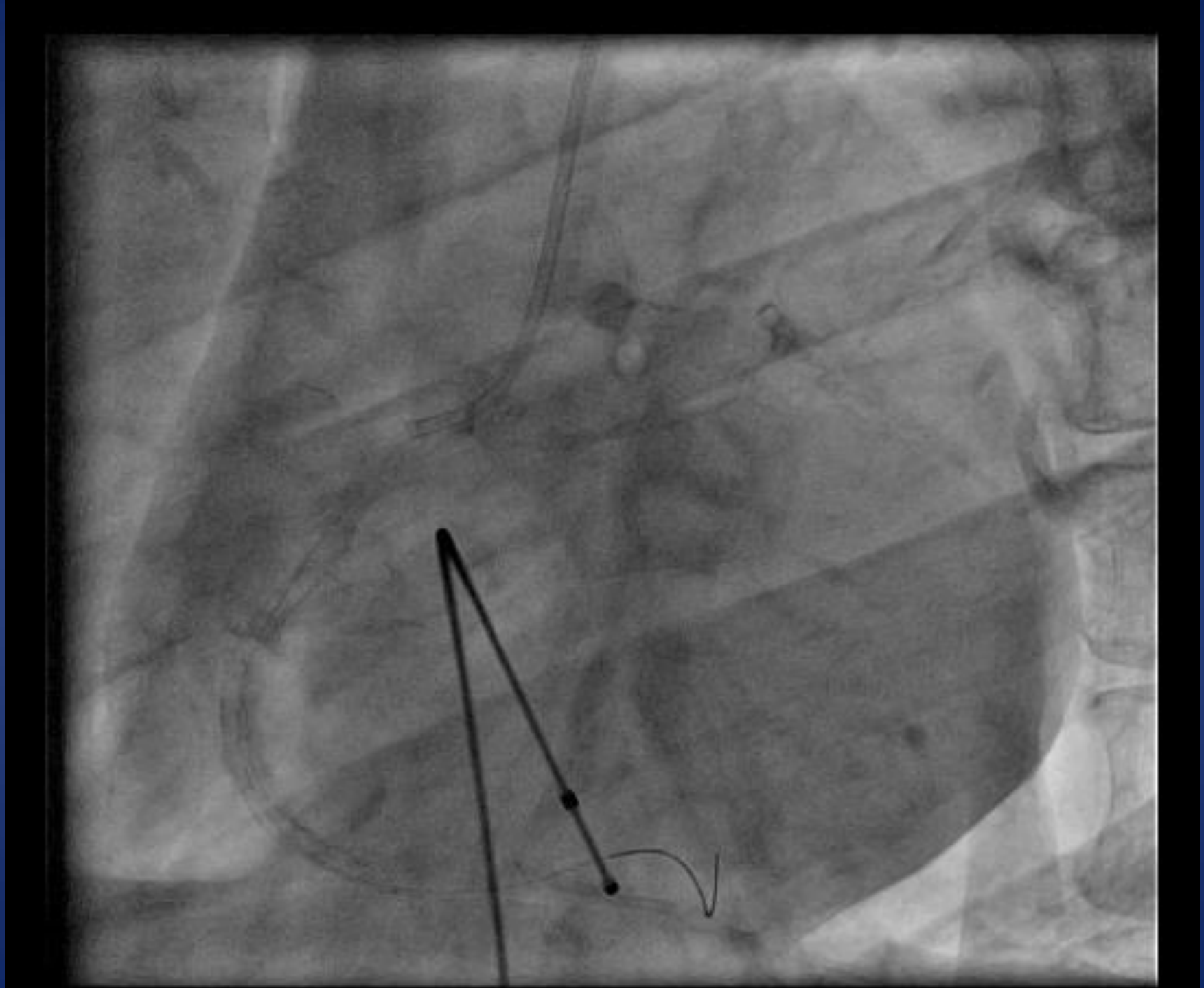












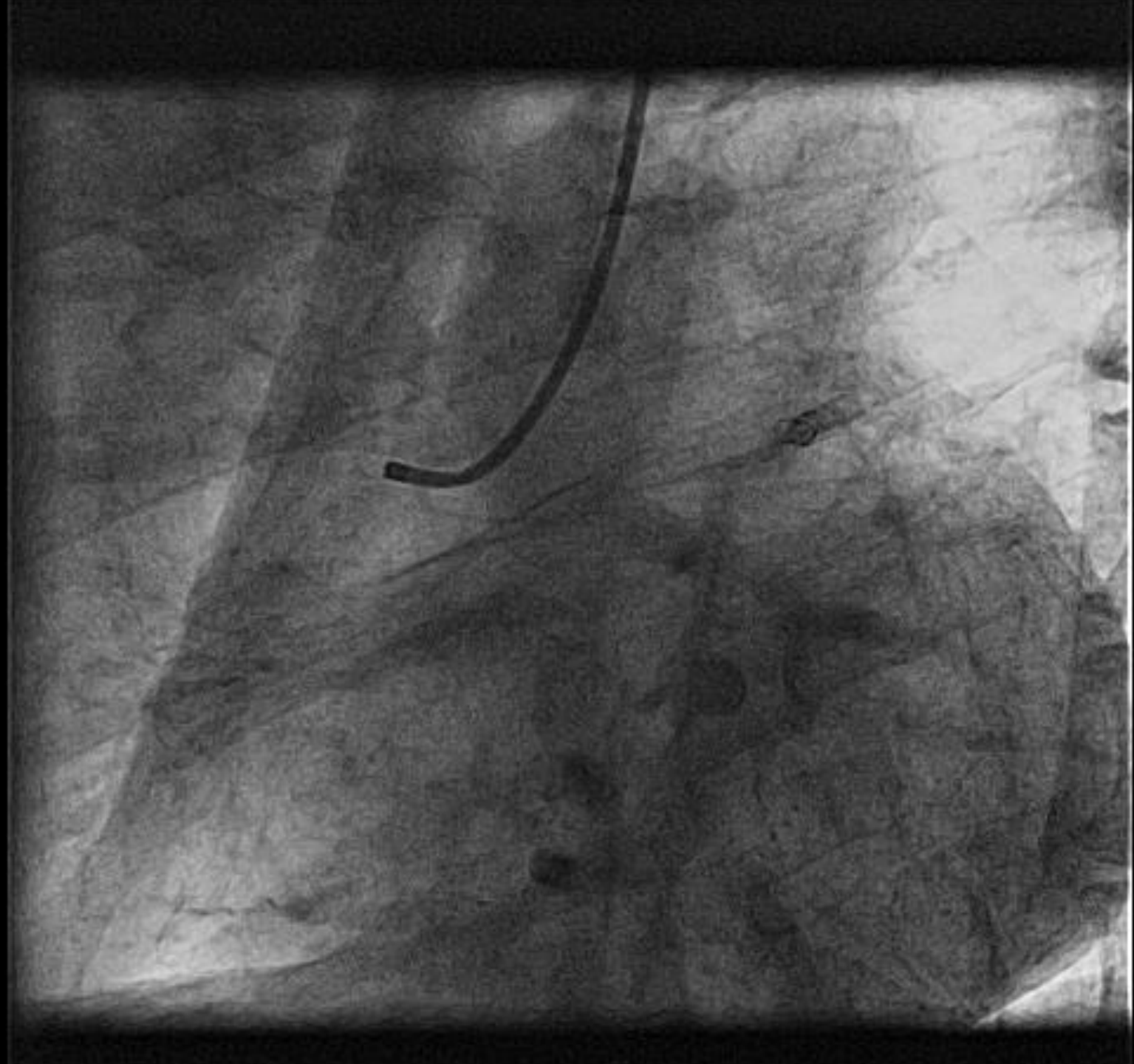
Stent Delivery
Personal approach

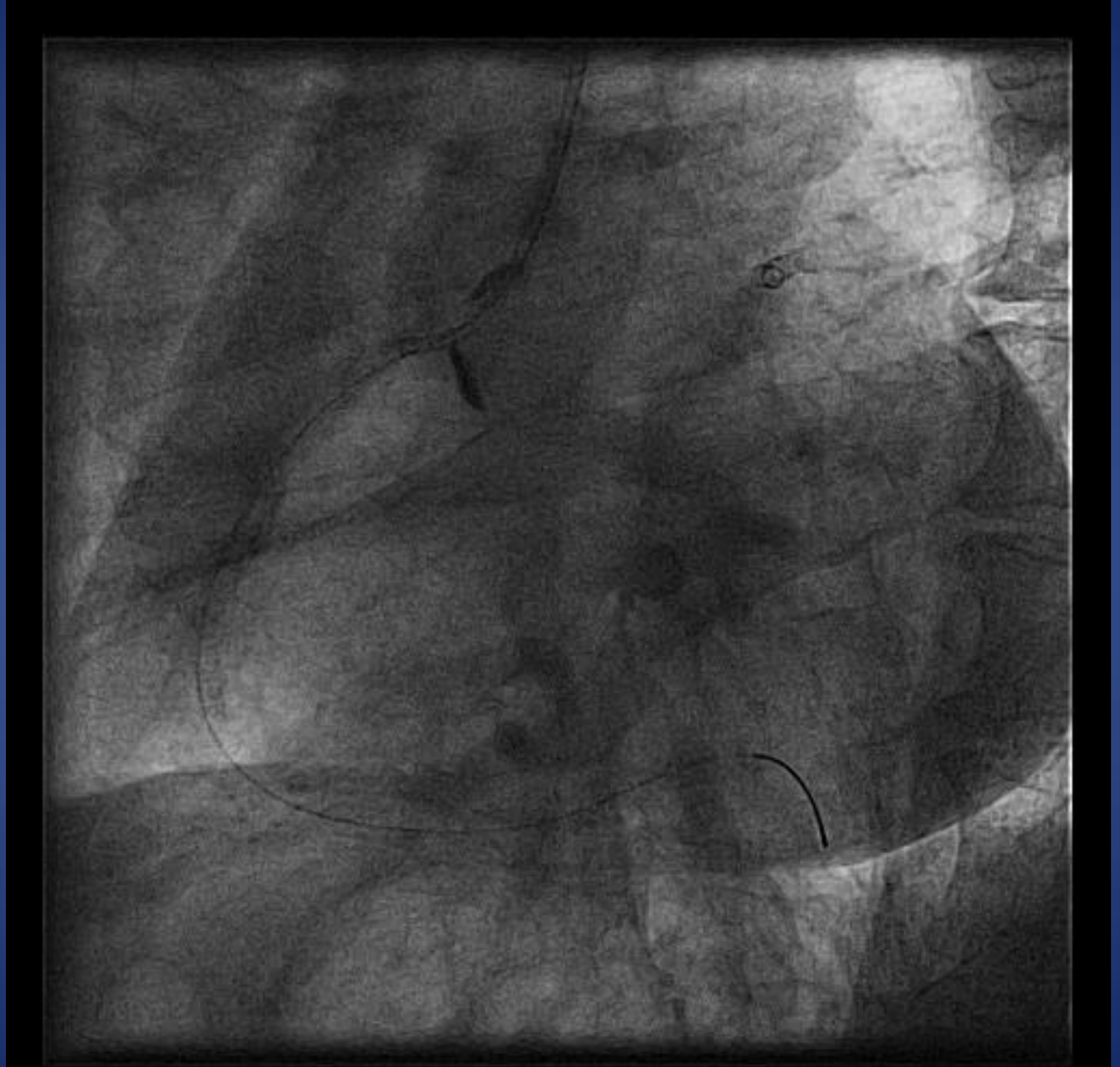
- Guiding catheter
- Lesion Preparation (predilatation)
- Wires
- Anchor Balloon
- Rotablator

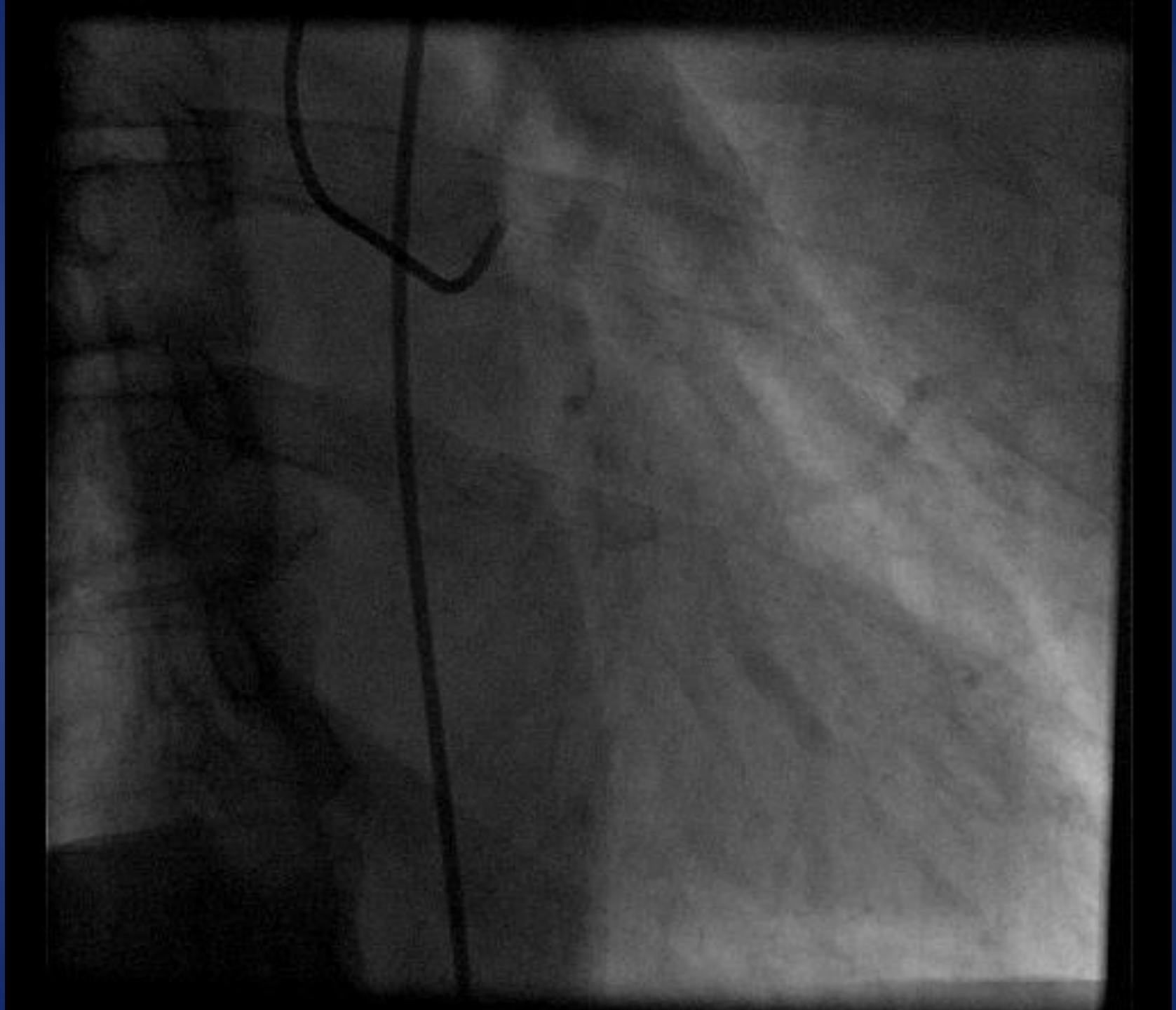
Guiding Catheter

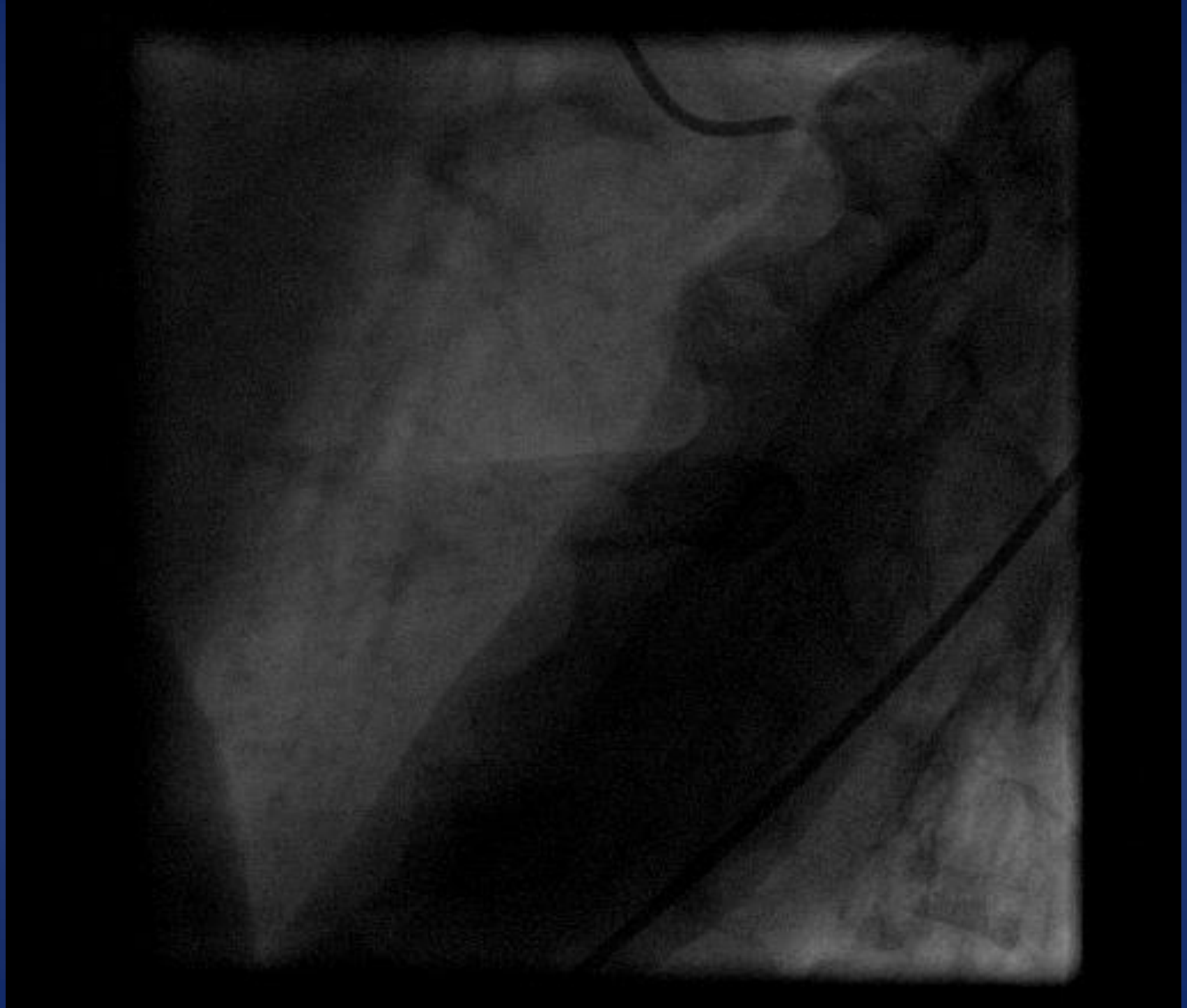
- Co-axial
- Shape
- Size
- Back-up.....Deep Throat

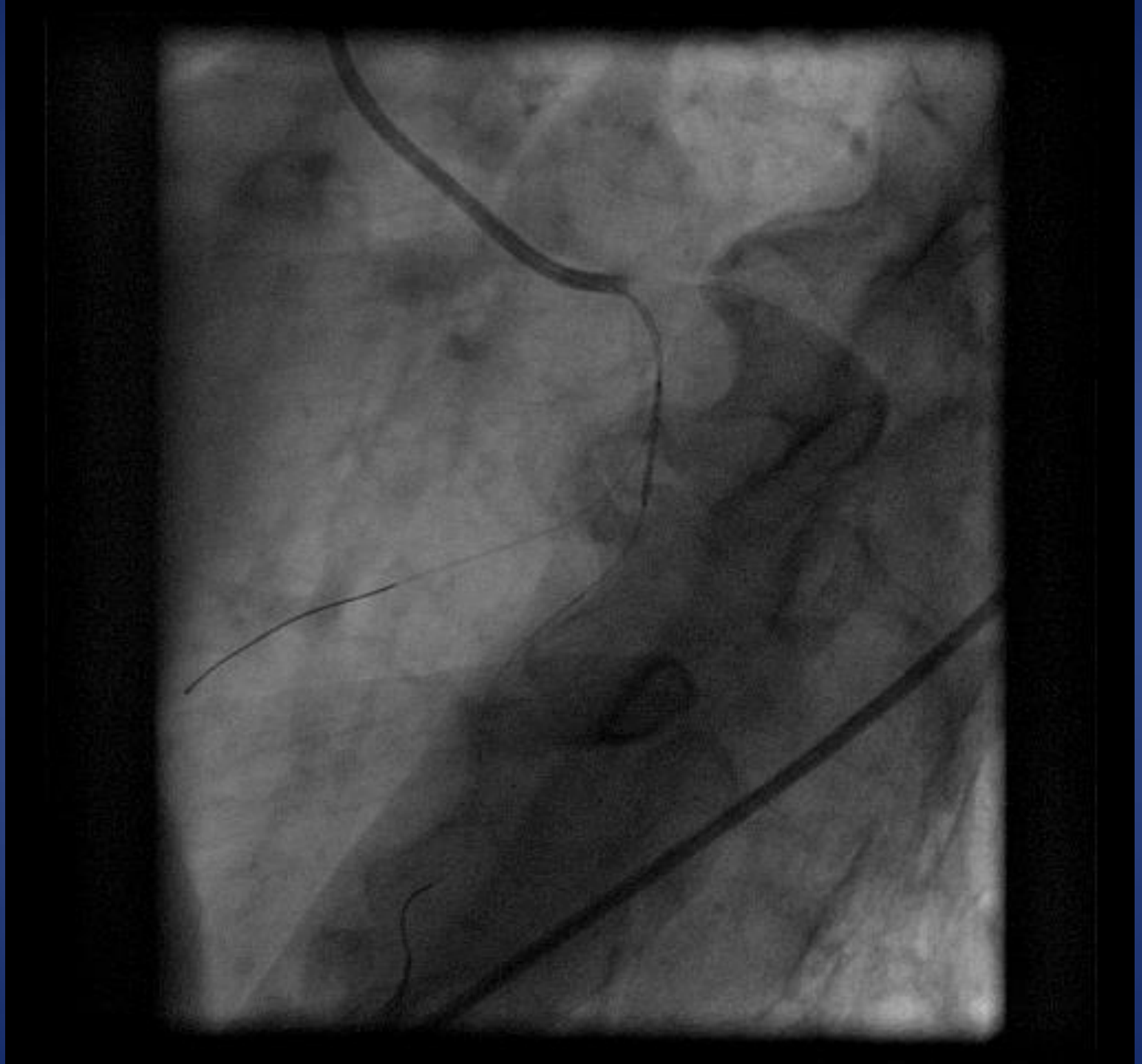
Coronary Dissection

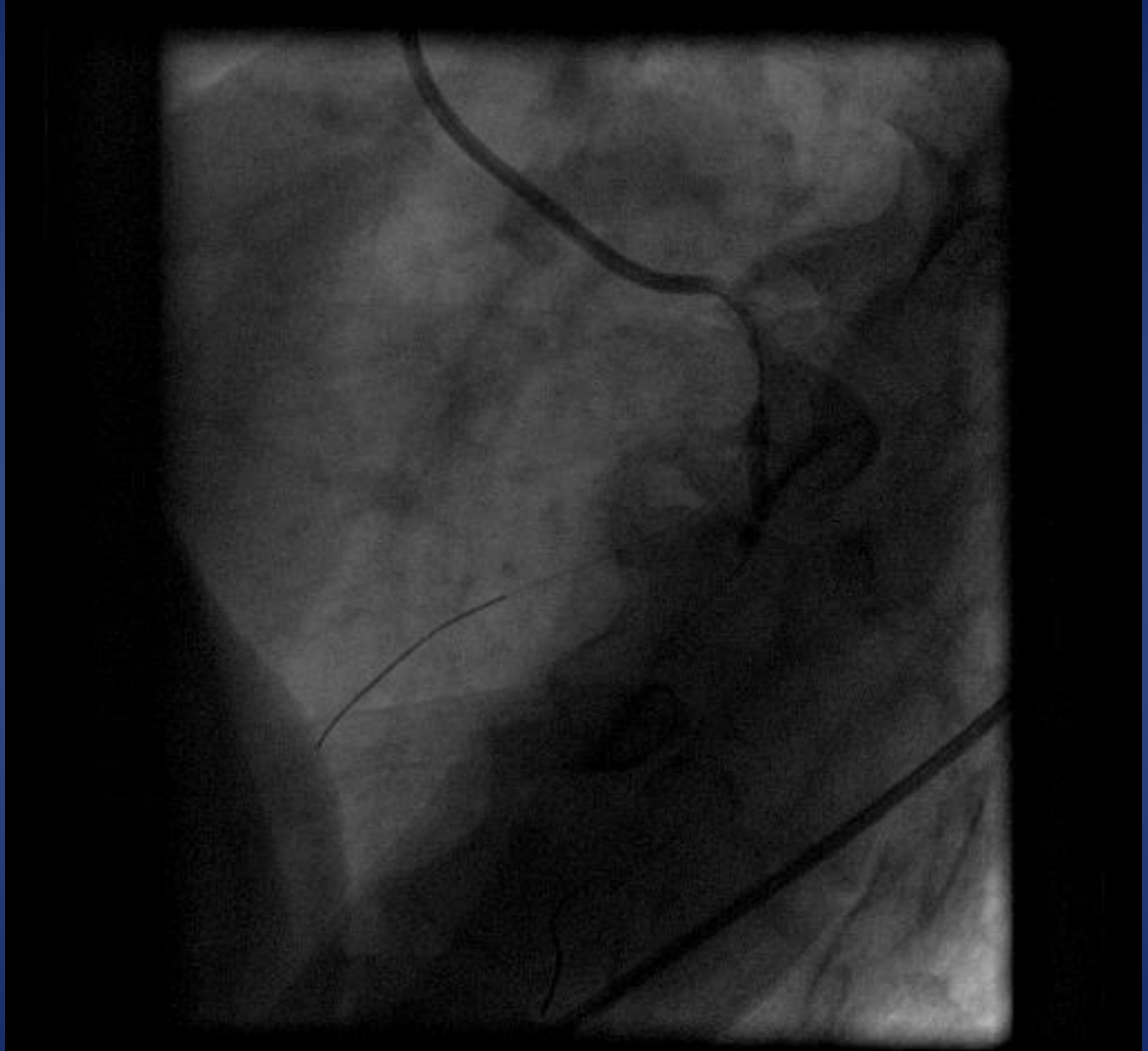


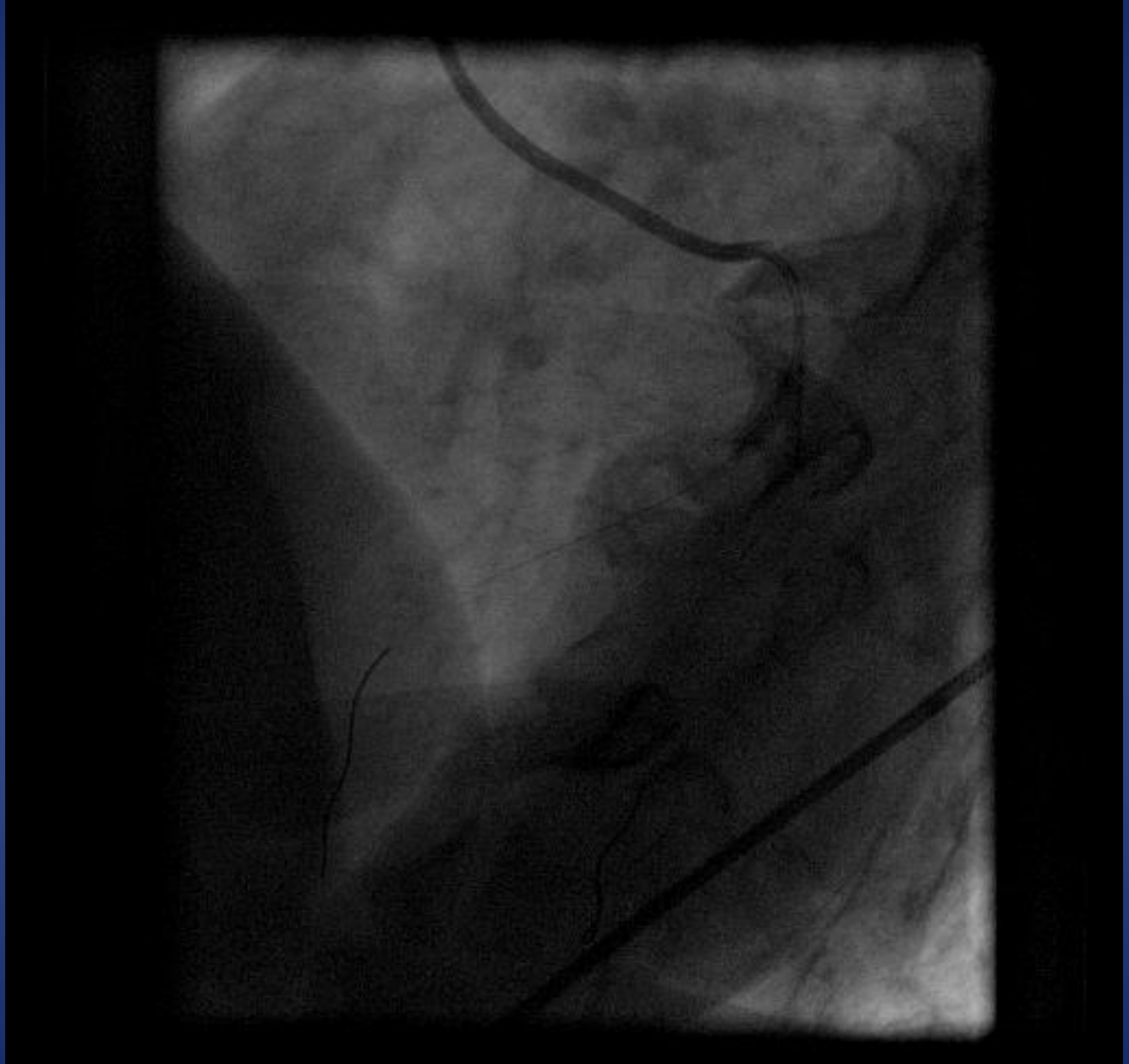


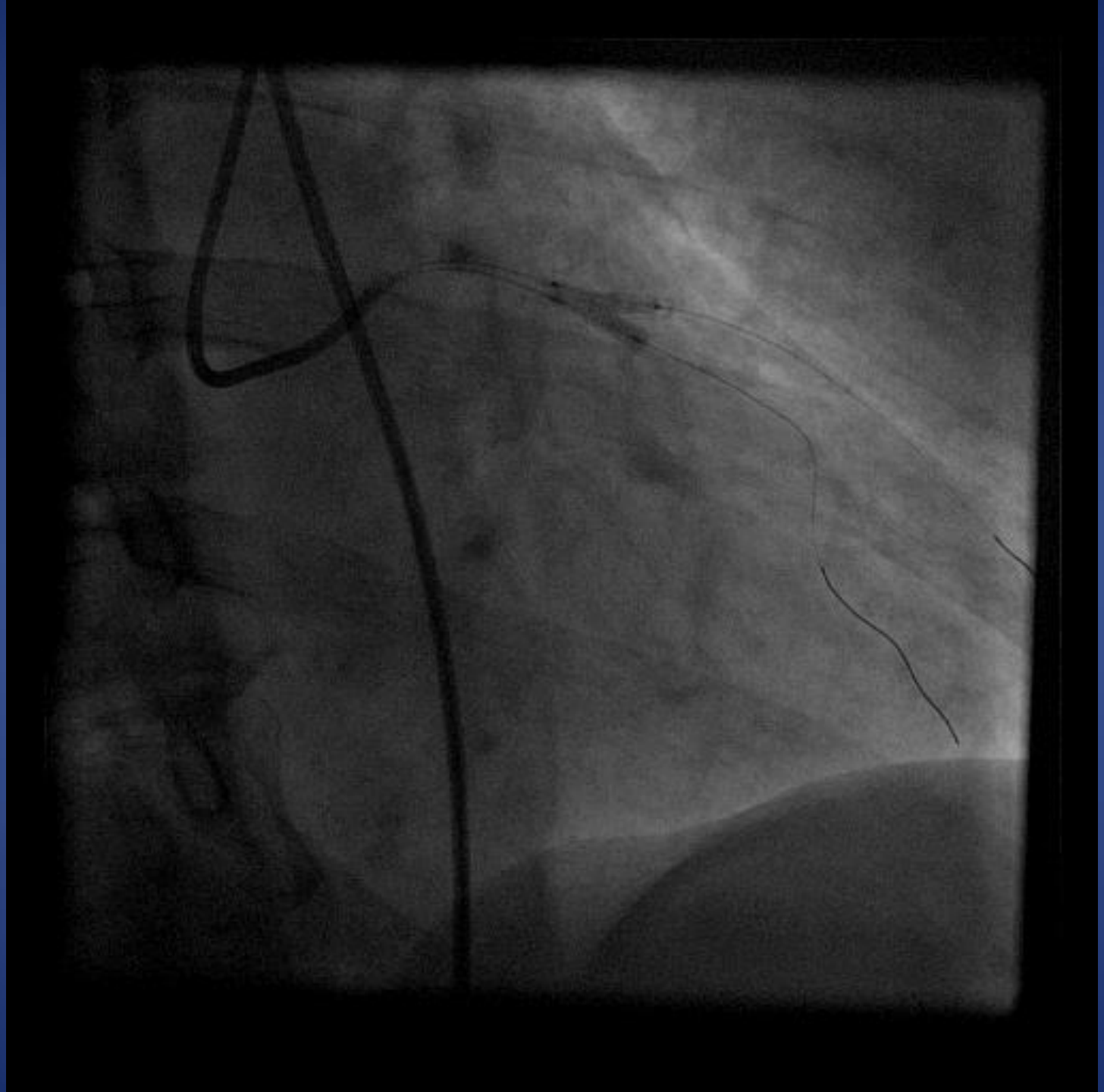


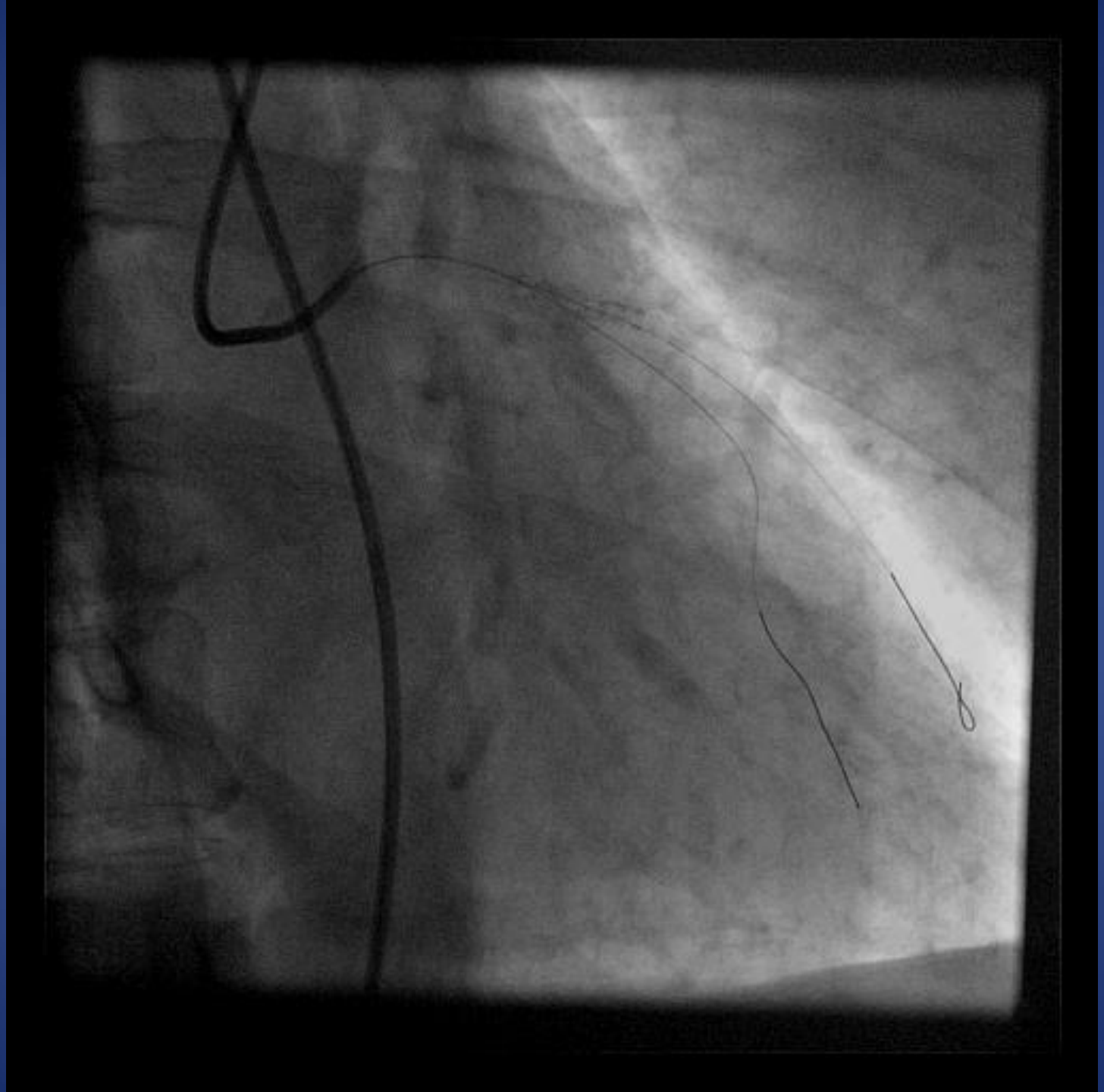


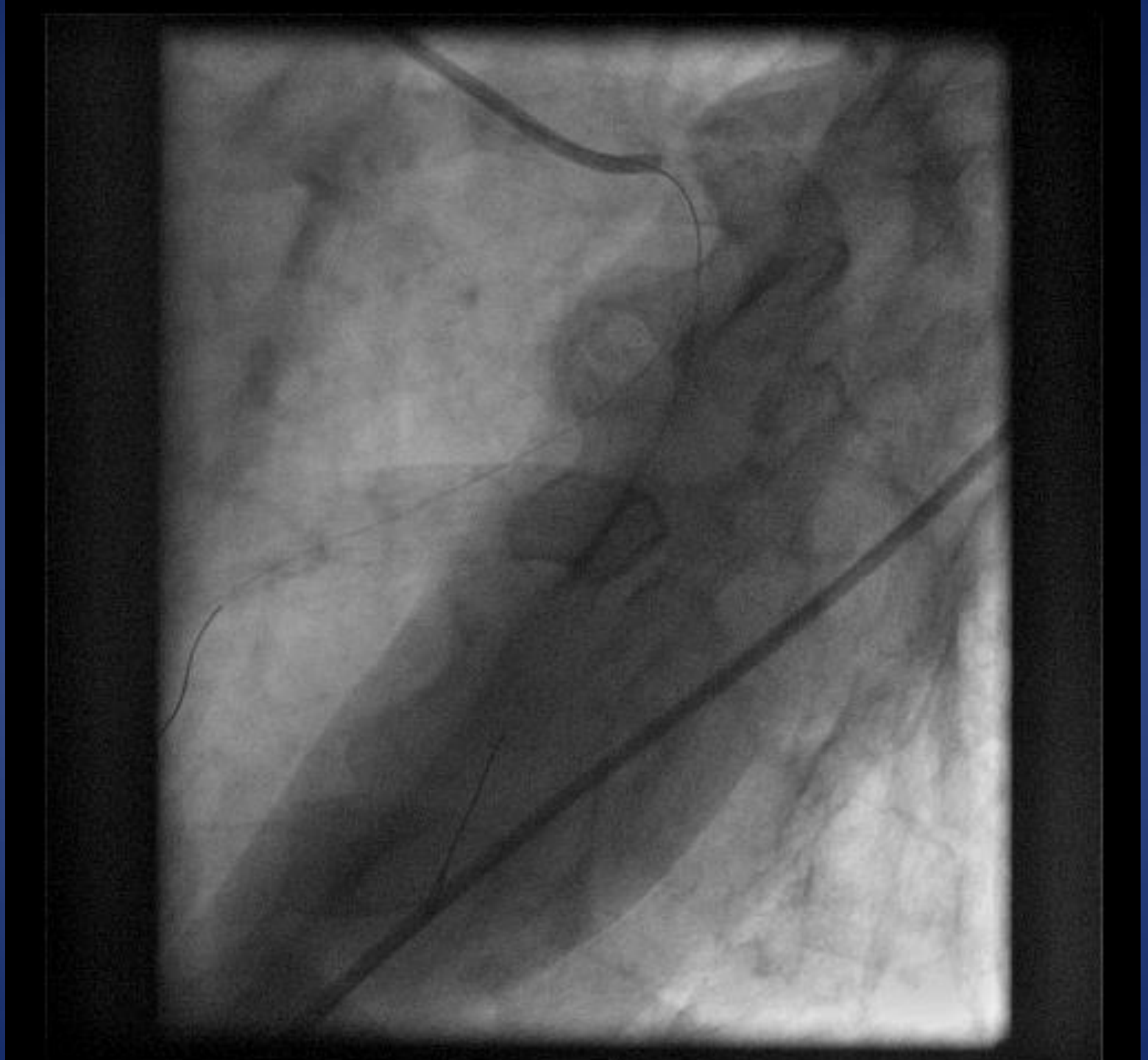


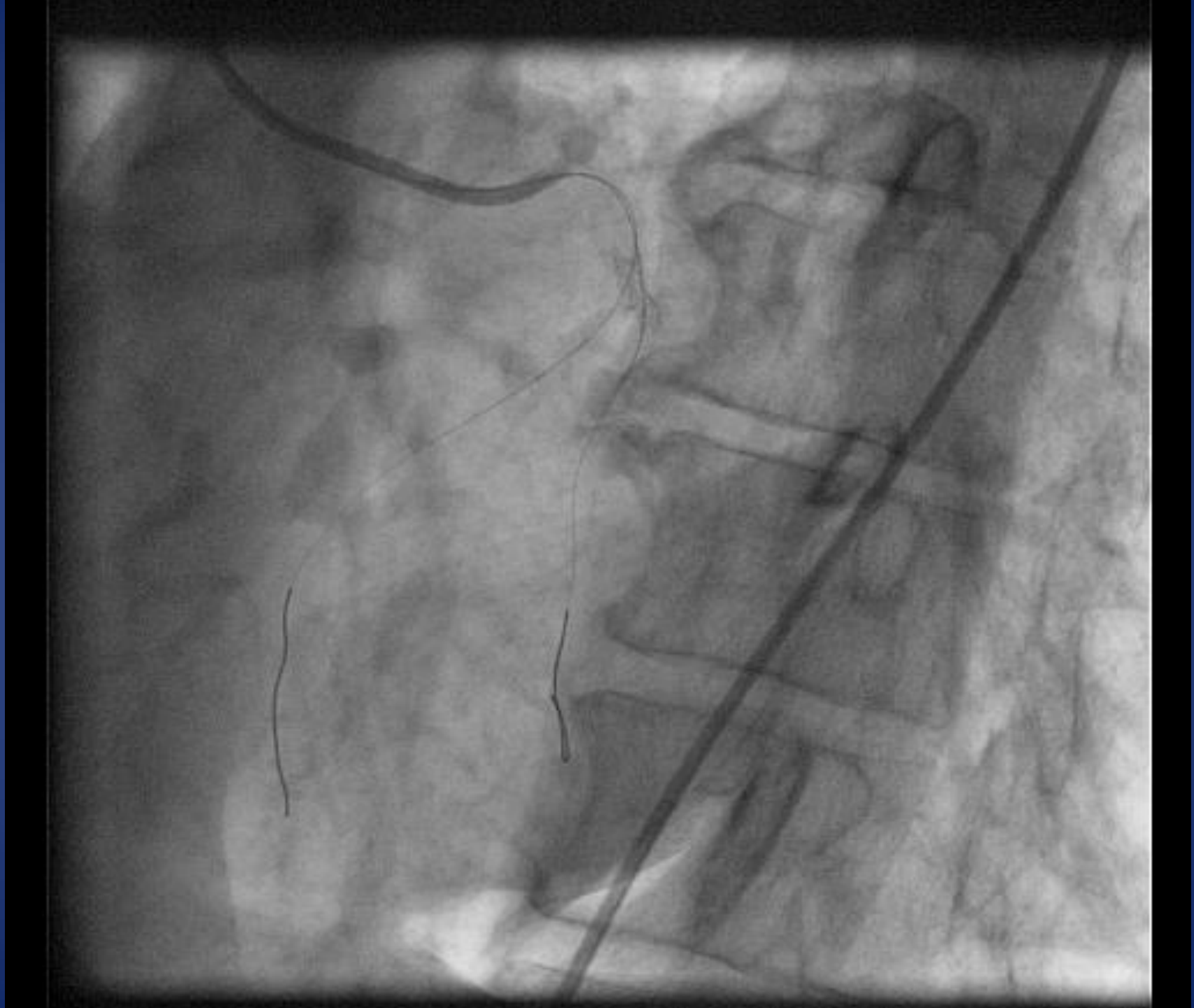


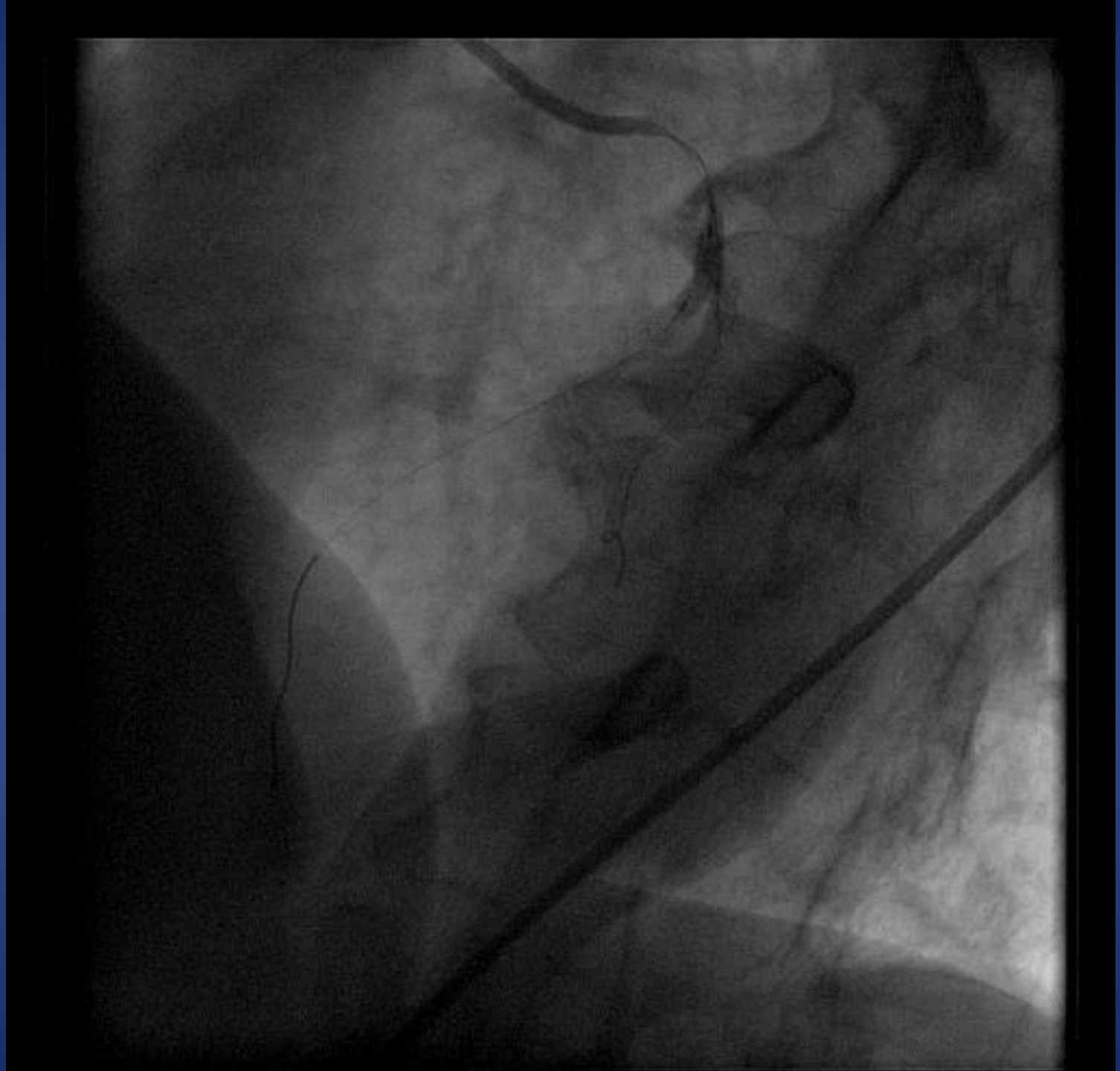


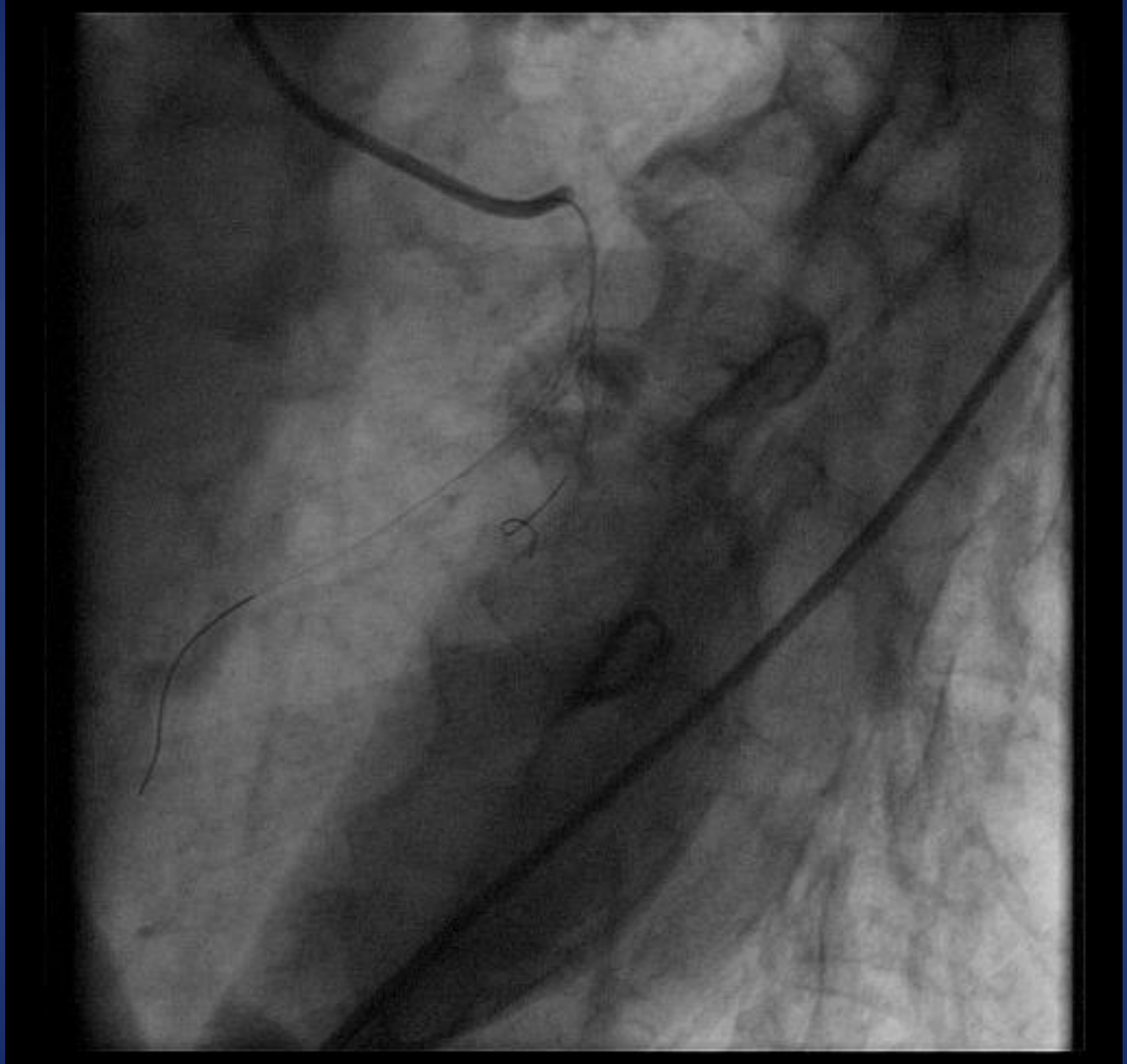


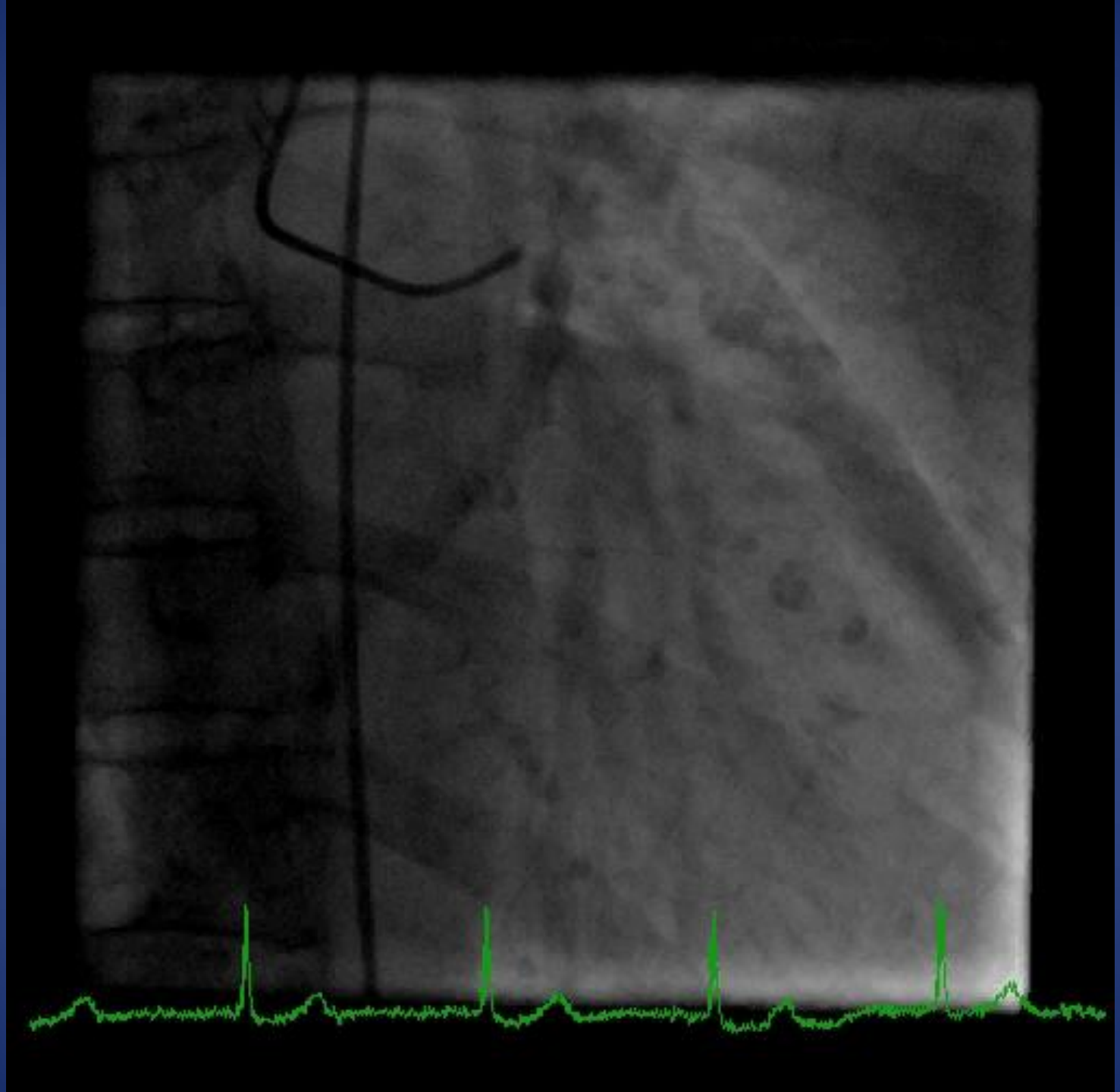


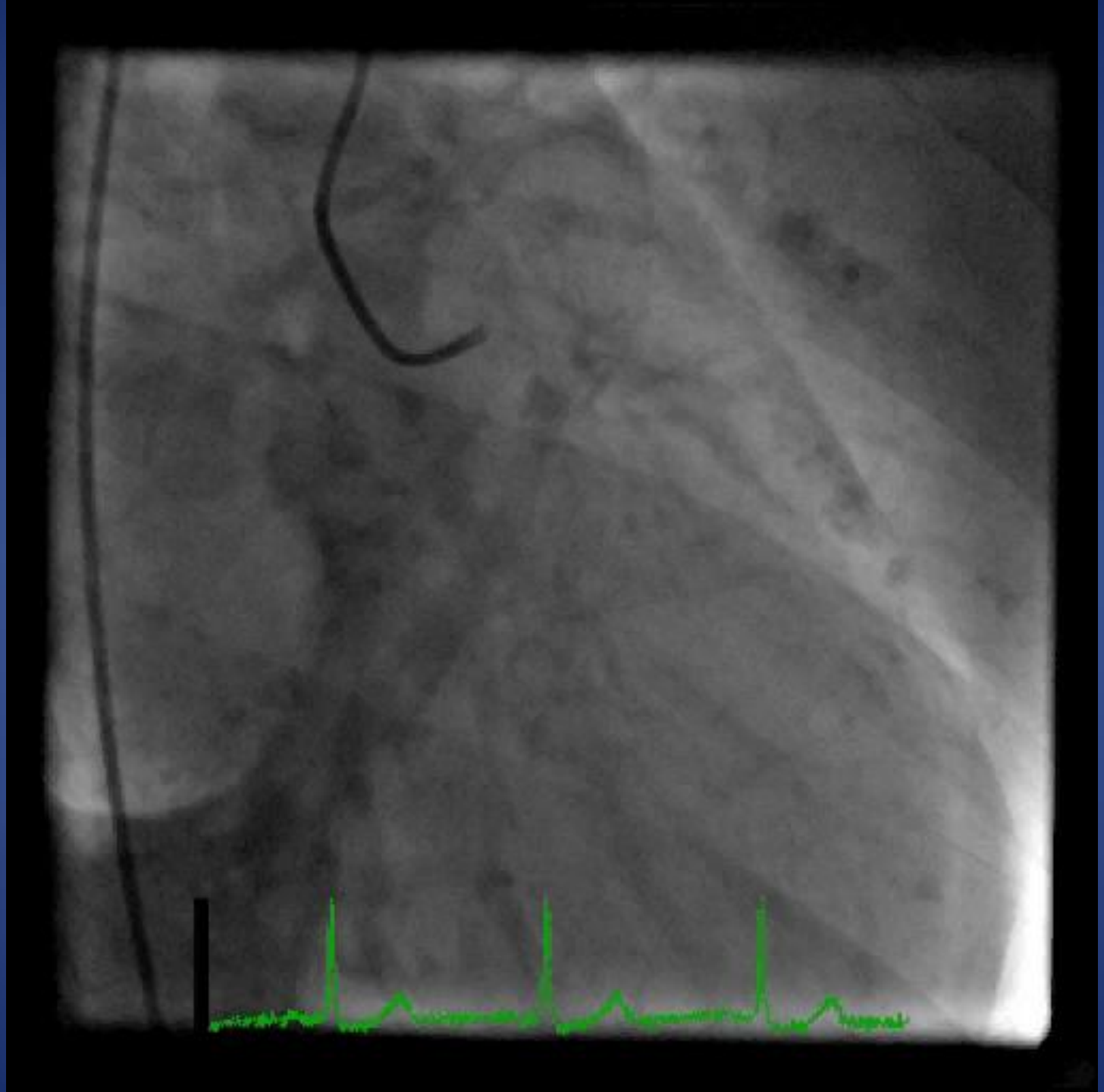


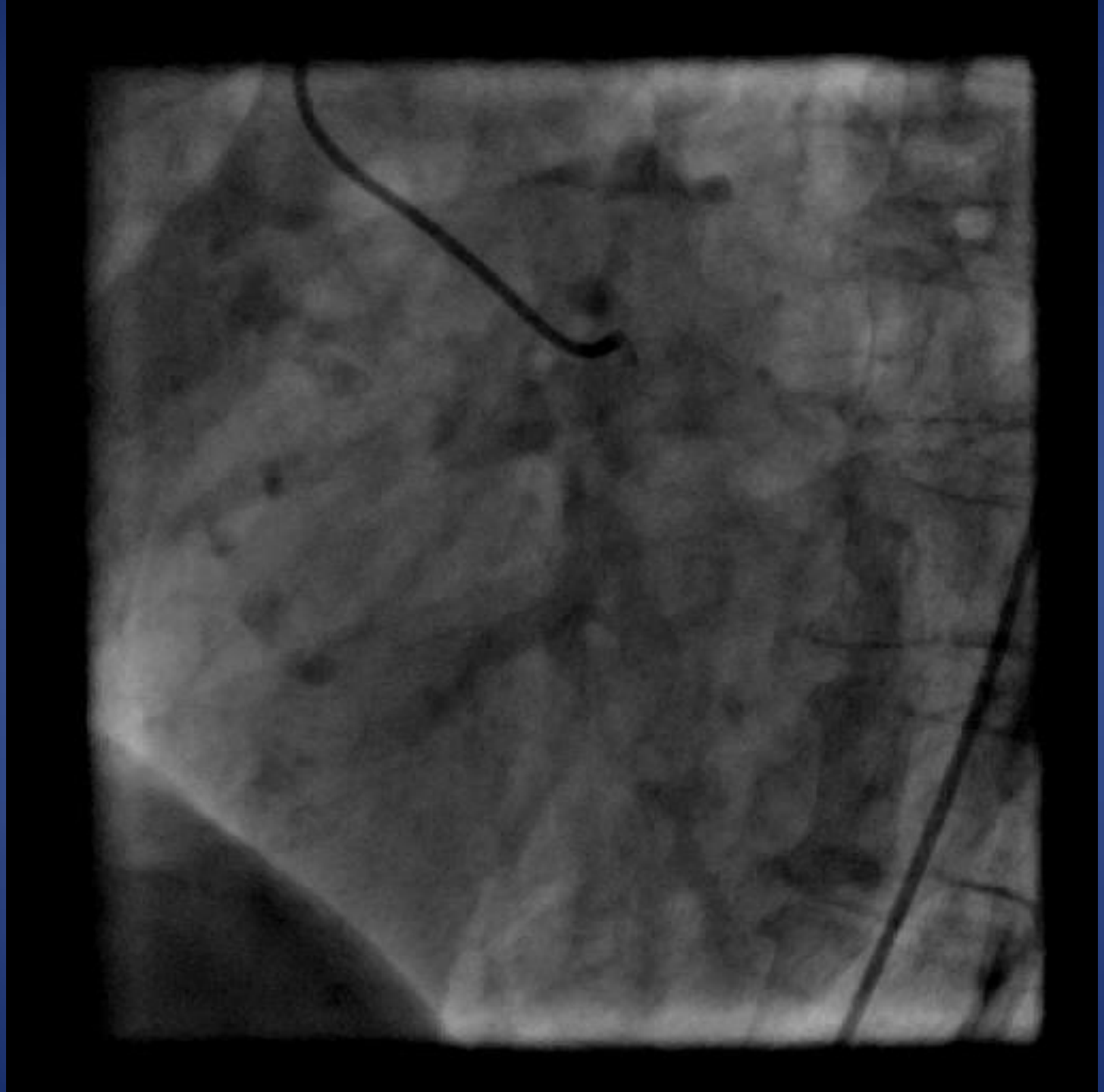


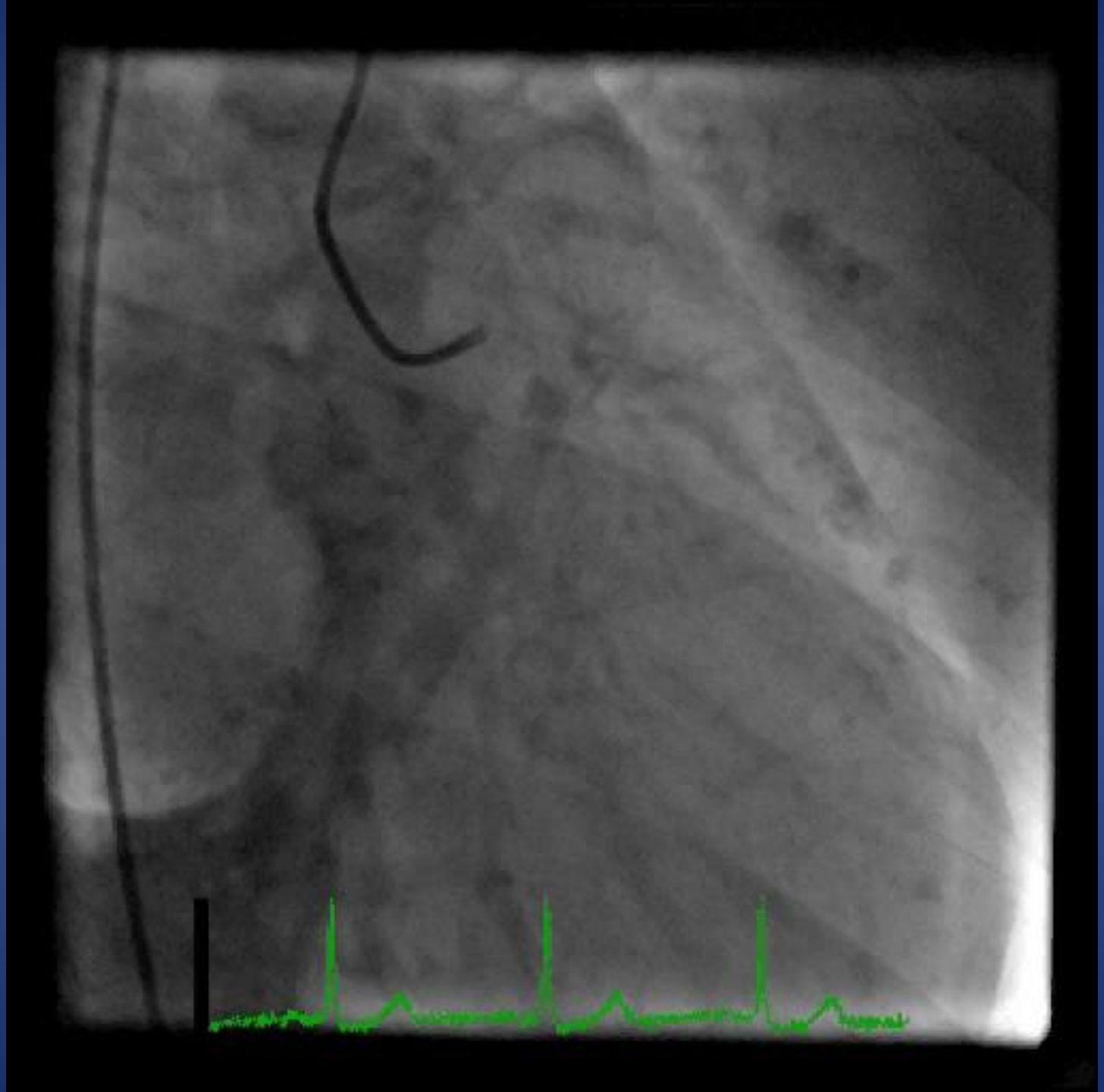


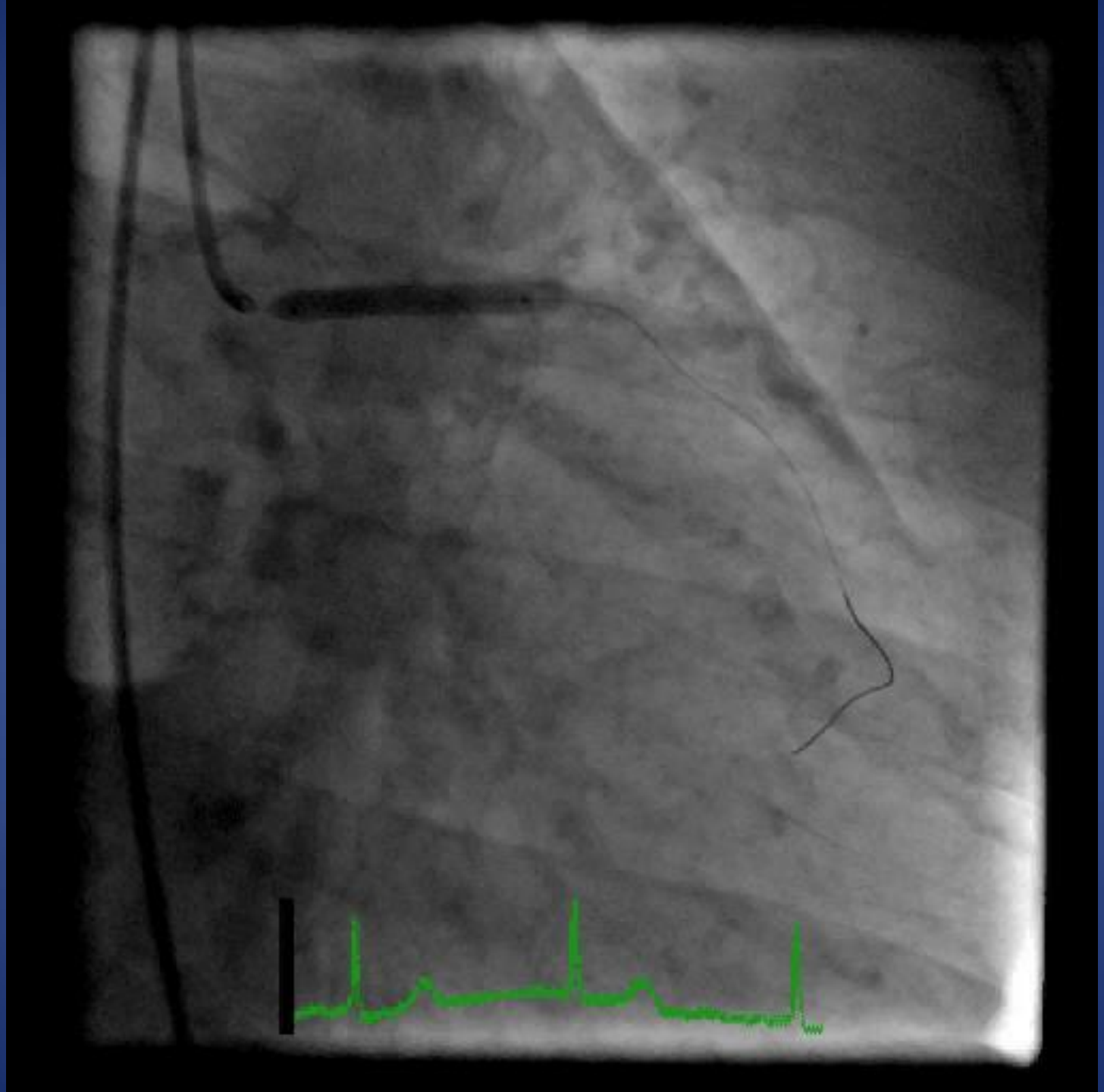








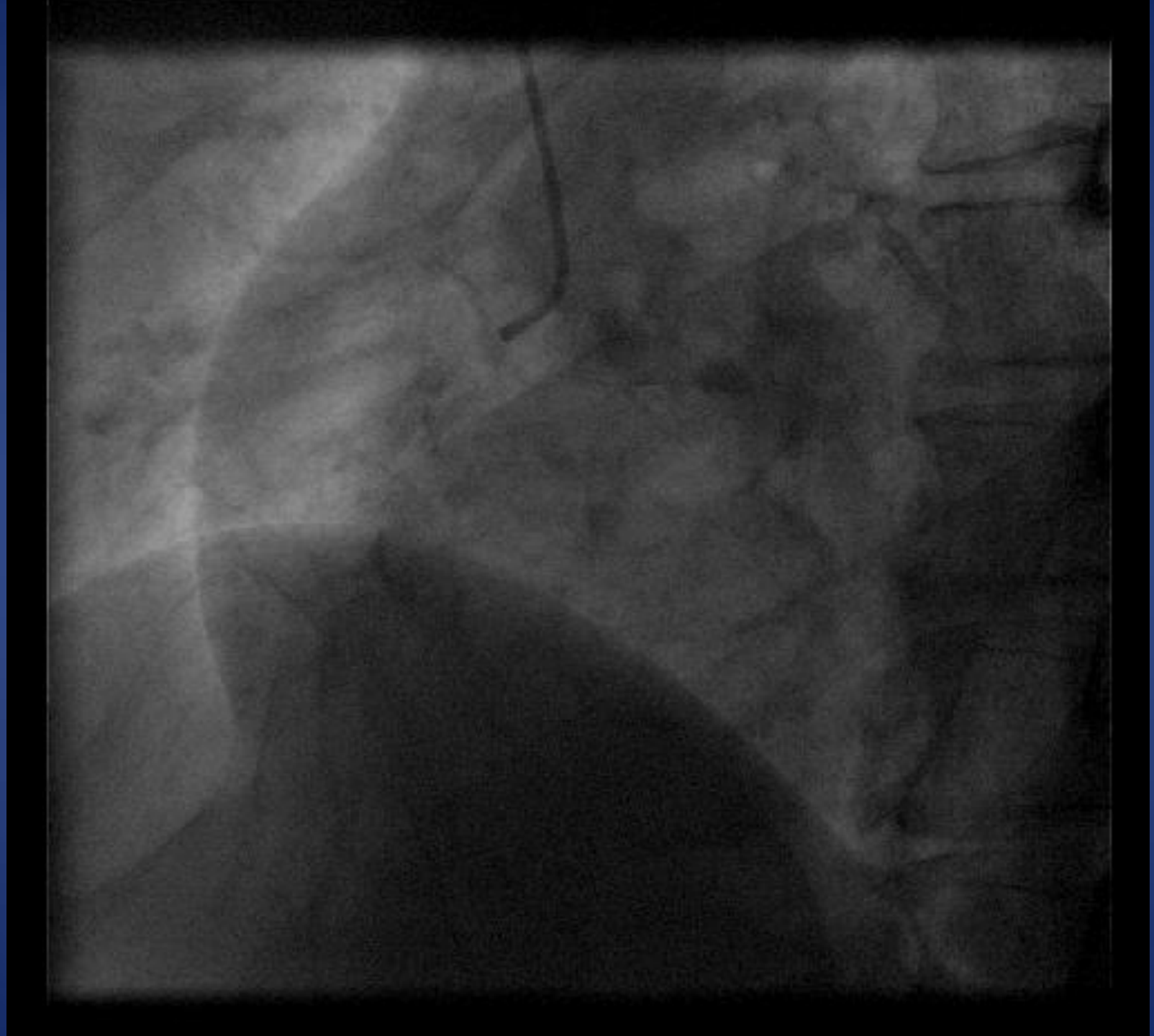


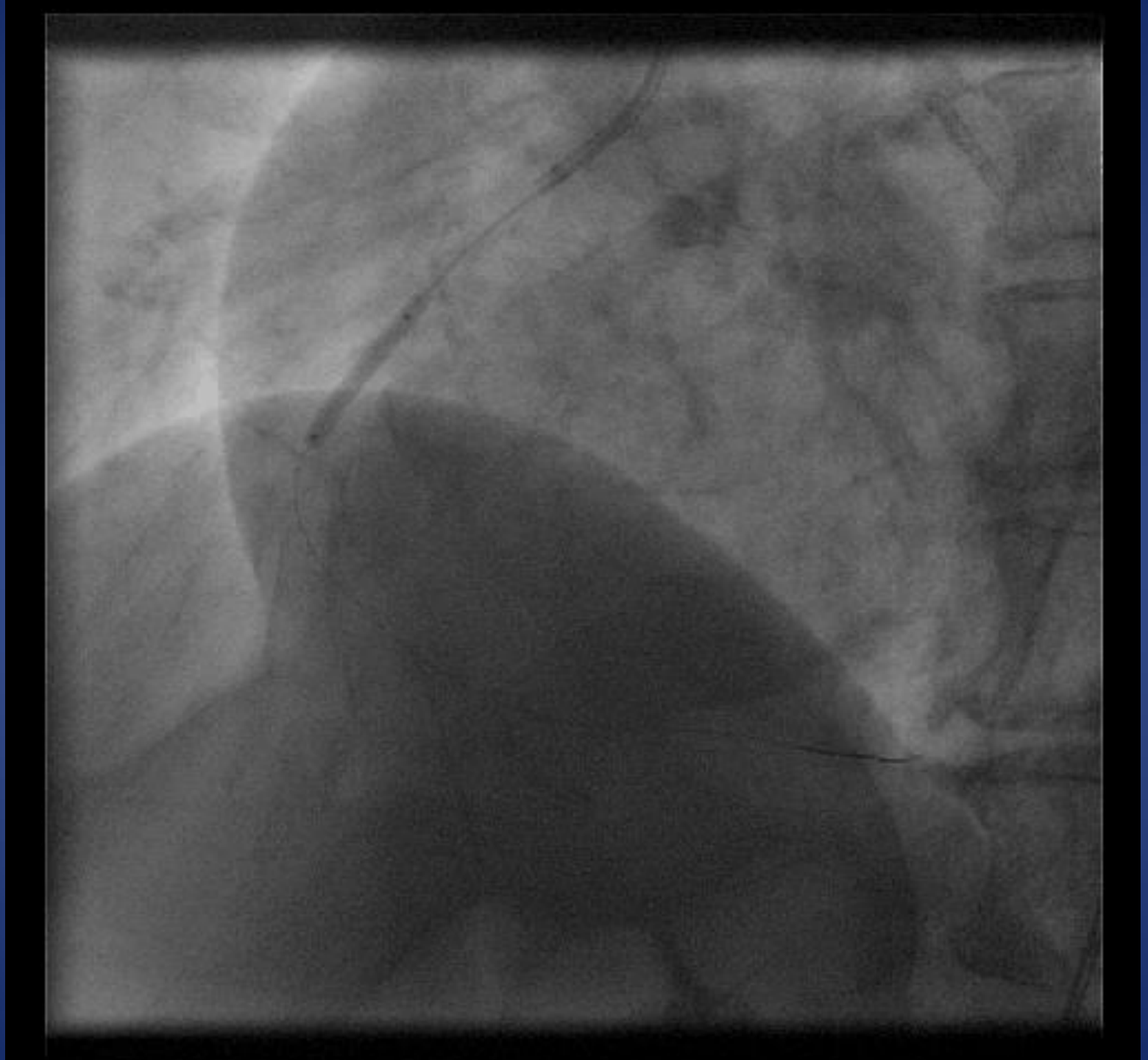


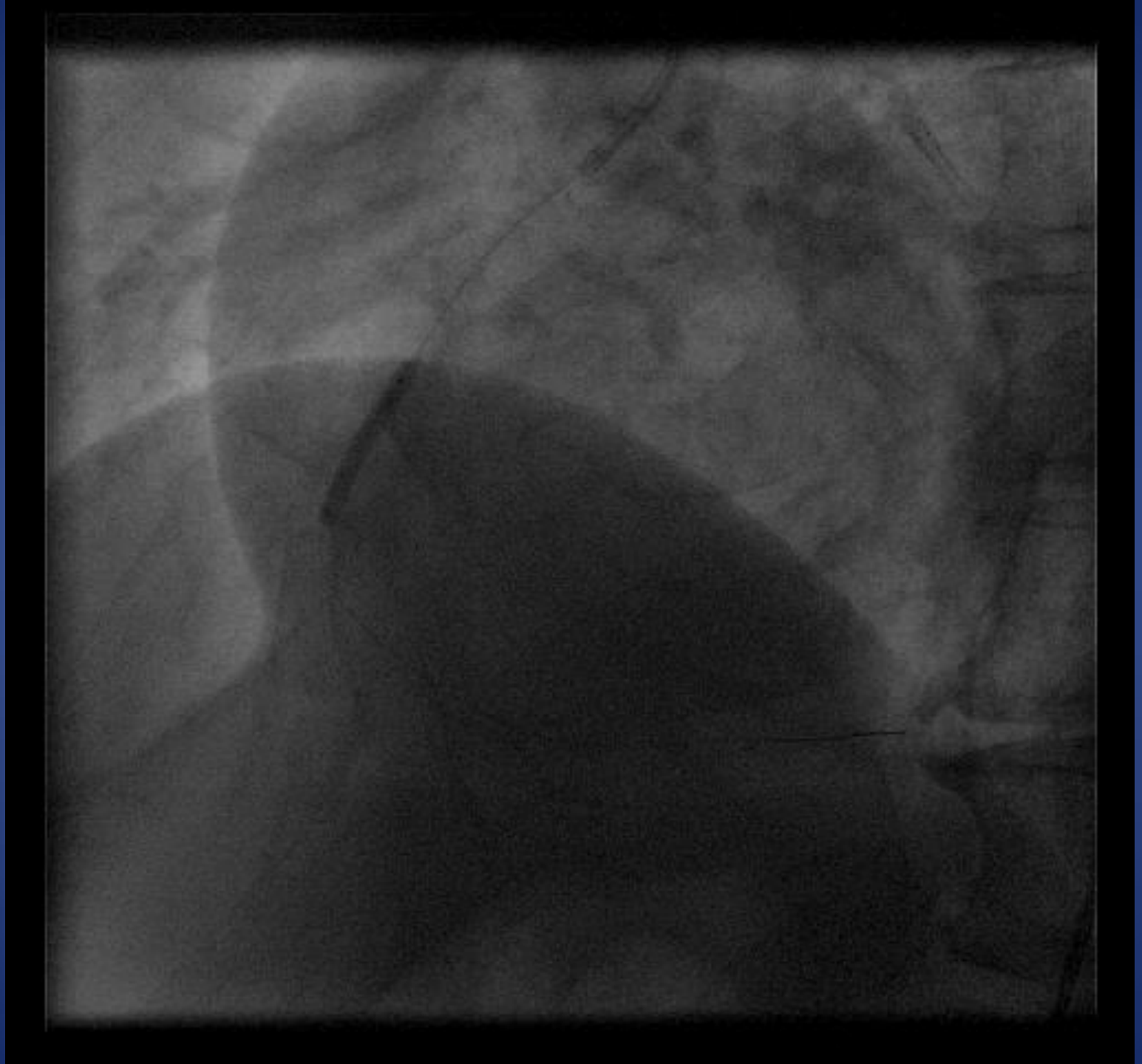
Complications are not uncommon

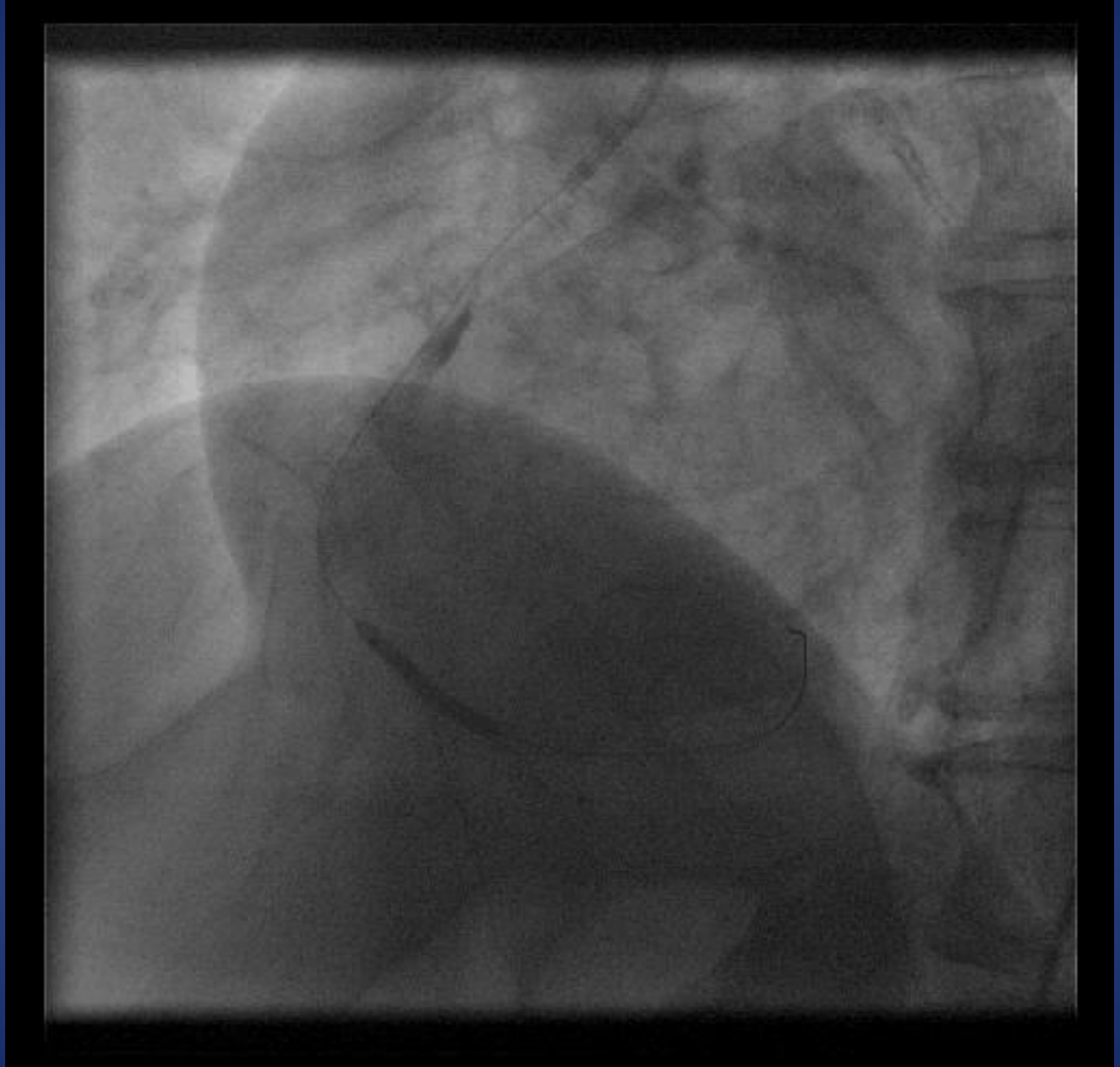
- Procedural Failure
- Perforation
- Guide Catheter Dissection
- **No Reflow**
- Bleeding
- Thrombosis
- Renal Failure
- Device Loss
- Myocardial Infarction
- Death

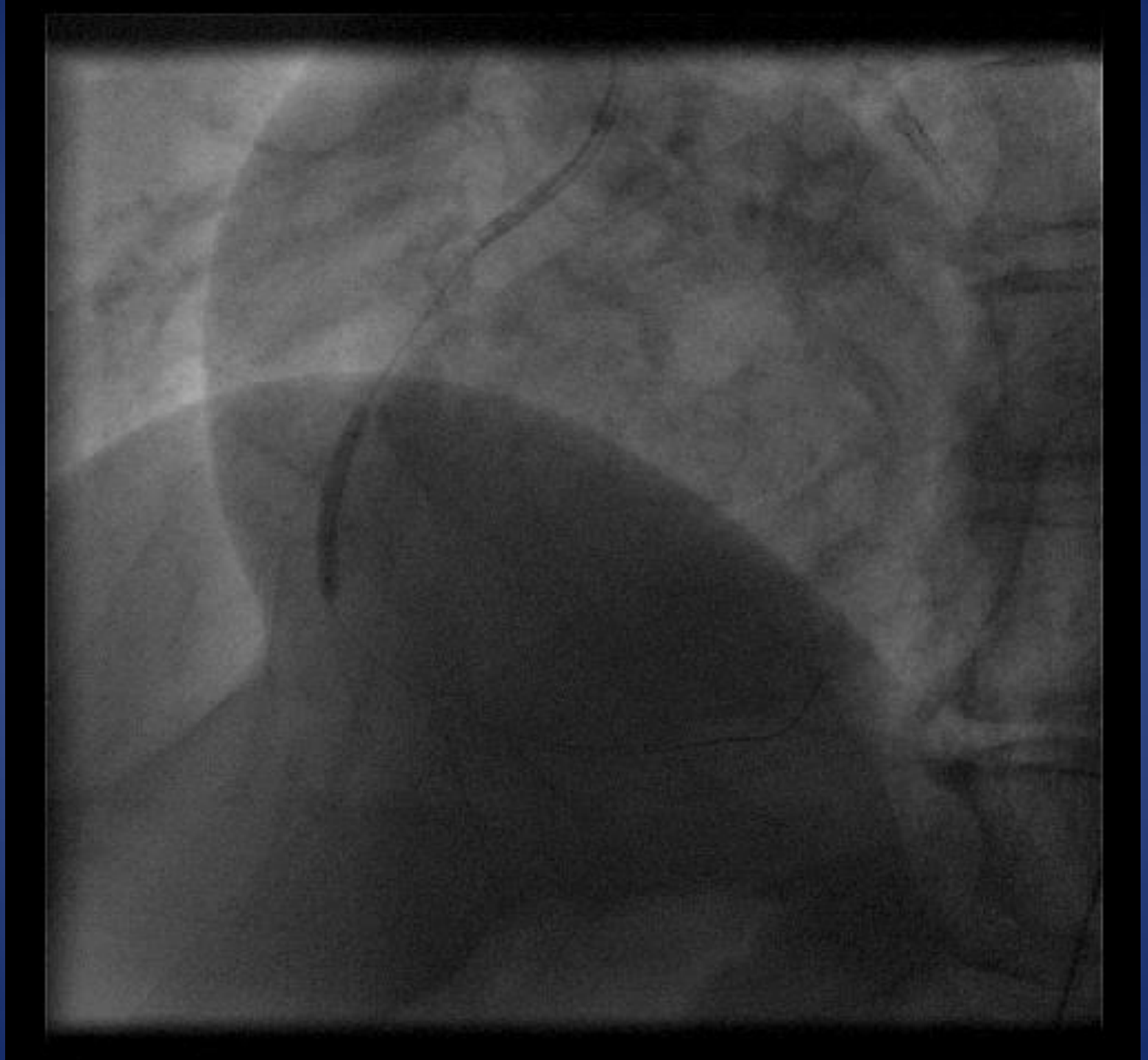
No Reflow in AMI

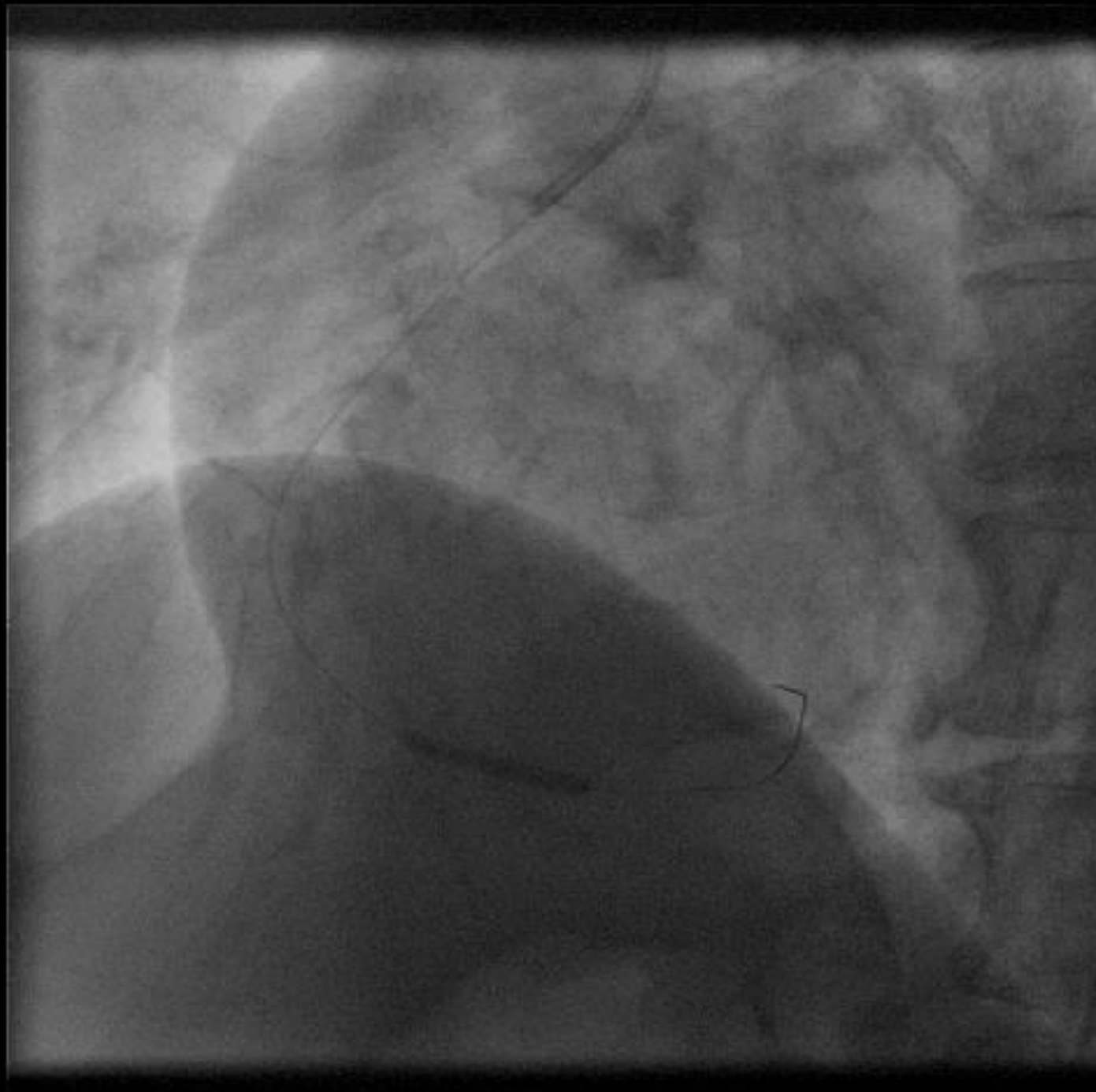


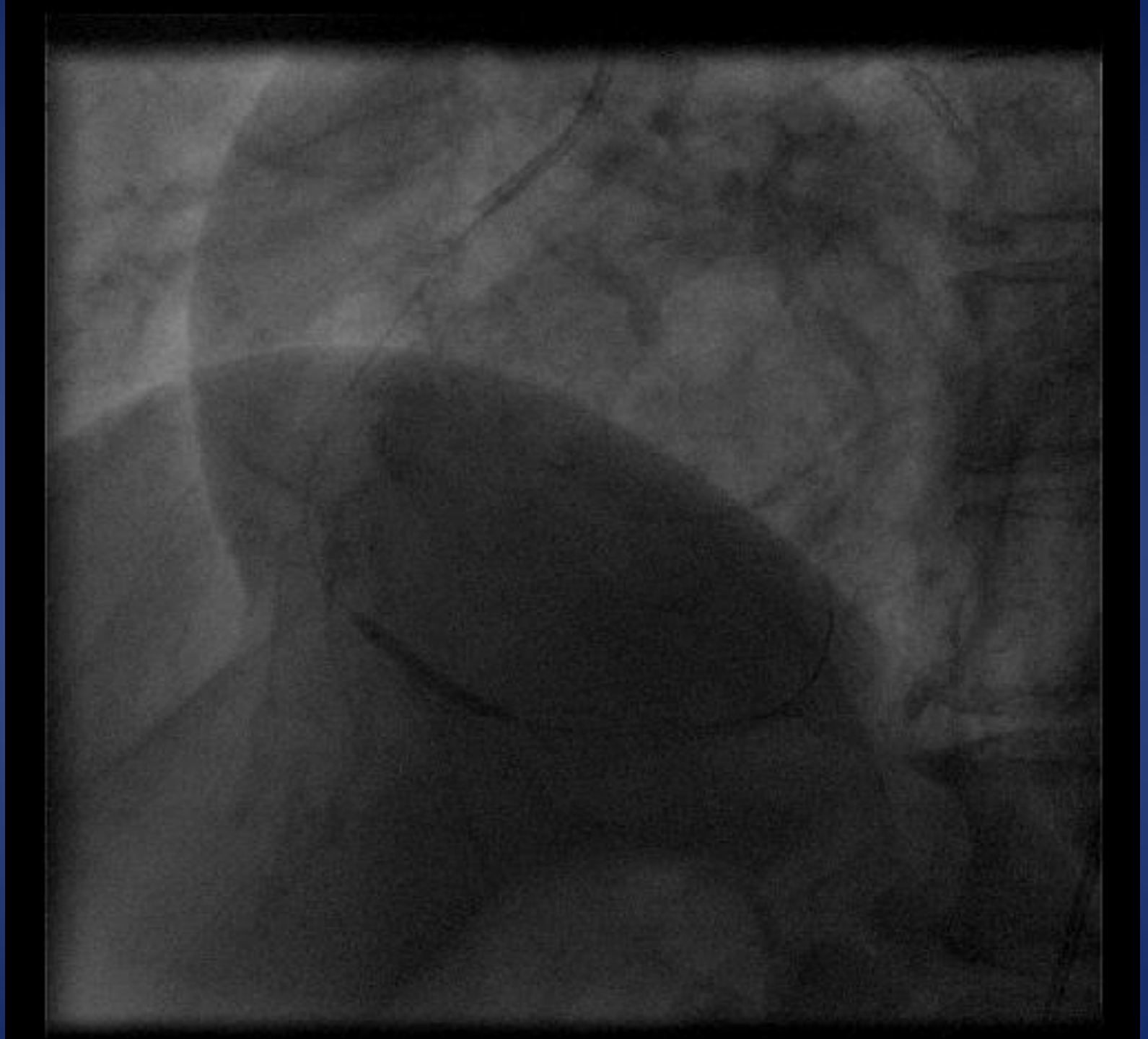




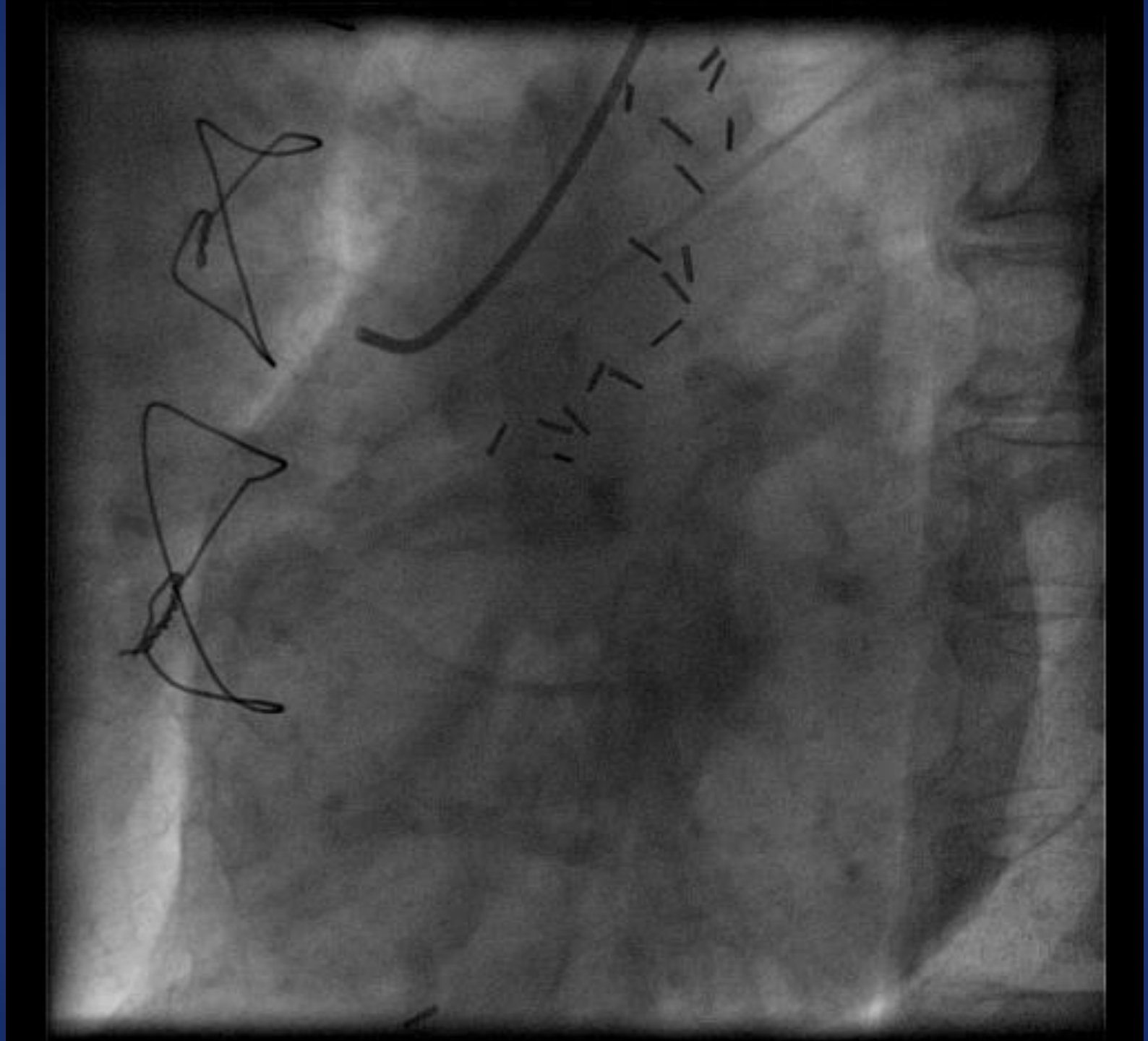


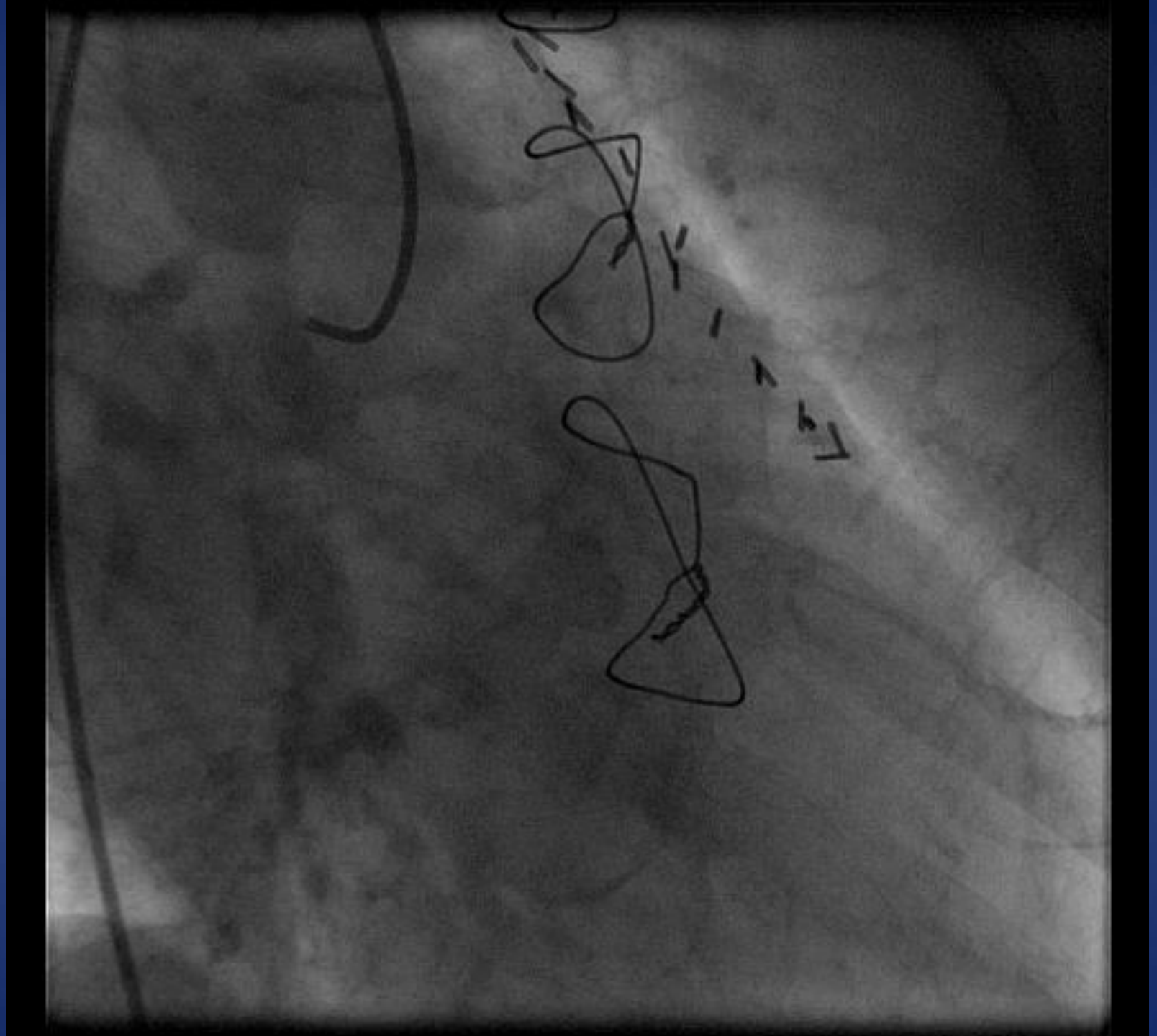


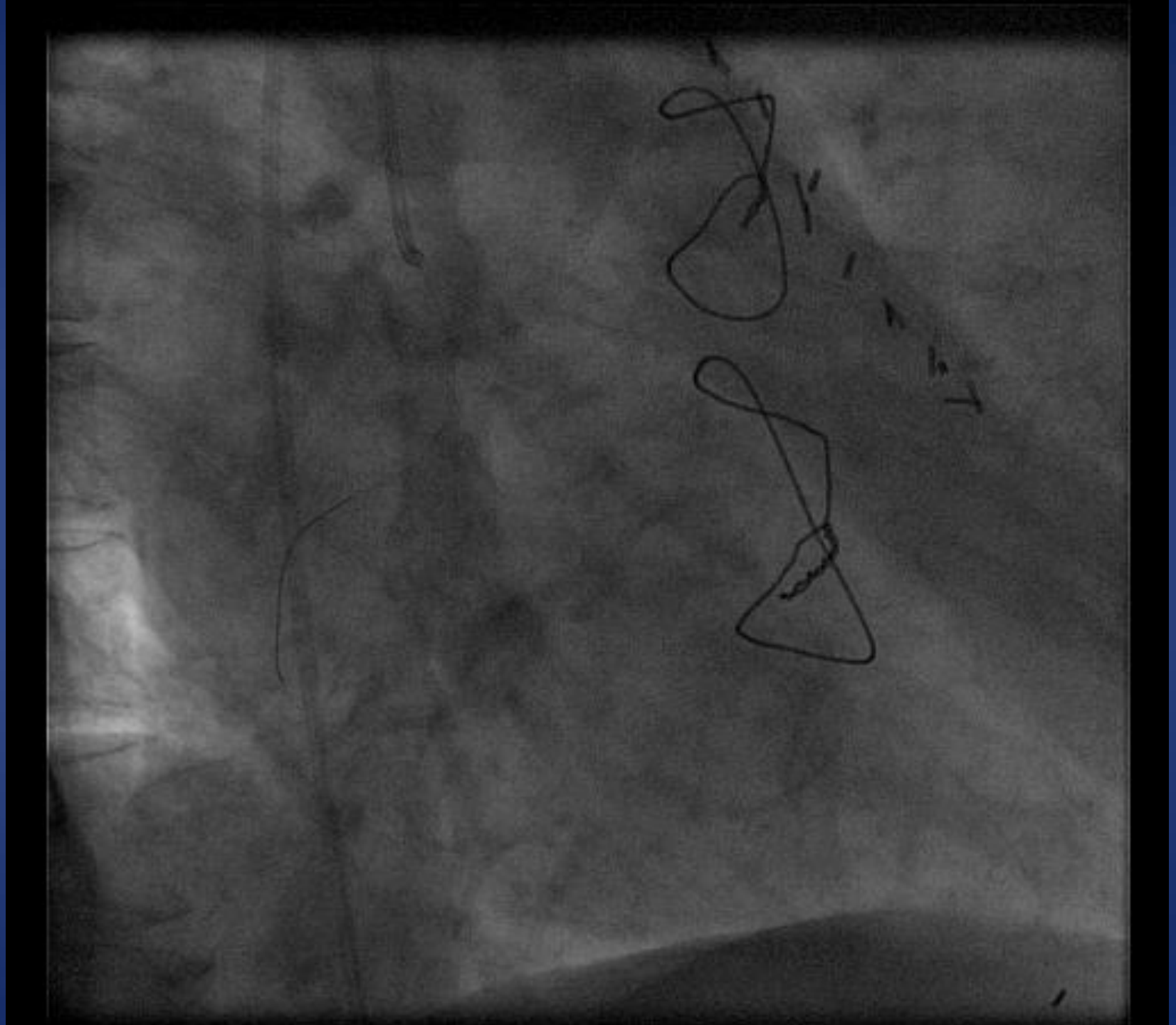




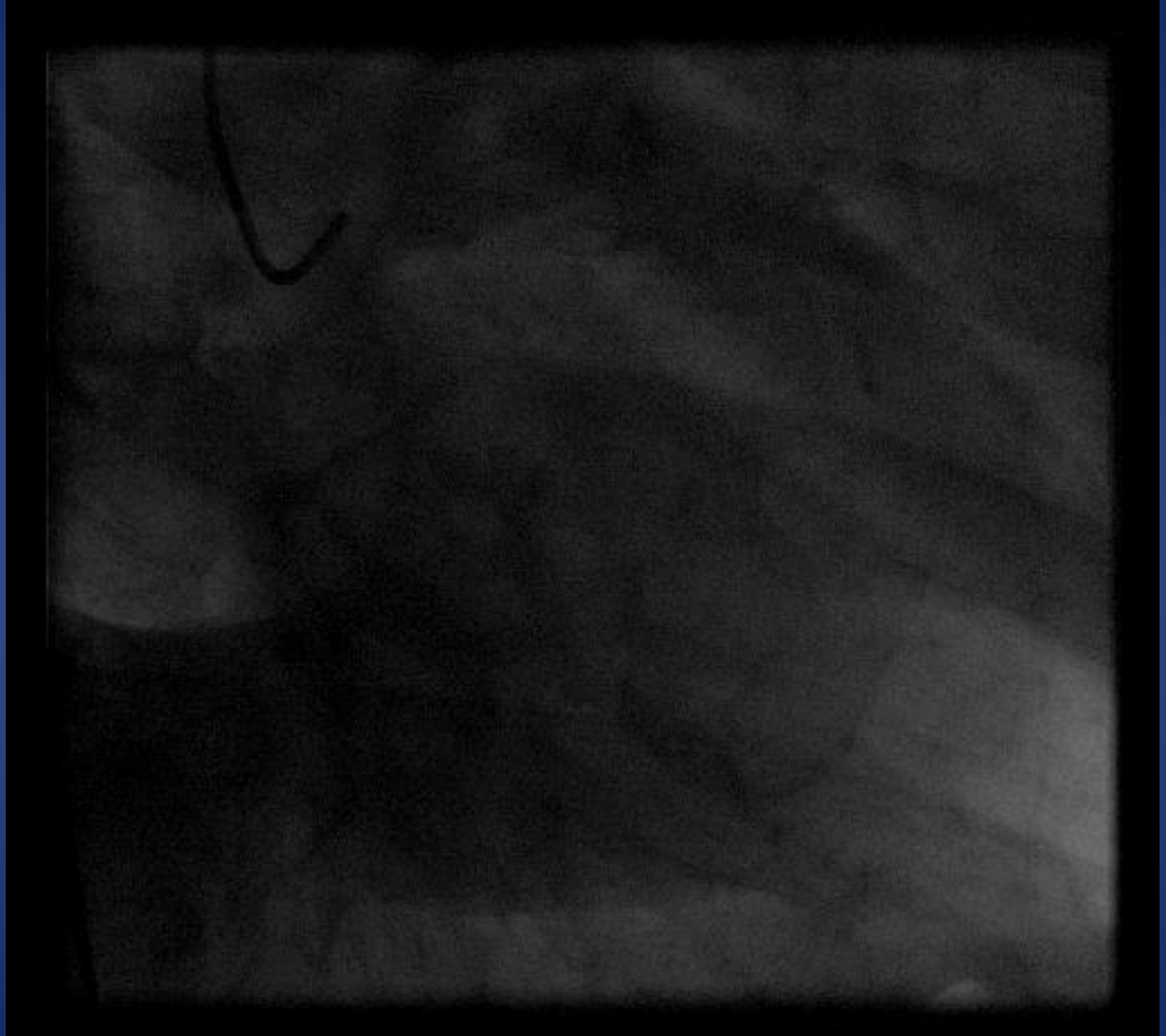
.....and Vein Grafts

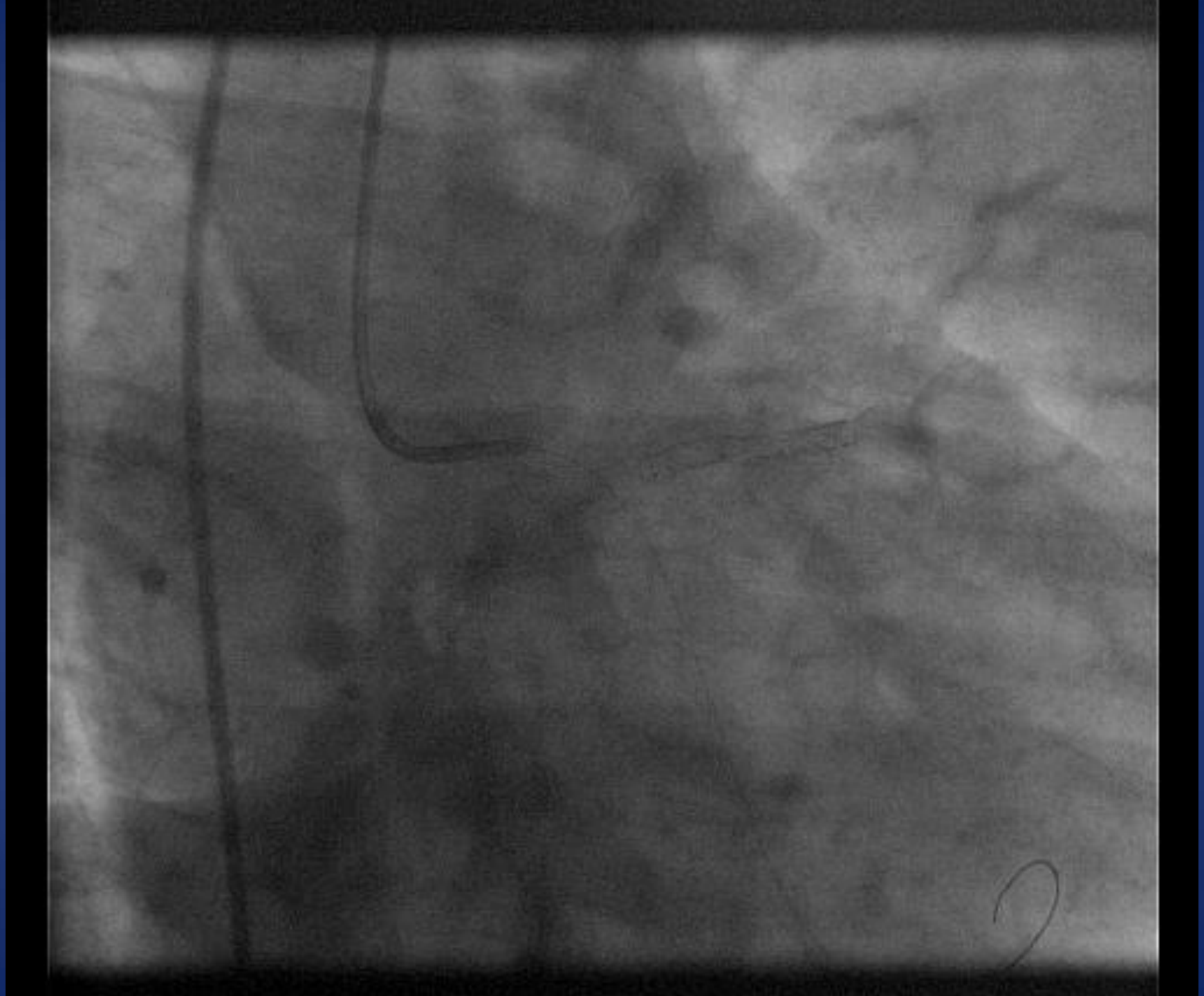


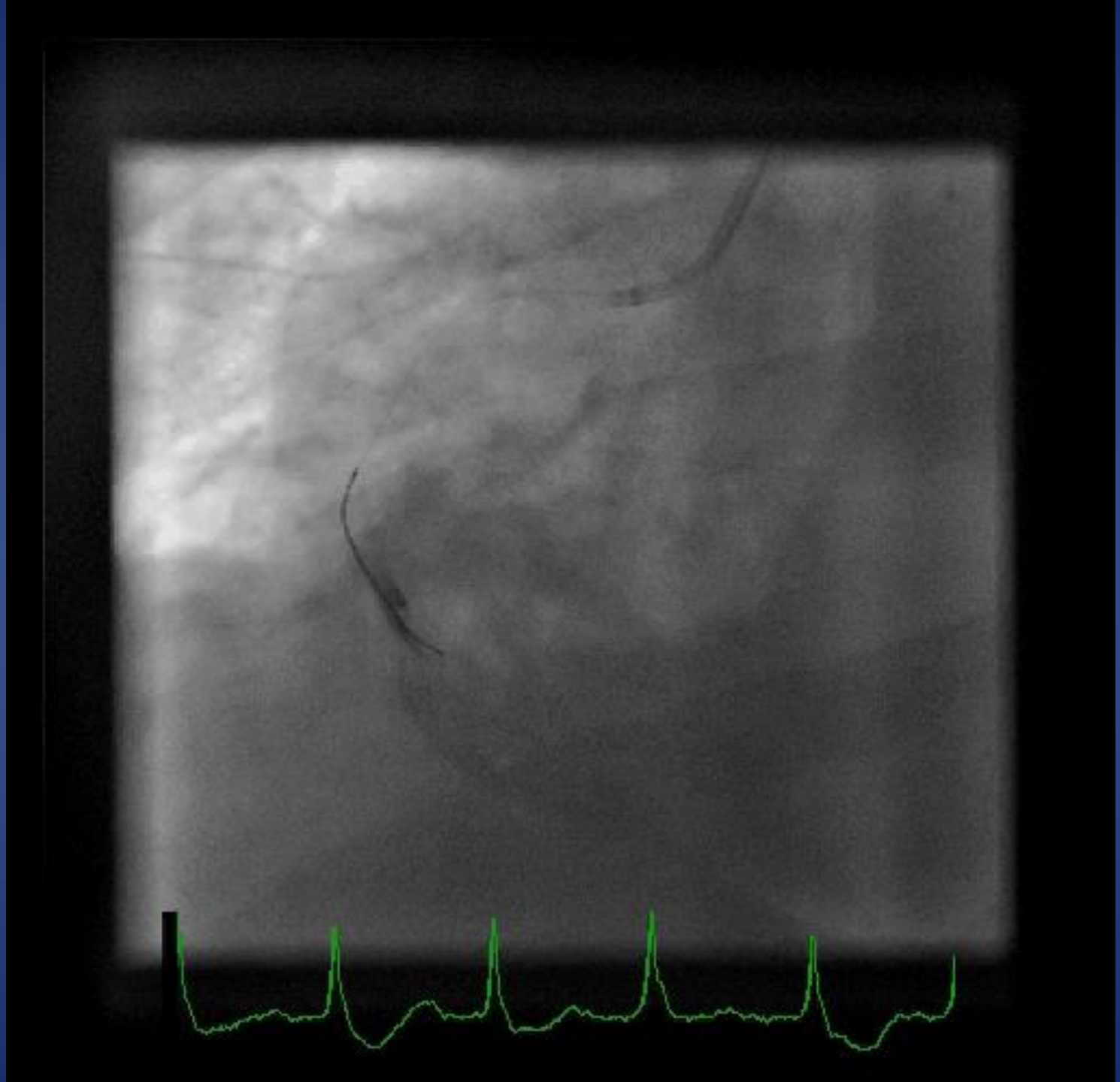


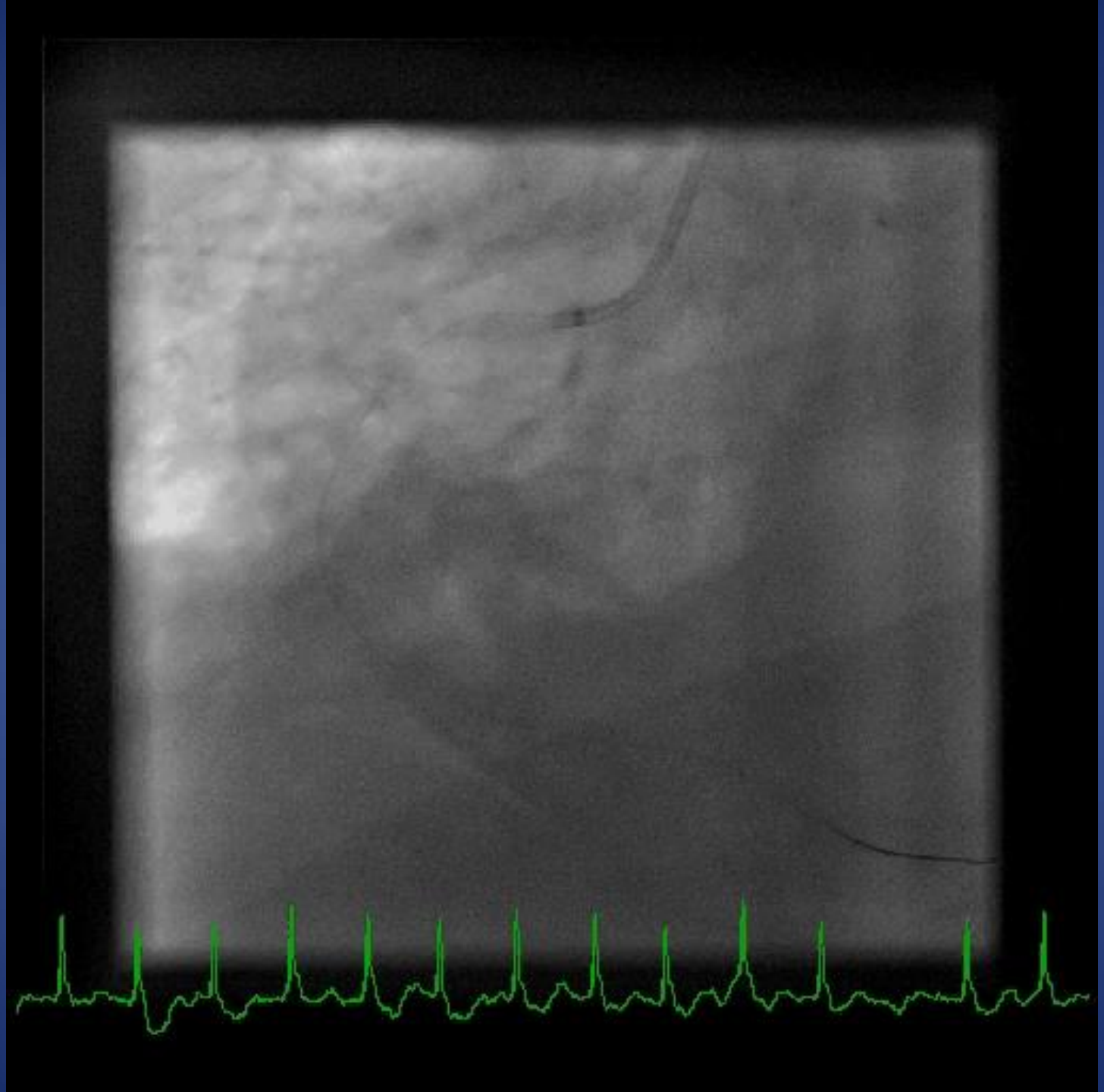


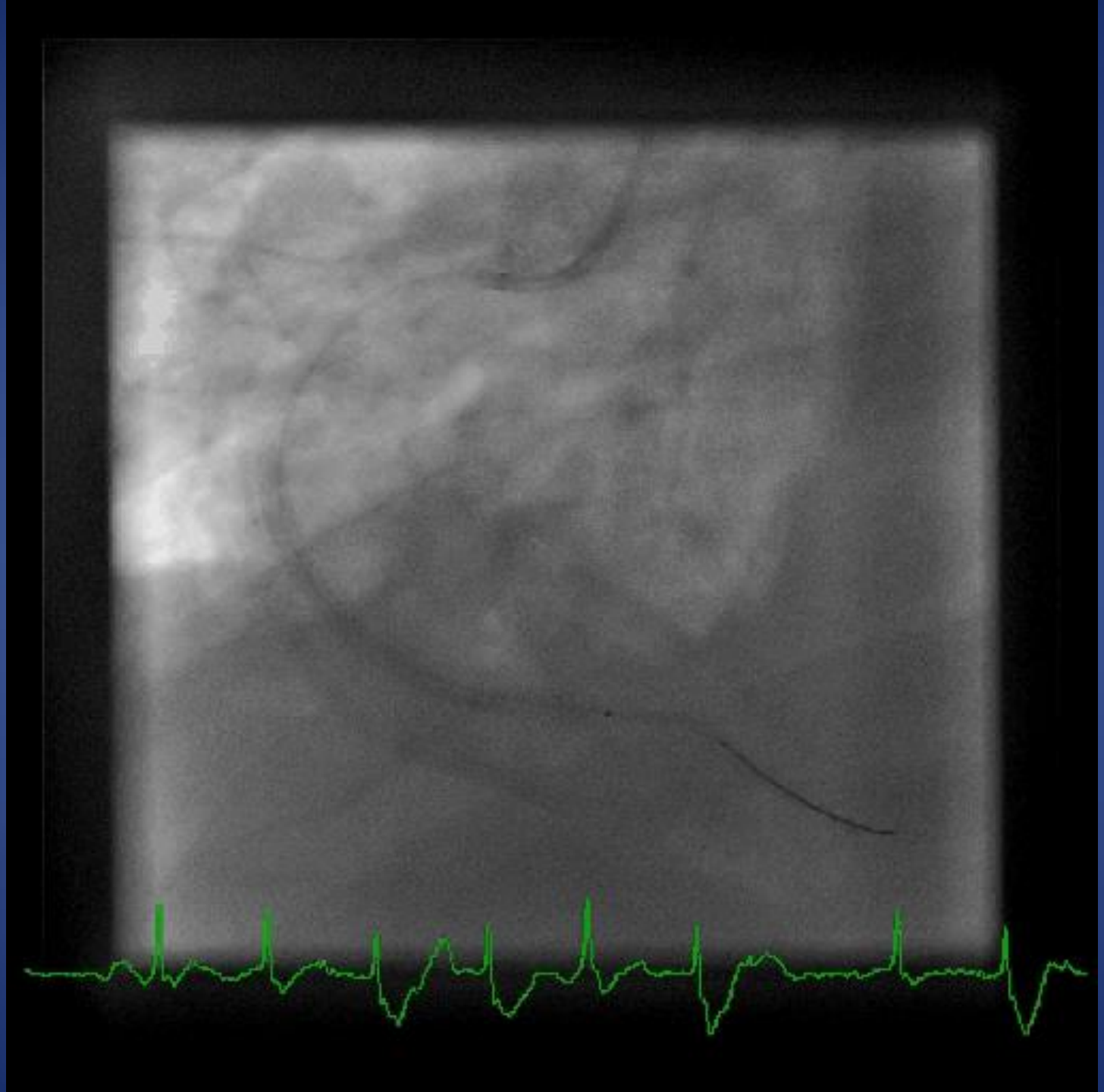
……and more AMI



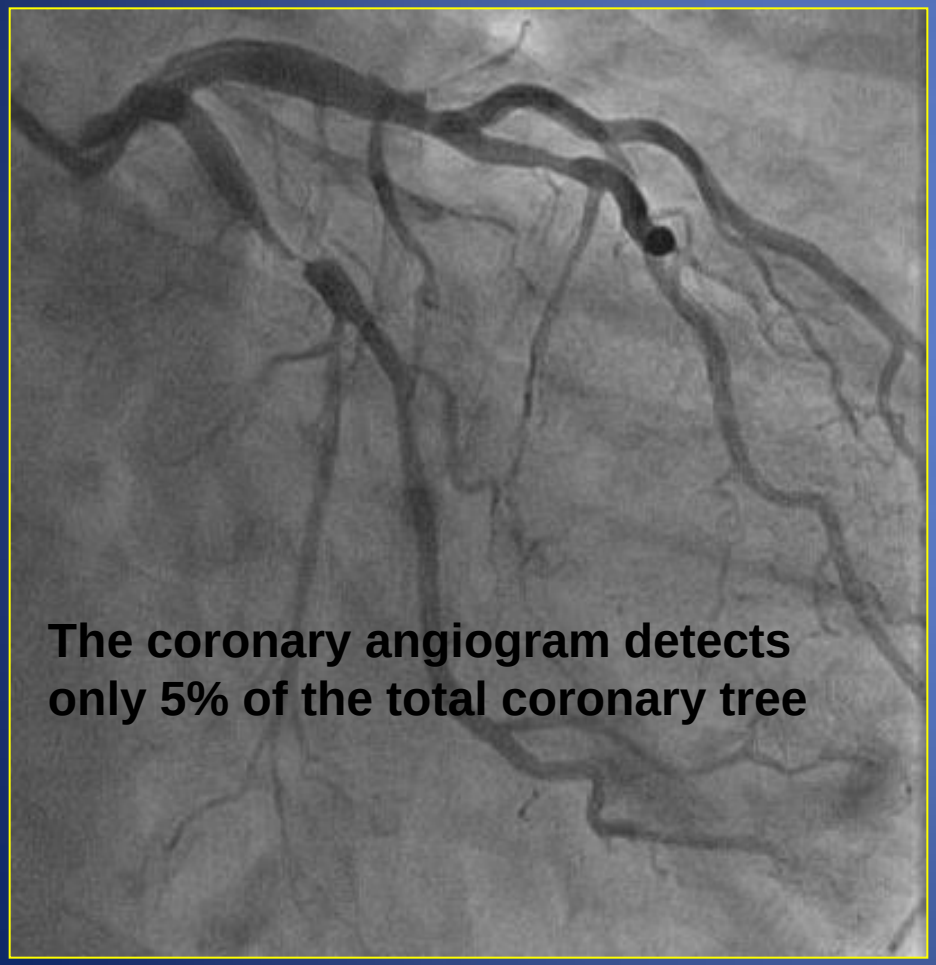








Two Compartment Model of the Coronary Circulation

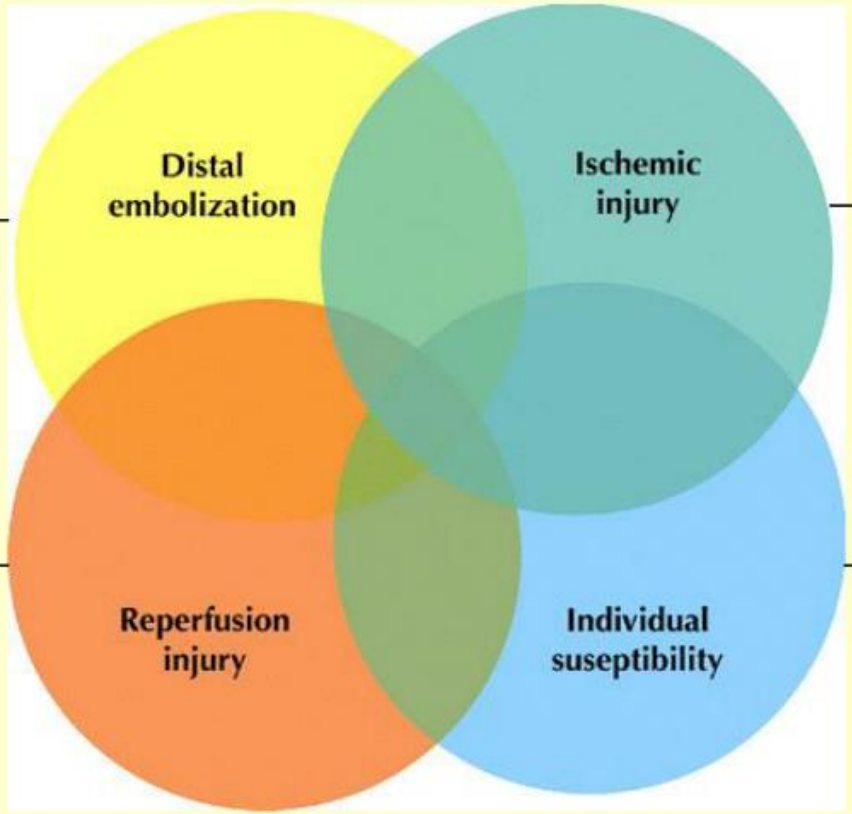


The coronary angiogram detects only 5% of the total coronary tree

No reflow: a multifactorial phenomenon

Rather usual, unavoidable **elective AND PPCI**

Variable, **PPCI for AMI**

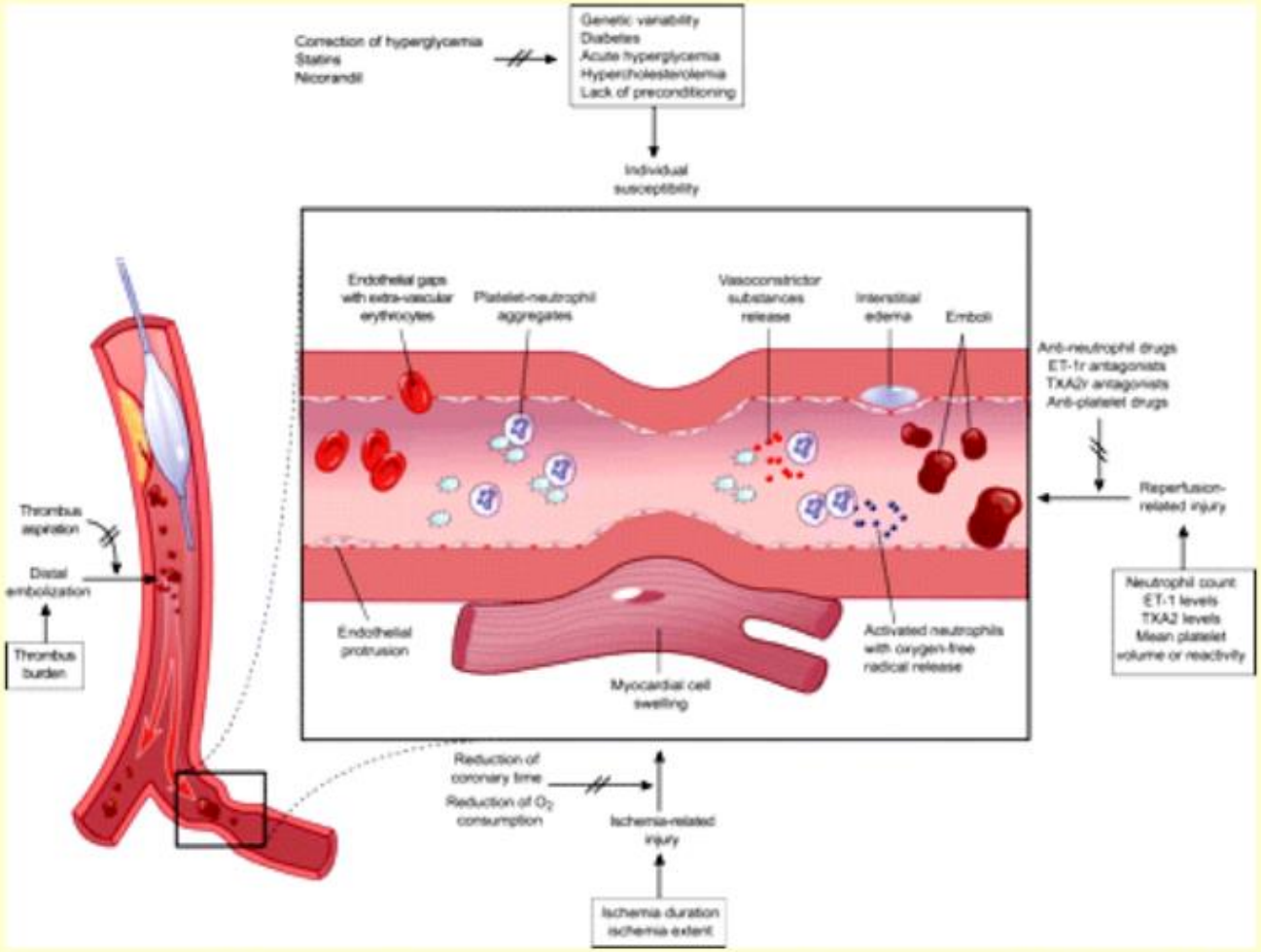


AMI / ACS

The unpredicta

Niccoli et al, JACC 2009; 54:2

Mechanisms of no reflow



Proximal plaque disruption and thrombus mobilization leads
stal embolization with multiple cell-cell and cell-wall interactions
obstruction at the microvascular level

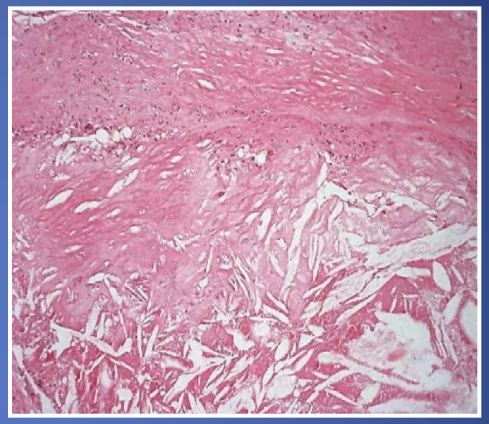
Niccoli et al, JACC 200

Morphology

Limited human data :

✓Soft plaque :

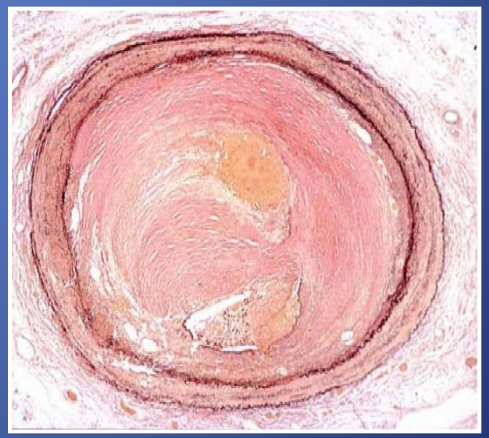
- −lipid-laden cells
- −foam cells
- −loose fibrous tissue.



✓Hard plaque :

- − dense fribrocalcific tissue and collagen.

(Predominant in old lesions)

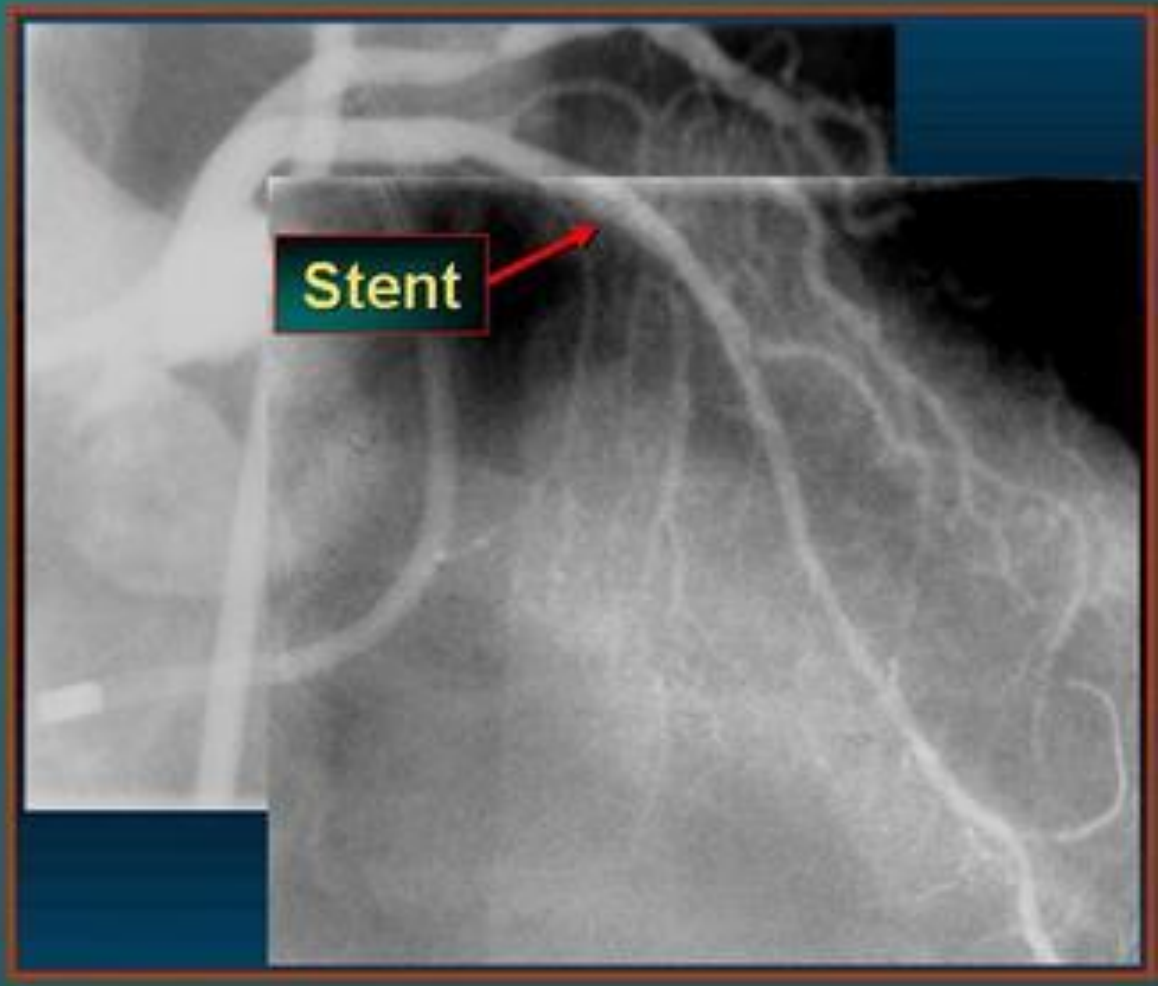


Srivasta et al. JACC 1997;29:955-963

Evaluating Myocardial Perfusion

TIMI-3 flow after primary stenting of an occluded PLAD

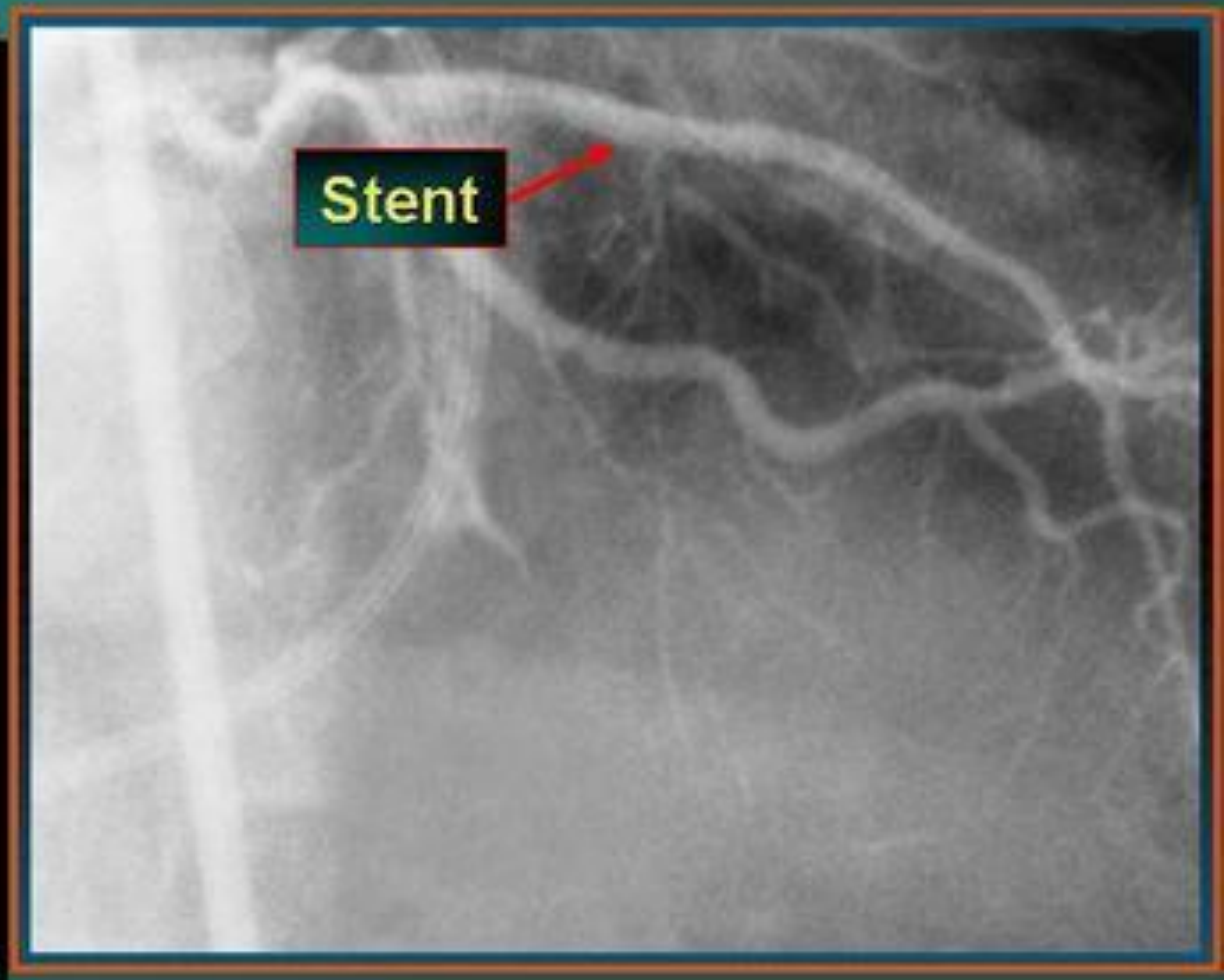
Normal Myocardial blush



Evaluating Myocardial Perfusion

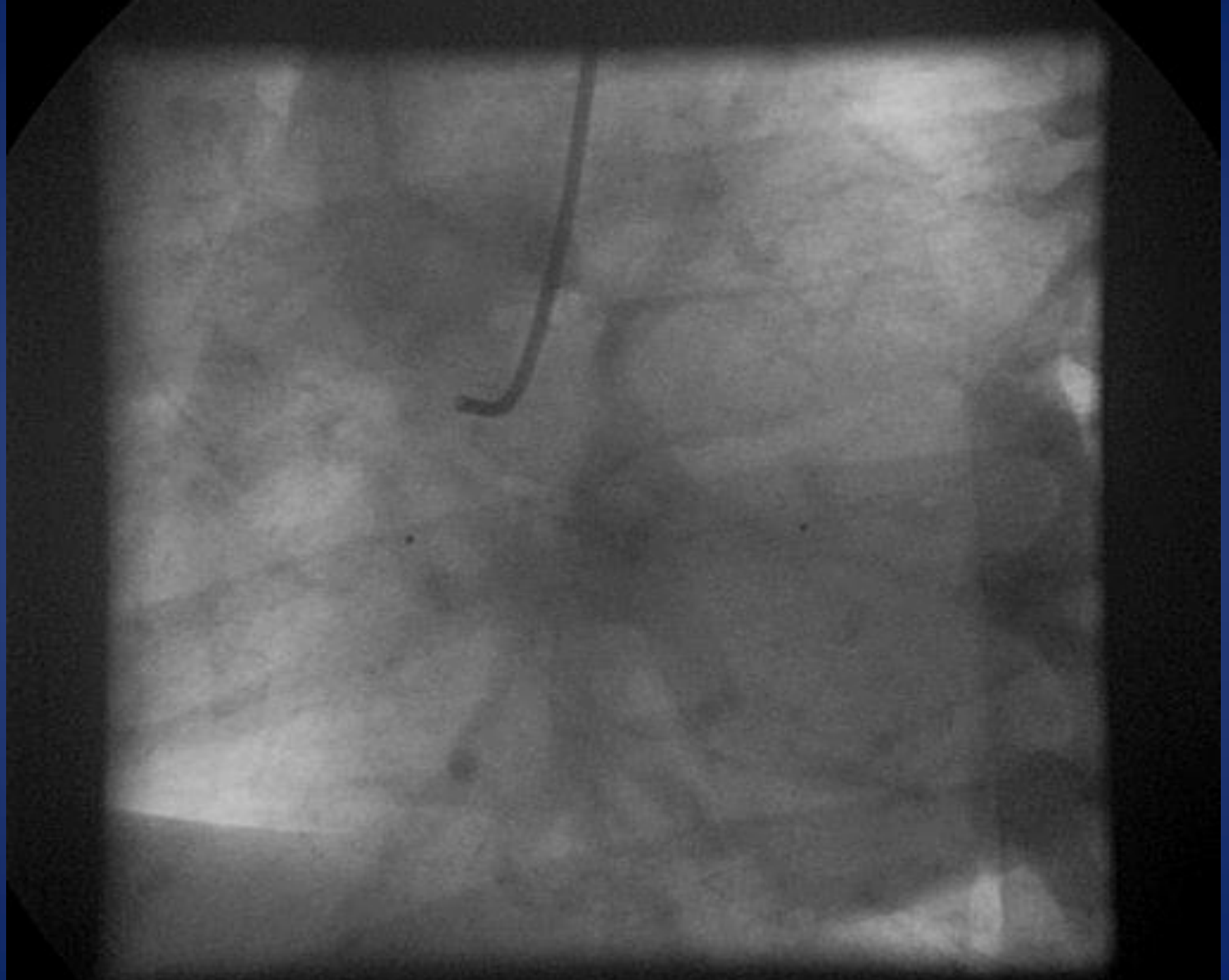
TIMI-3 flow after primary stenting of an occluded PLAD

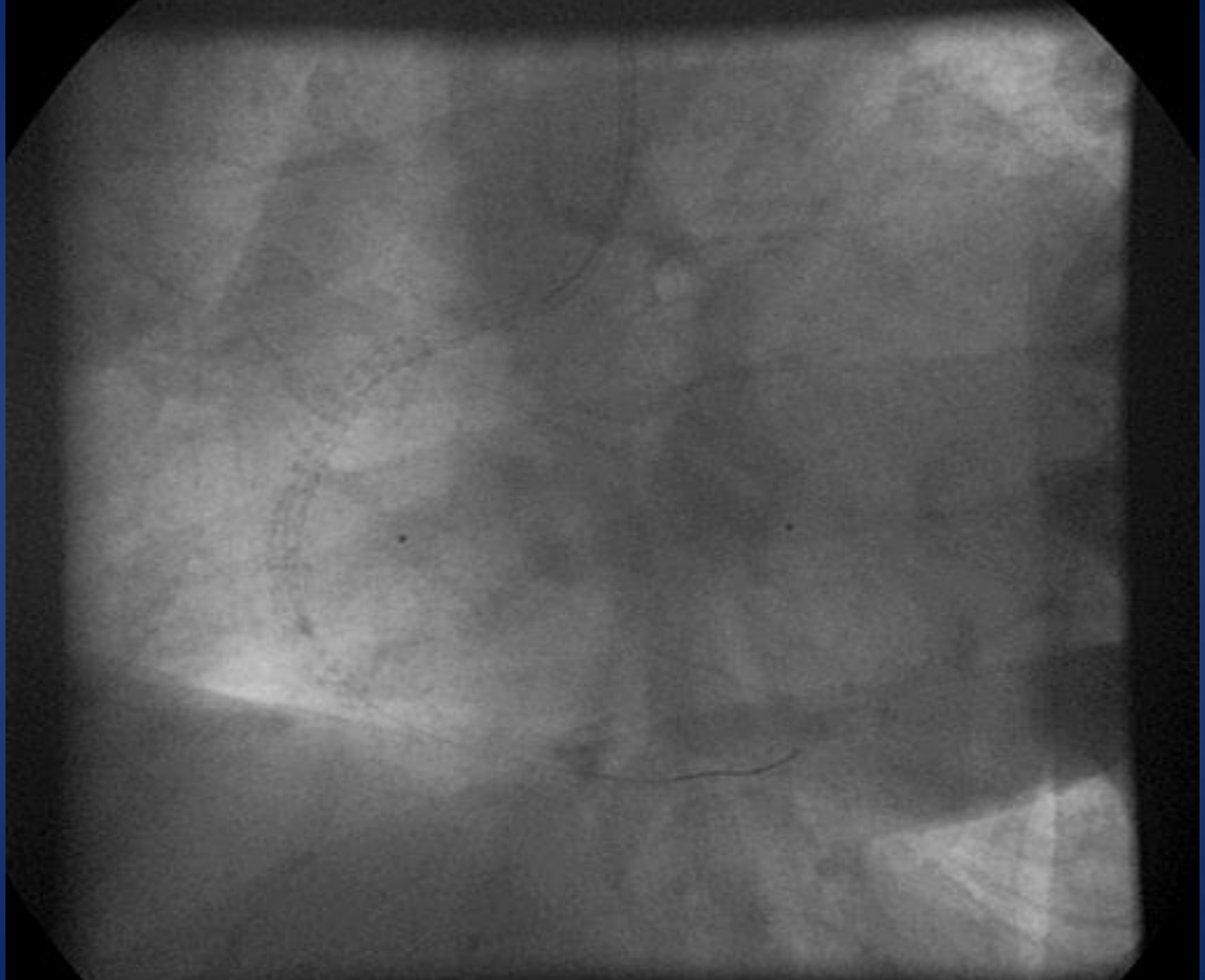
Absent Myocardial blush



Slow Flow

Don’t Forget AIR !!!!





CLASSIFICATION

(Ellis et al. Circulation 1994; 90 : 2725-30)

Type I : Extraluminal crater without extravasation.

Type II : Pericardial or myocardial blush without contrast jet extravasation.

Type III : Extravasation through franc (>1 mm) perforation.

Type IV : Spilling into anatomic cavity chamber o cardiac vein.

Coronary Perforations

Classification

Type I

Limited to the media or adventitial layer of the vessel wall, producing a focal ulcerated crater and or mushroom appearance angiographically.

Type II

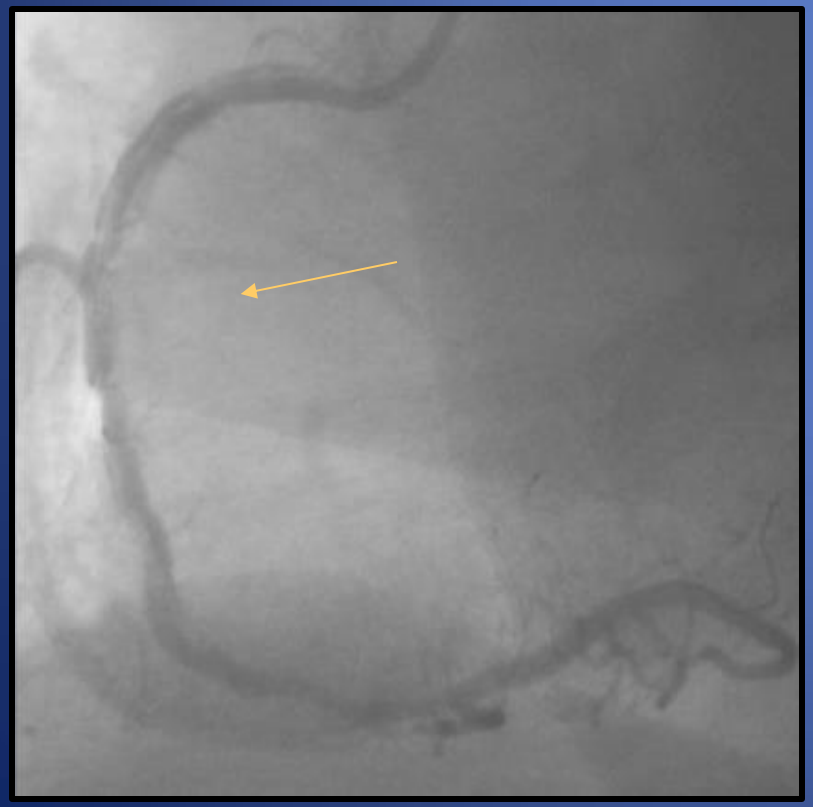
Limited extravasation producing patchy blushing or staining within the myocardium or pericardium

Ellis SG, et al.. *Circulation*1994;90:2725–2730.

Coronary Perforations

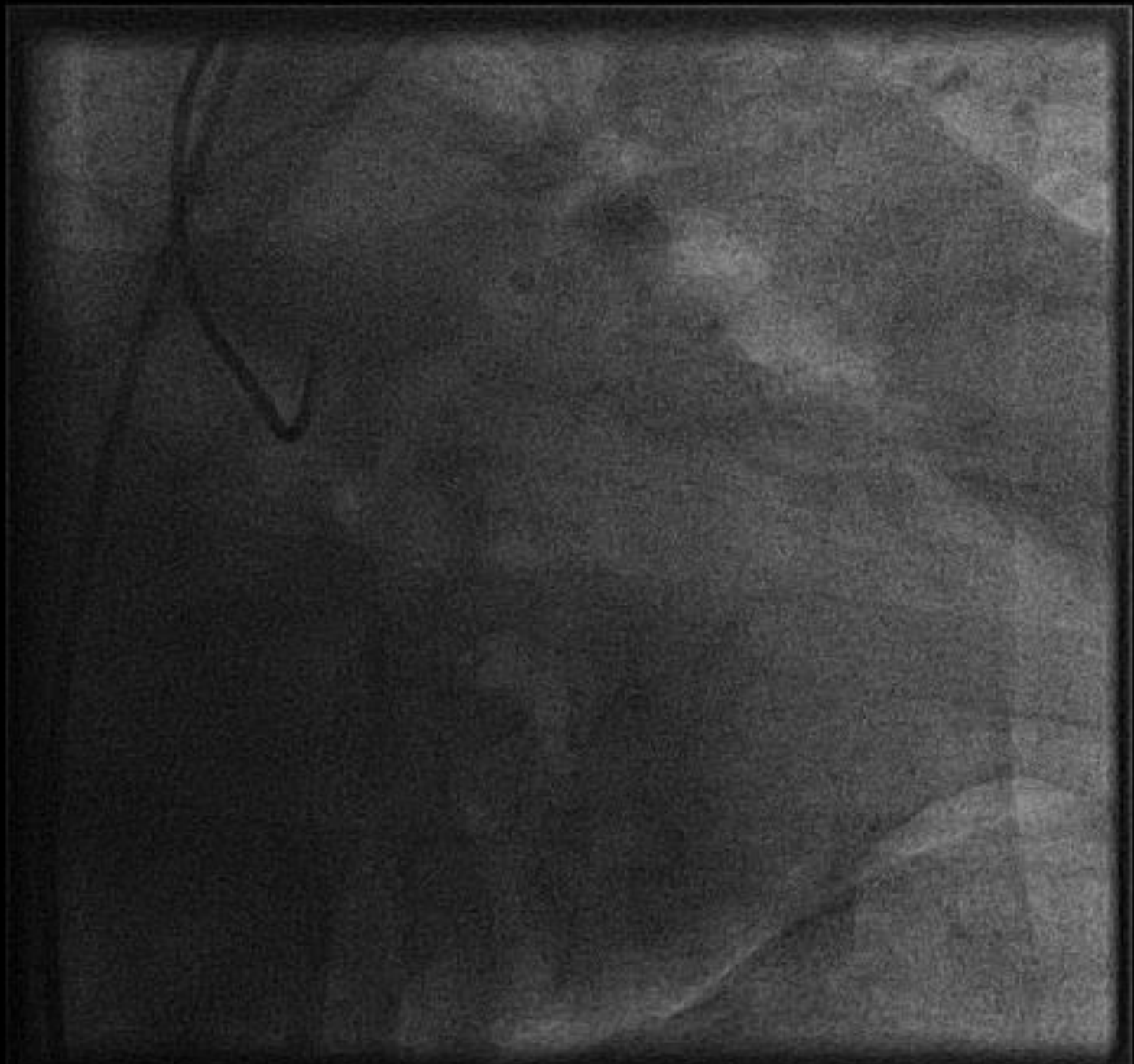
Type II

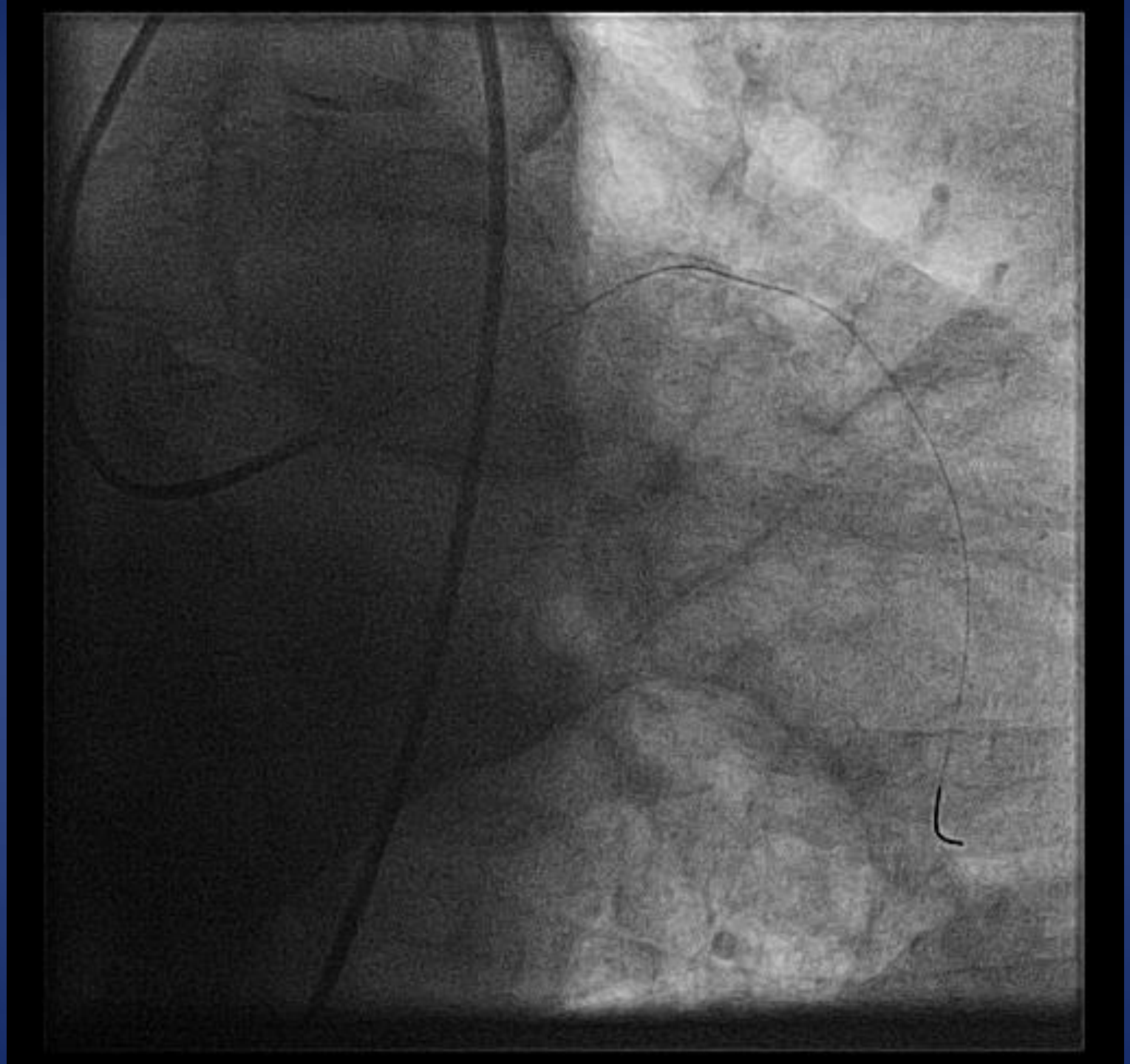
Limited extravasation producing patchy blushing or staining within the myocardium or pericardium

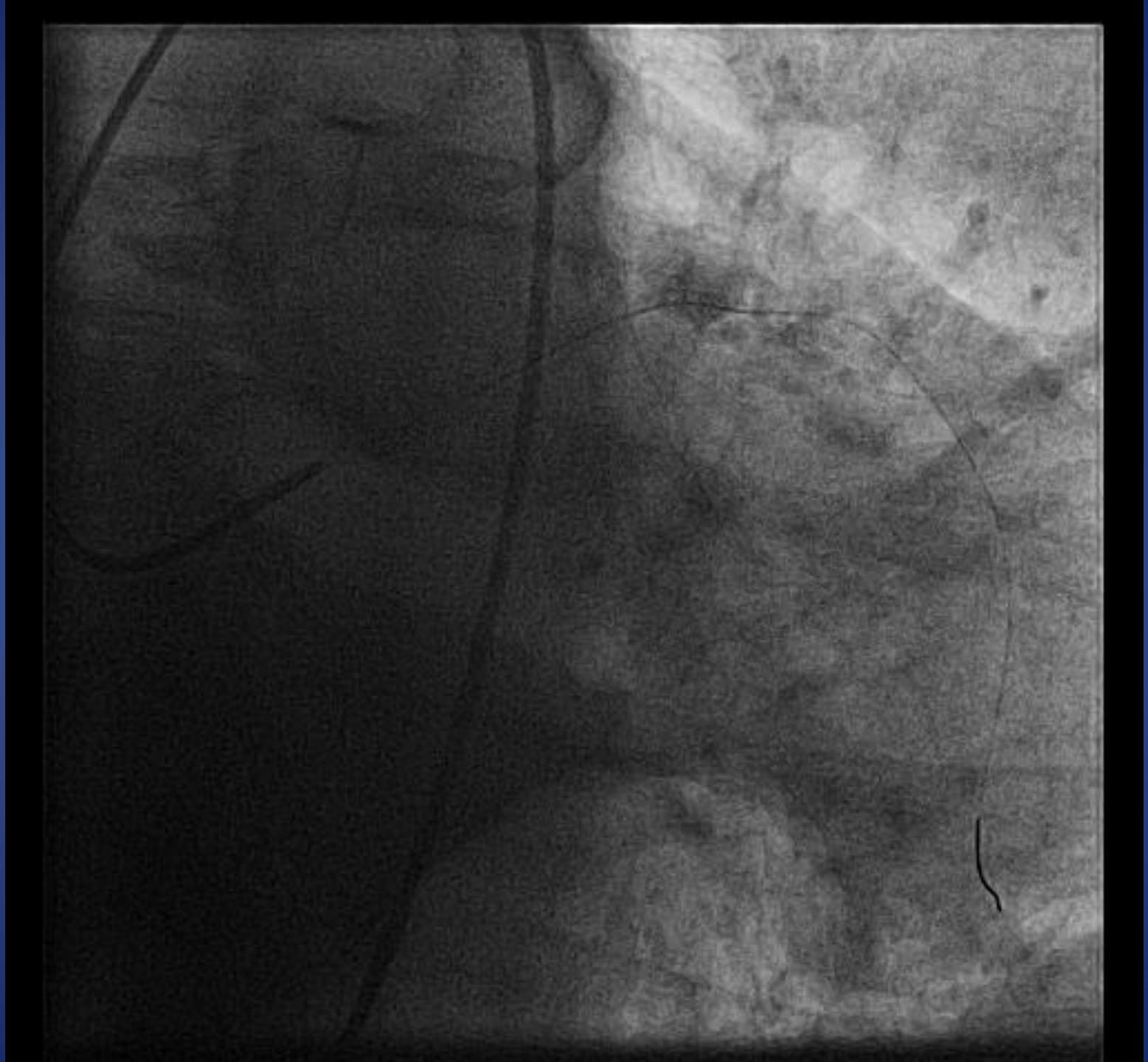


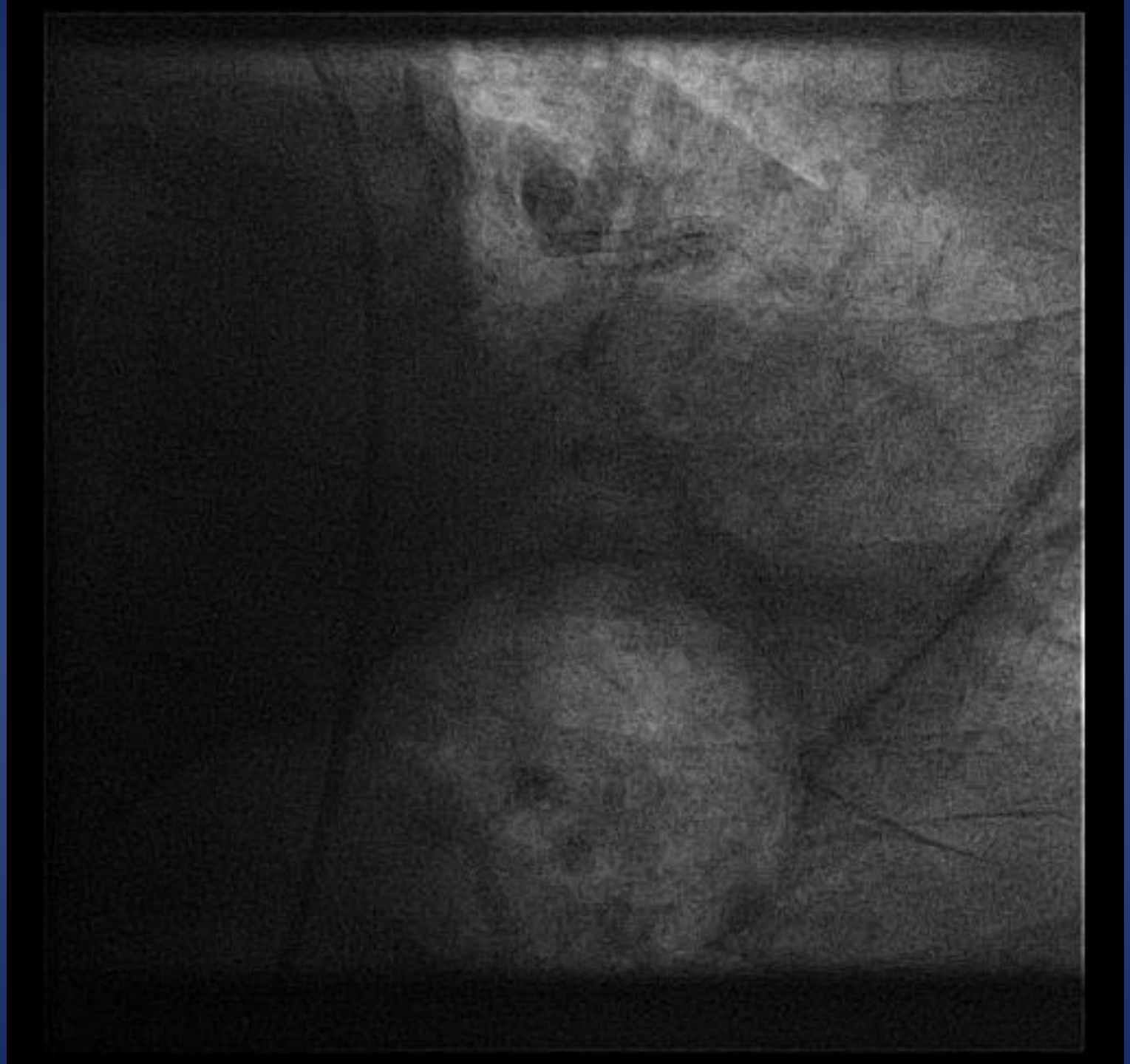
Coronary Perforation
(know when to quit)

- Mr T M 65
- BP Cholesterol Smoker
- STEMI 4.00 am









CLASSIFICATION

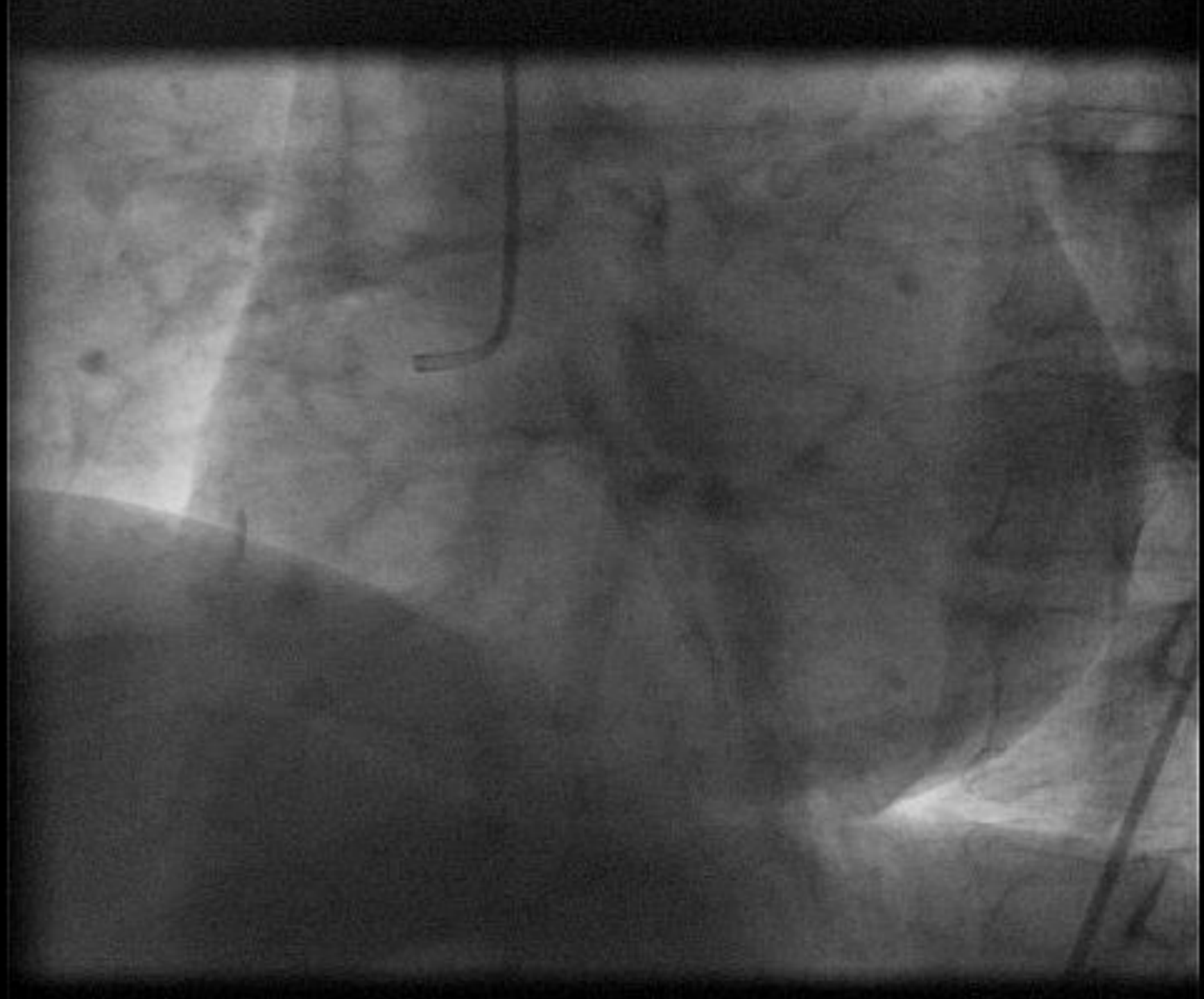
(Ellis et al. Circulation 1994; 90 : 2725-30)

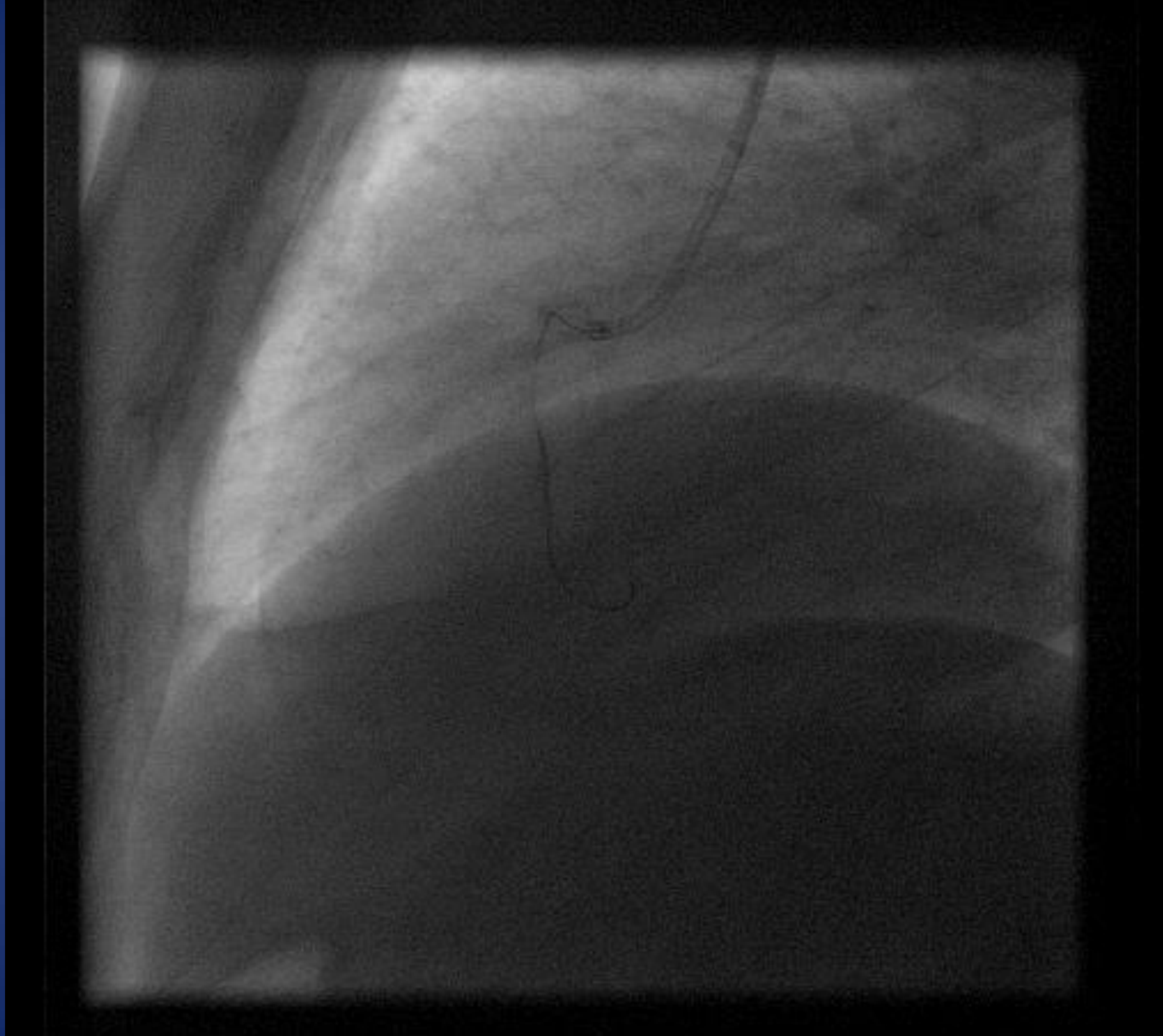
Type I : Extraluminal crater without extravasation.

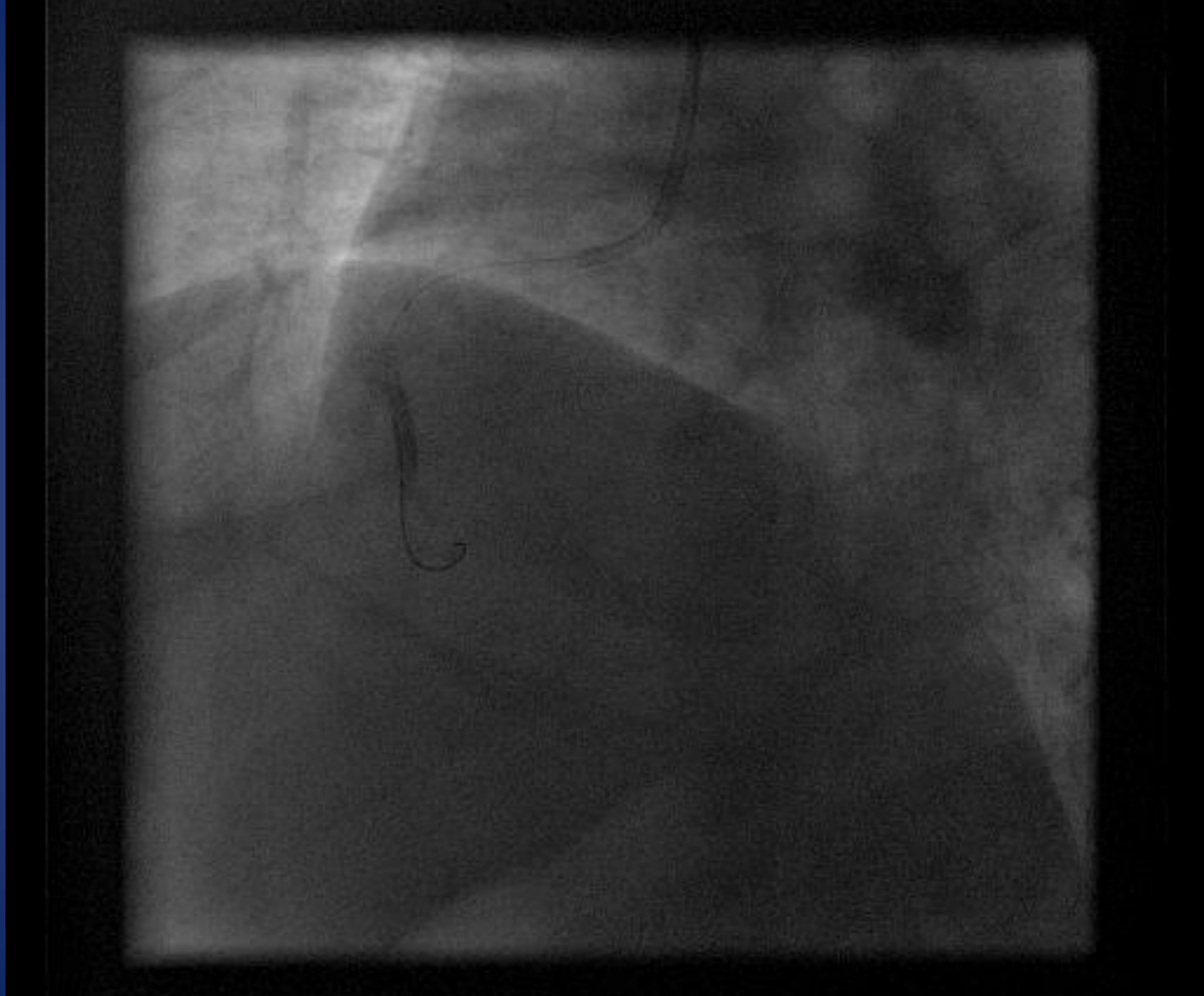
Type II : Pericardial or myocardial blush without contrast jet extravasation.

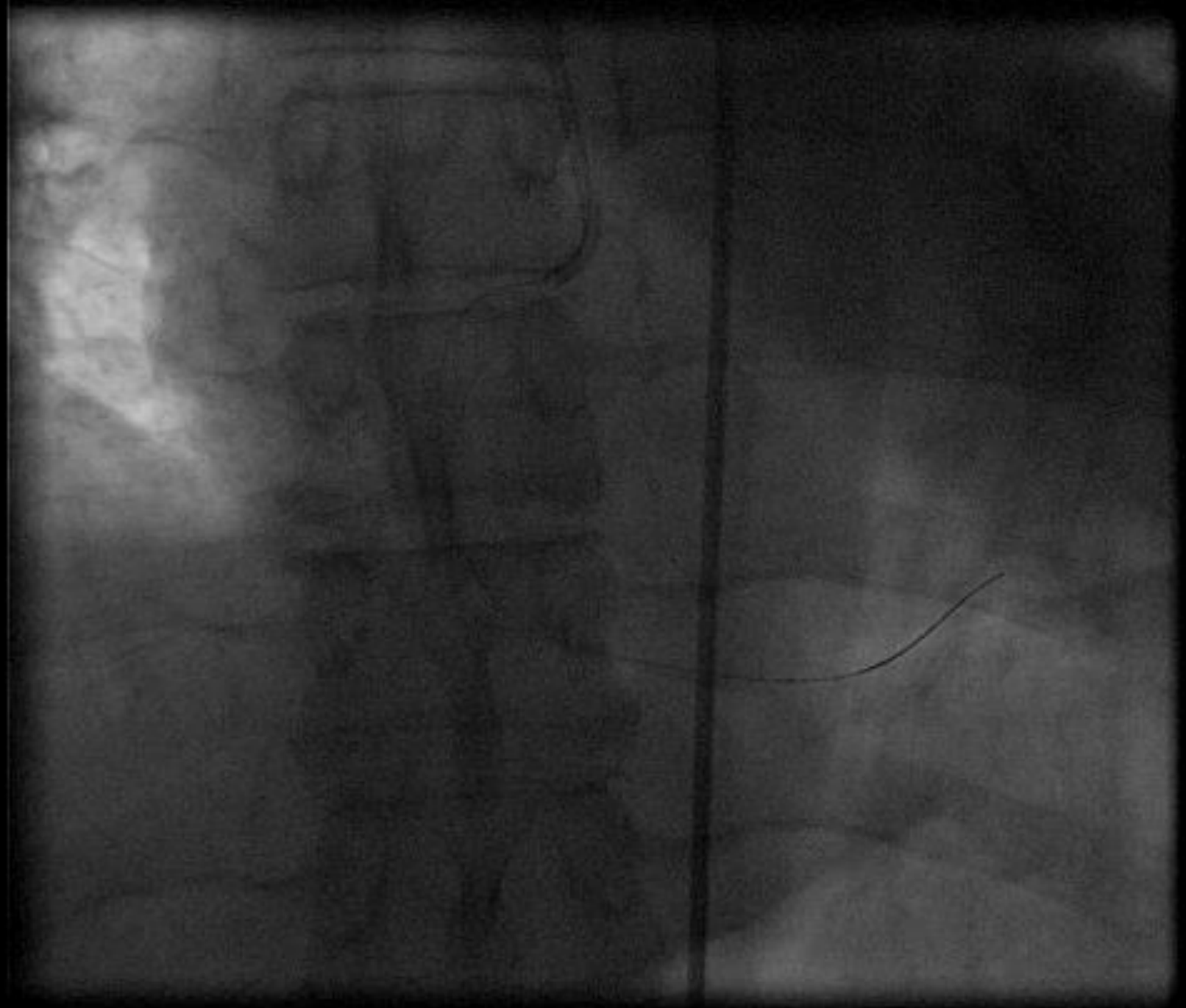
Type III : Extravasation through franc (>1 mm) perforation.

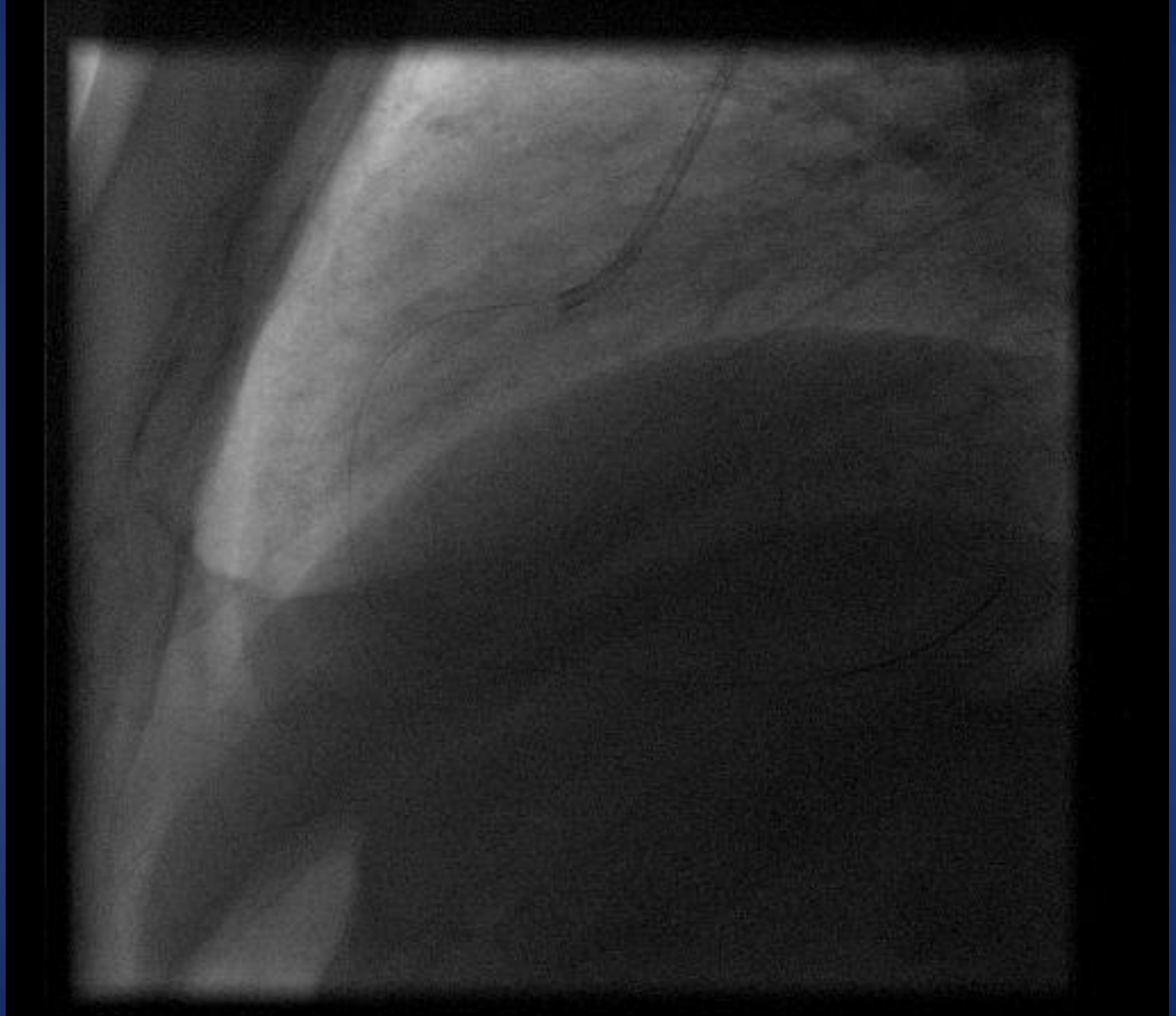
Type IV : Spilling into anatomic cavity chamber o cardiac vein.

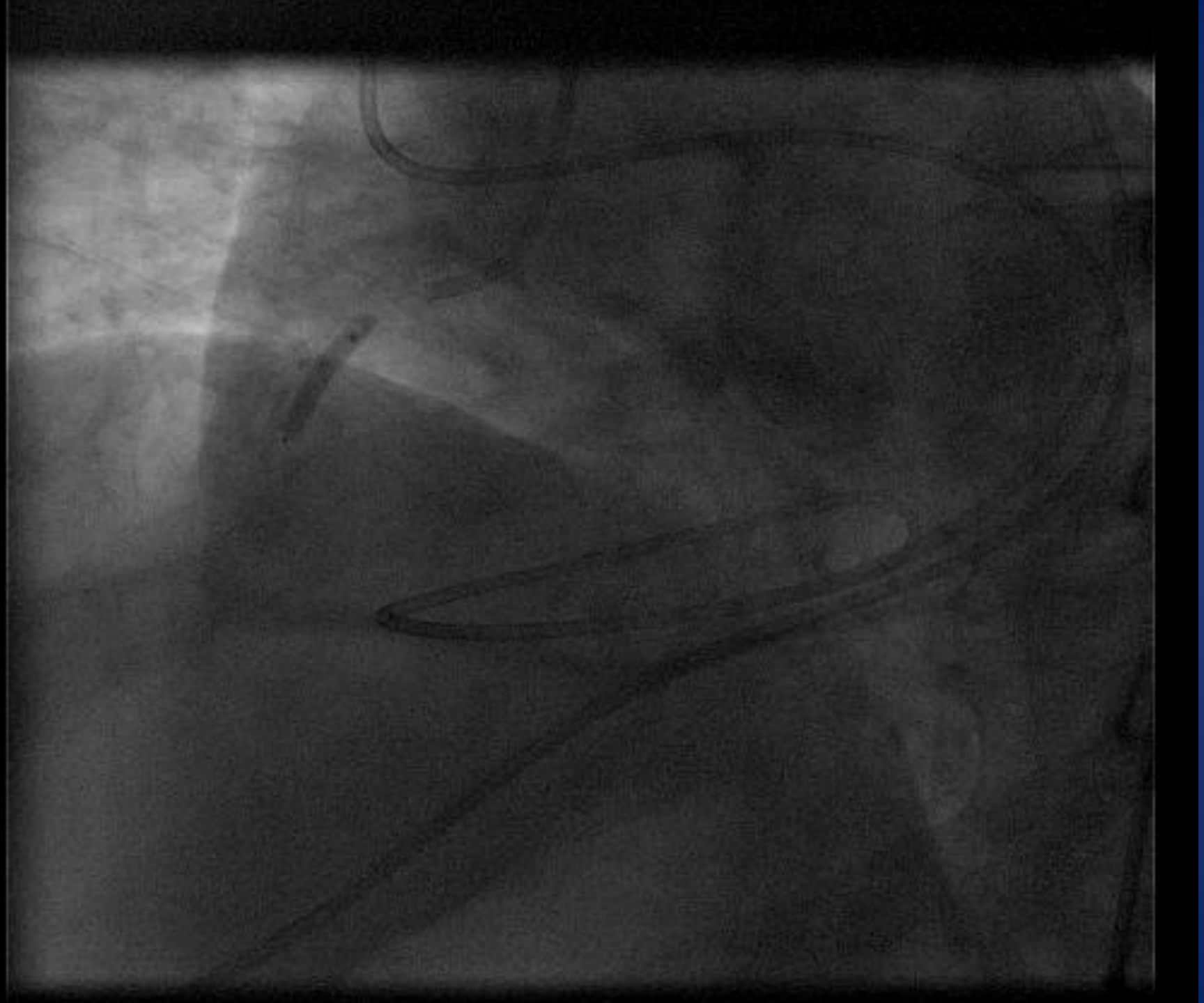


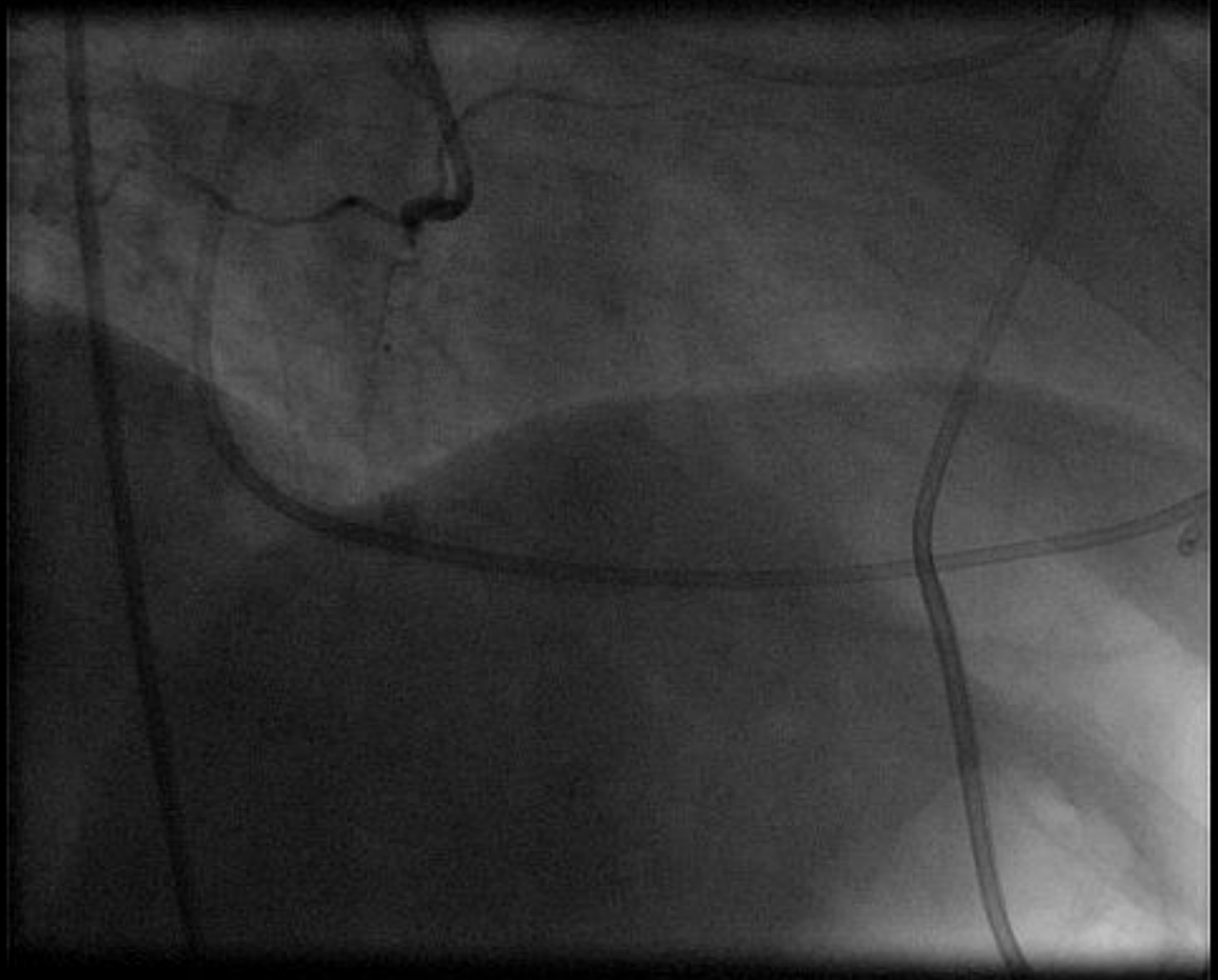


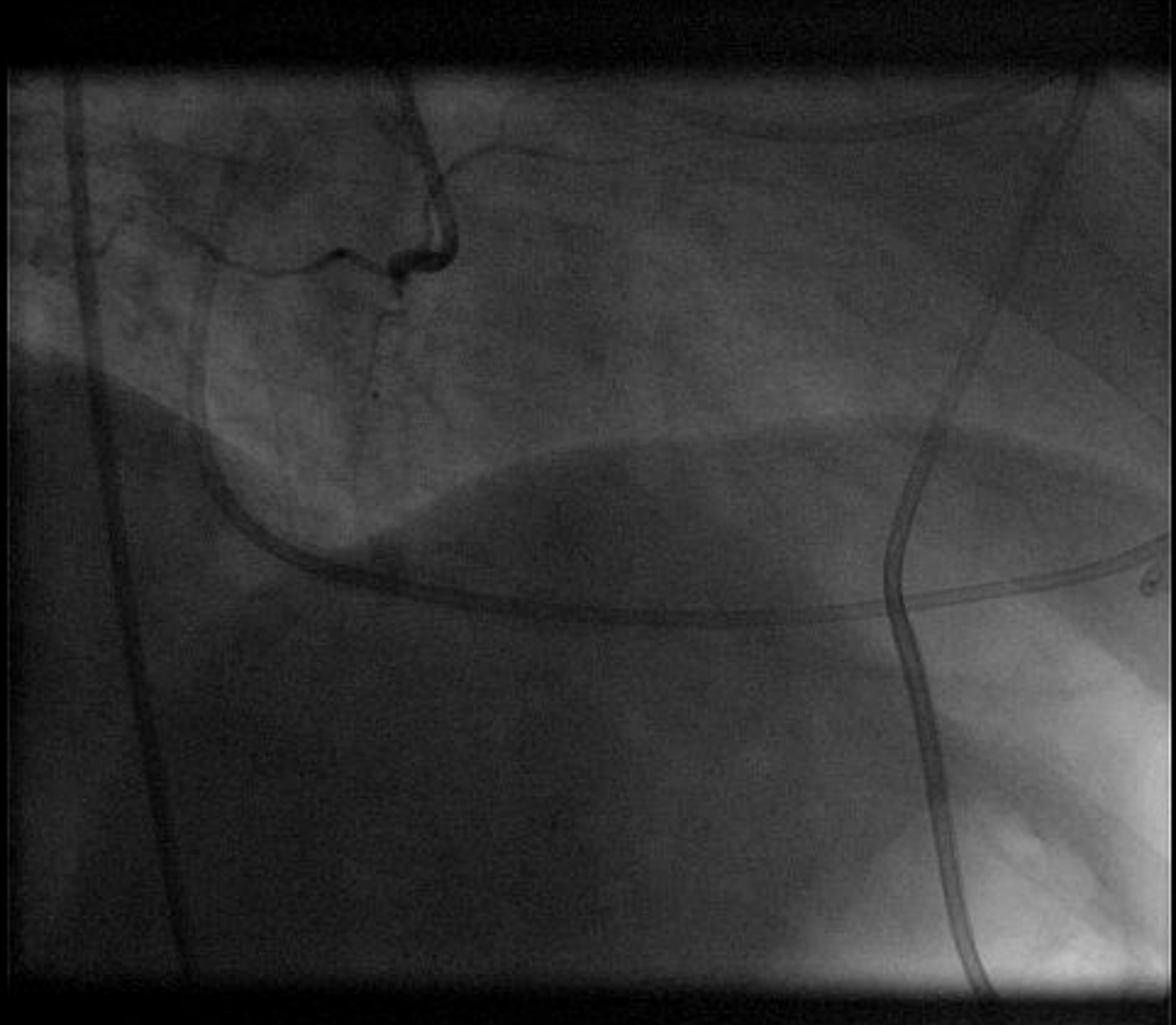


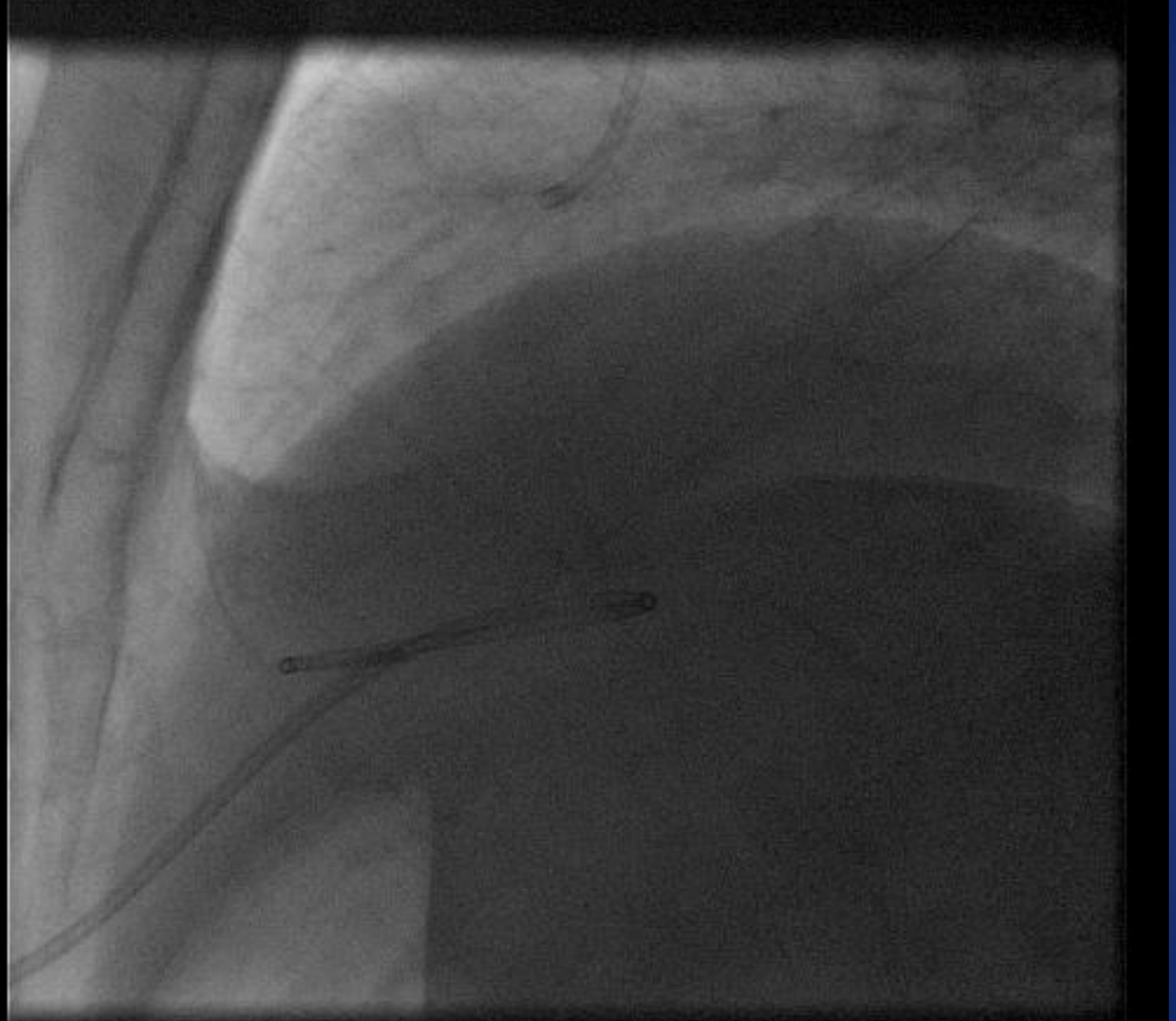


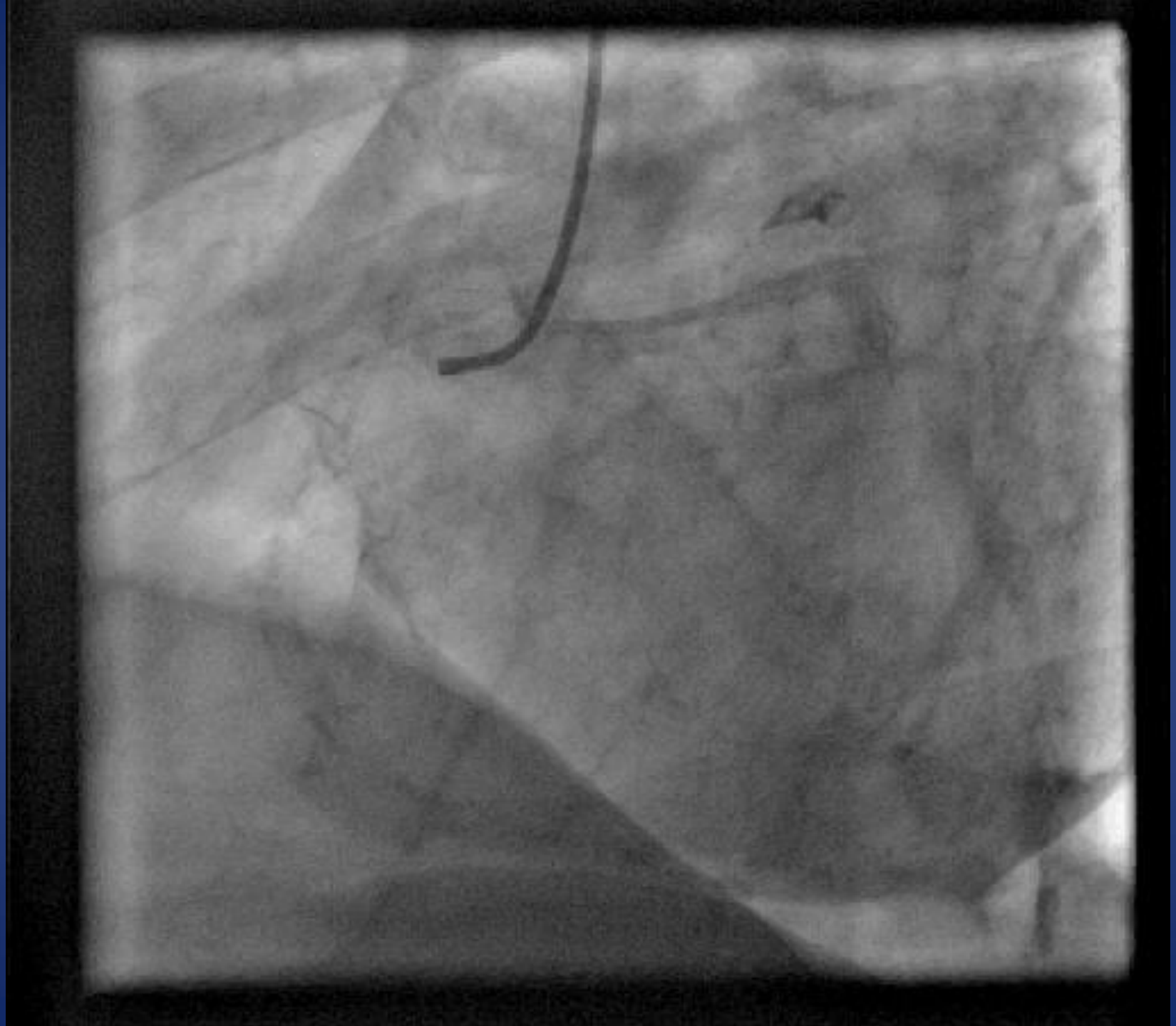


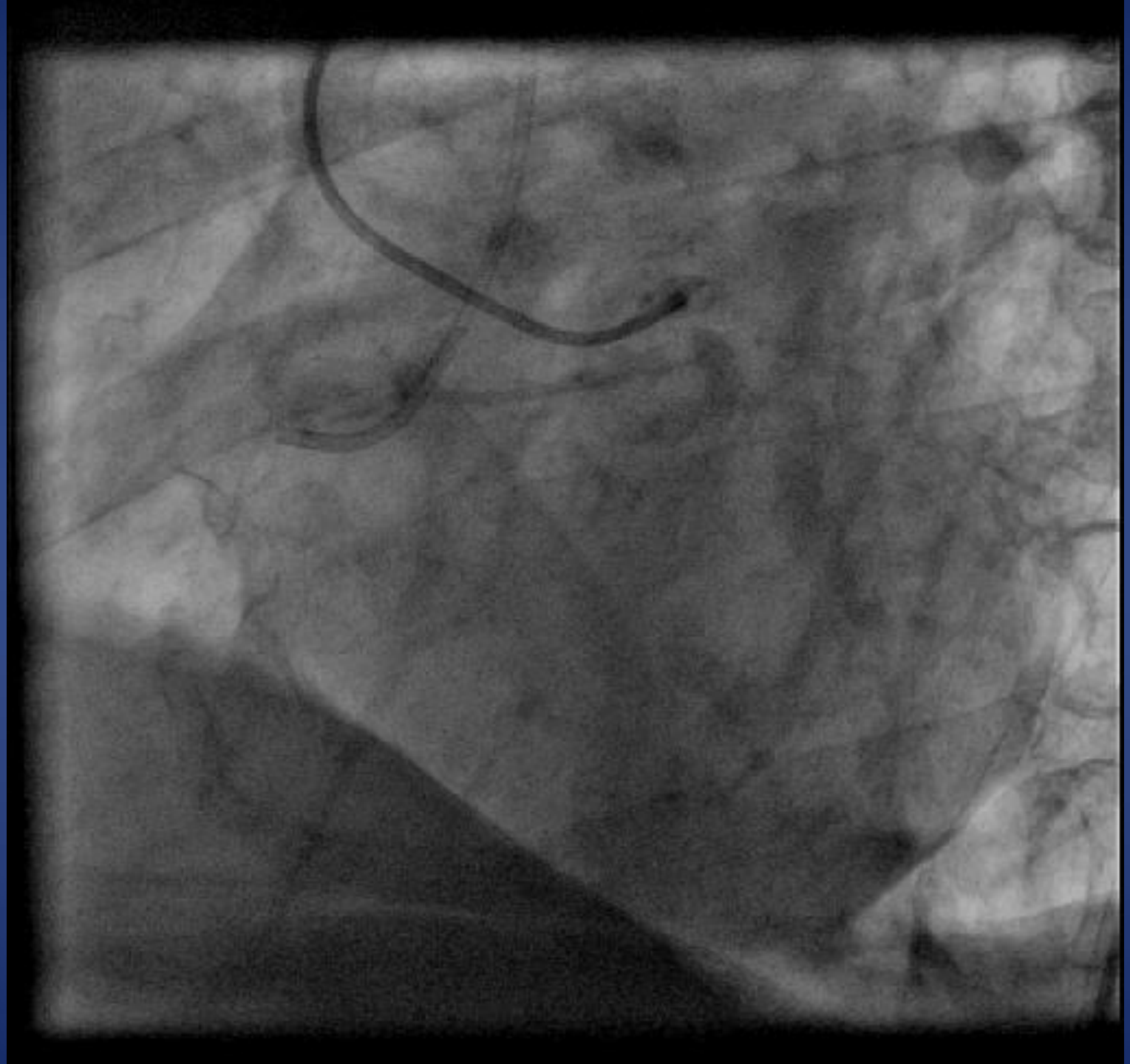


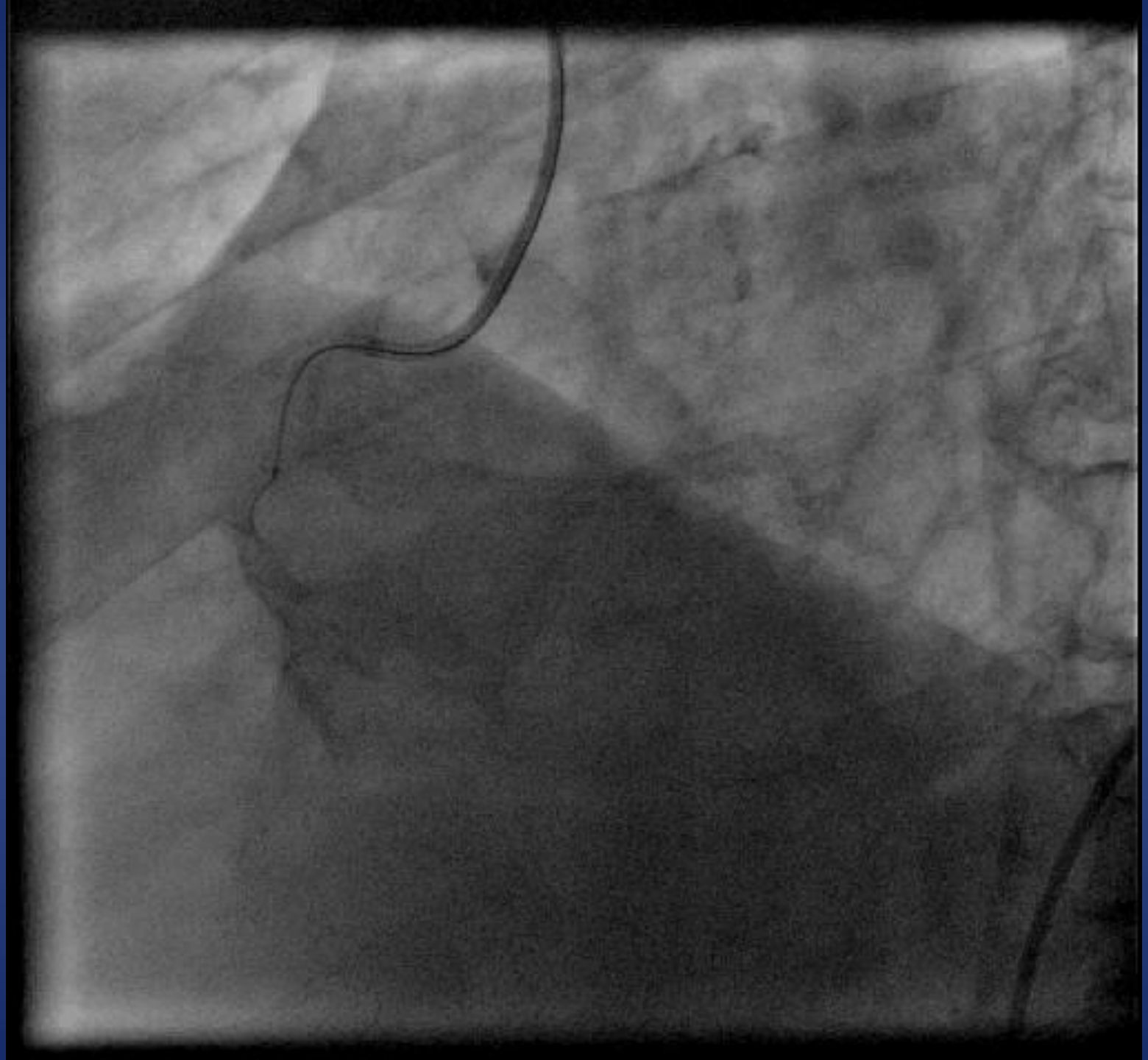


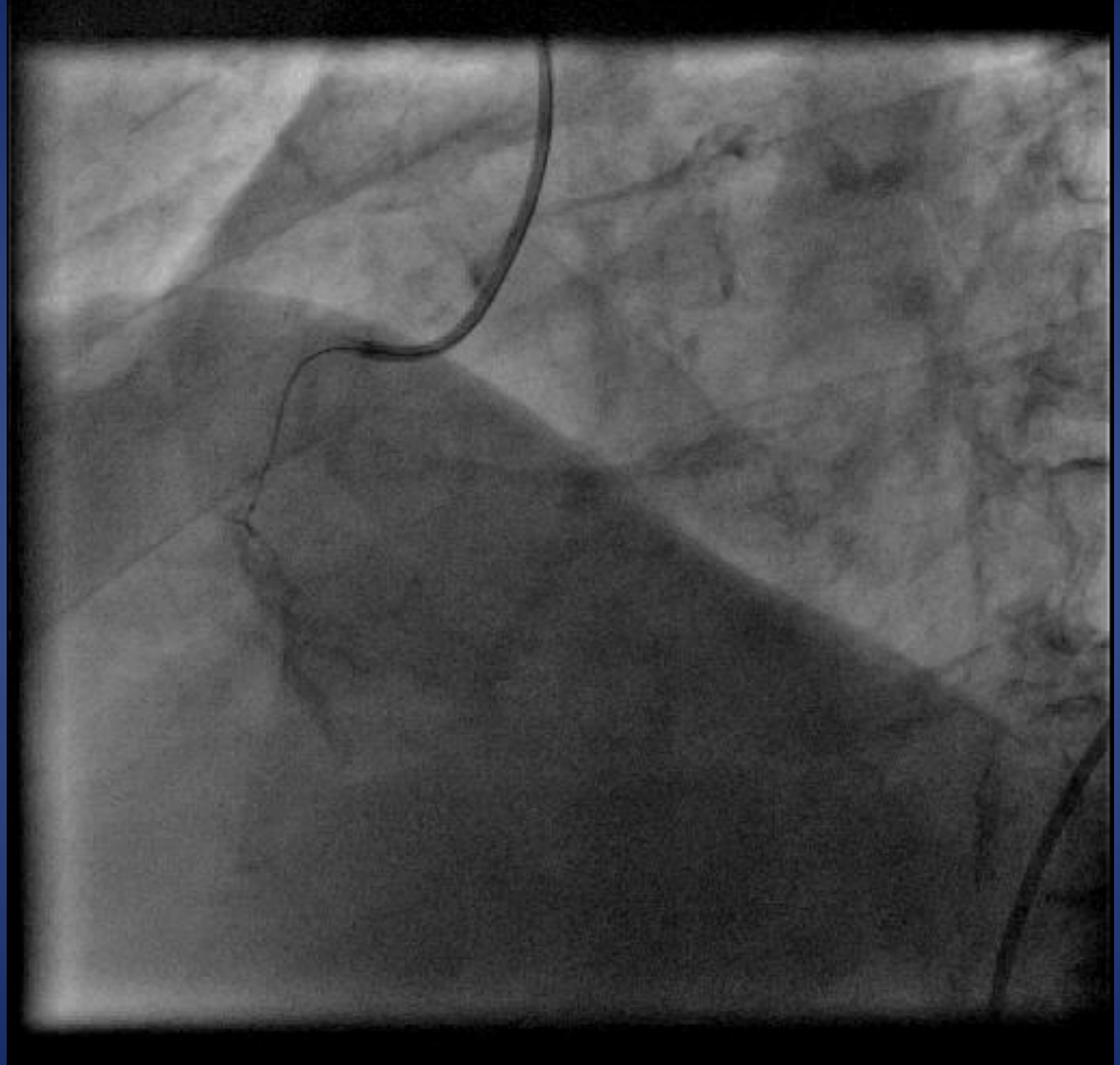


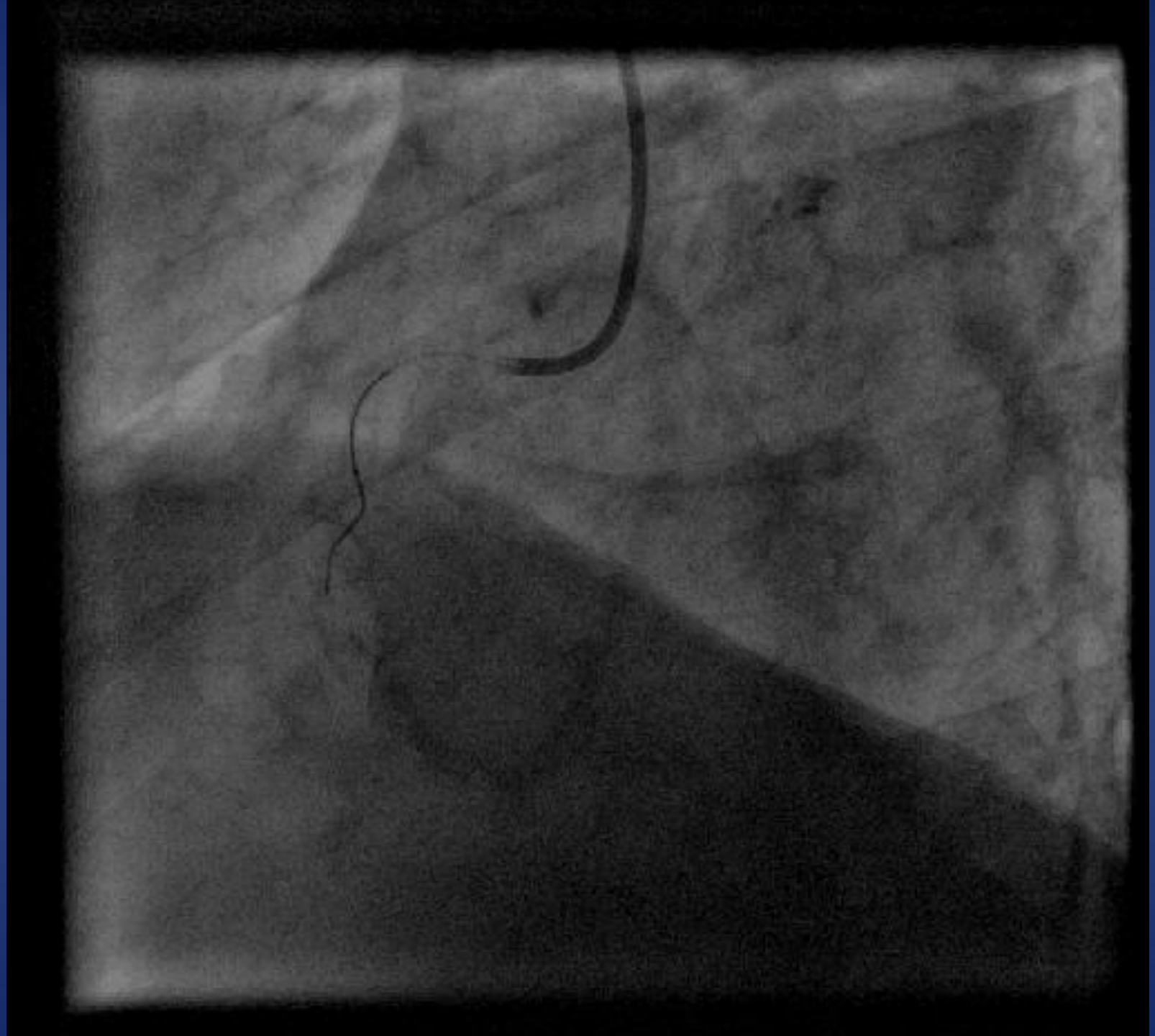


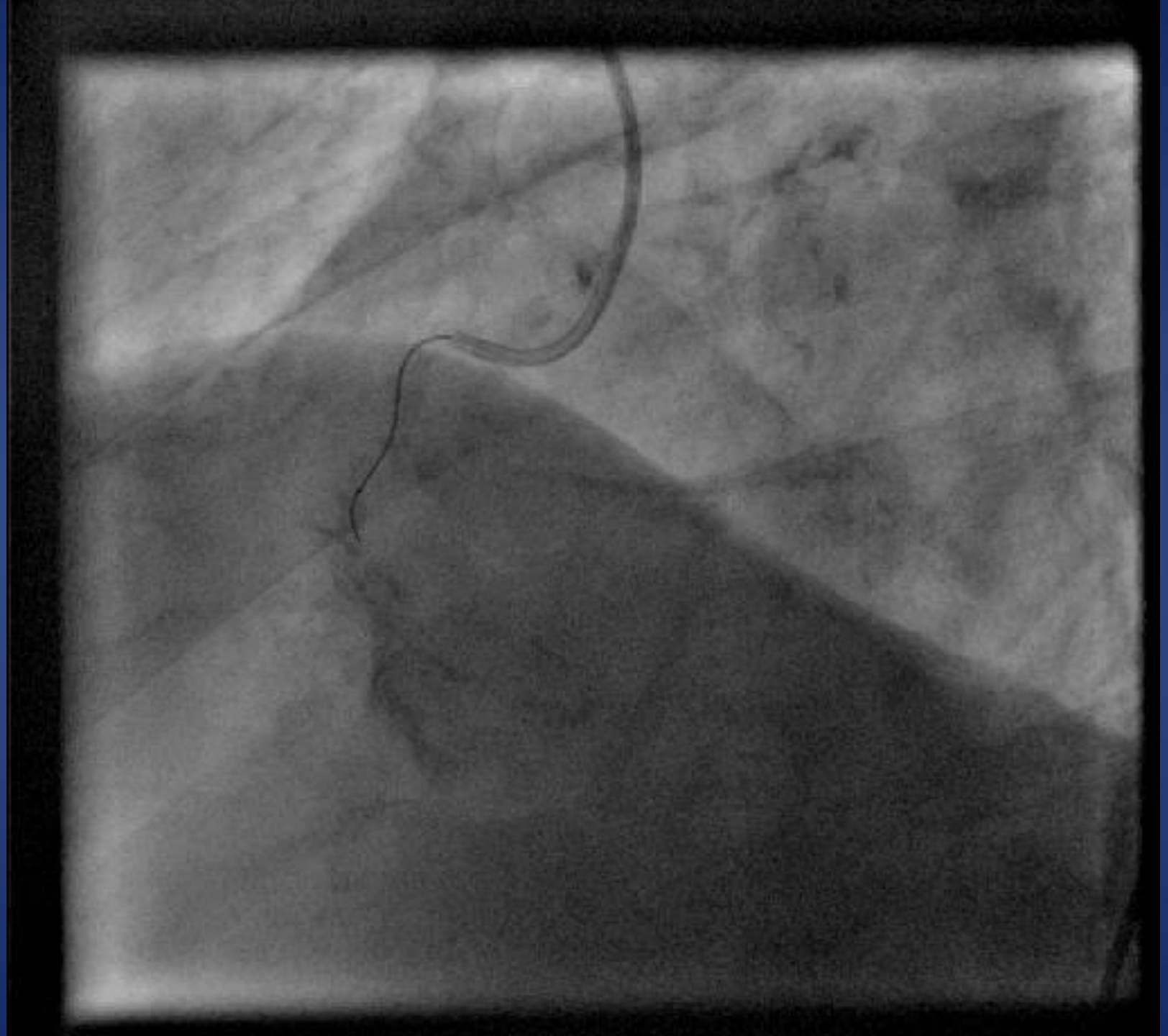


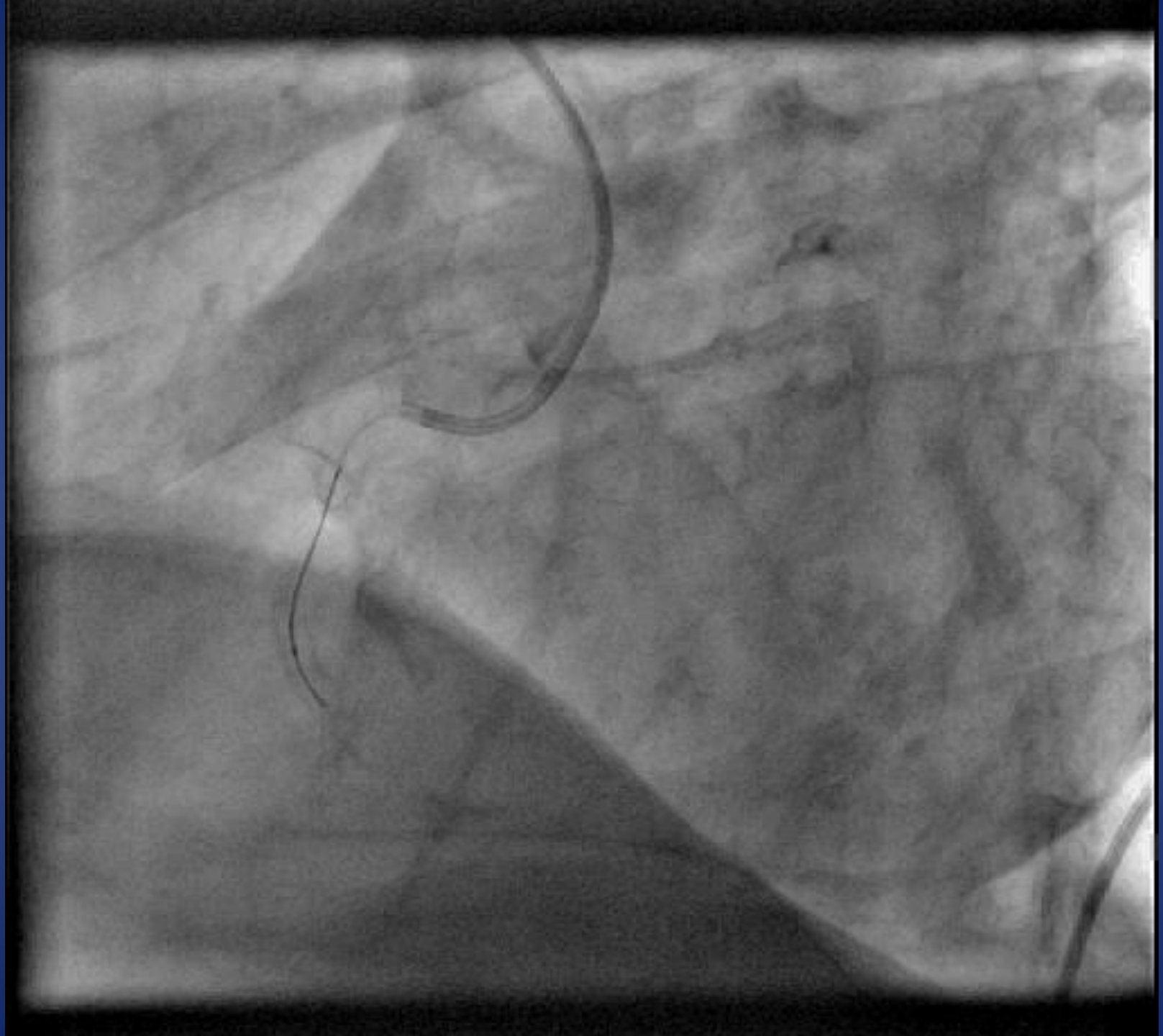


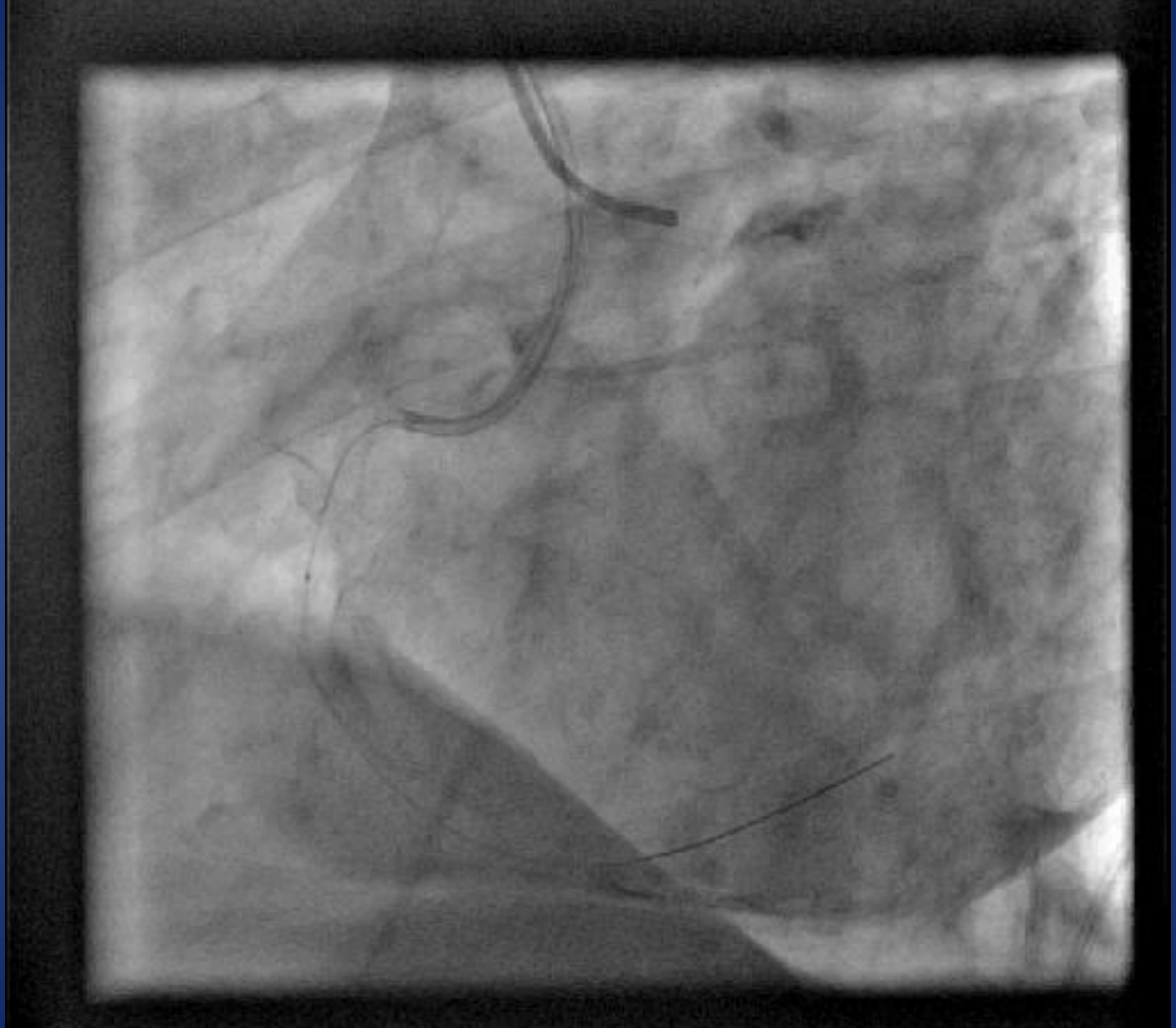


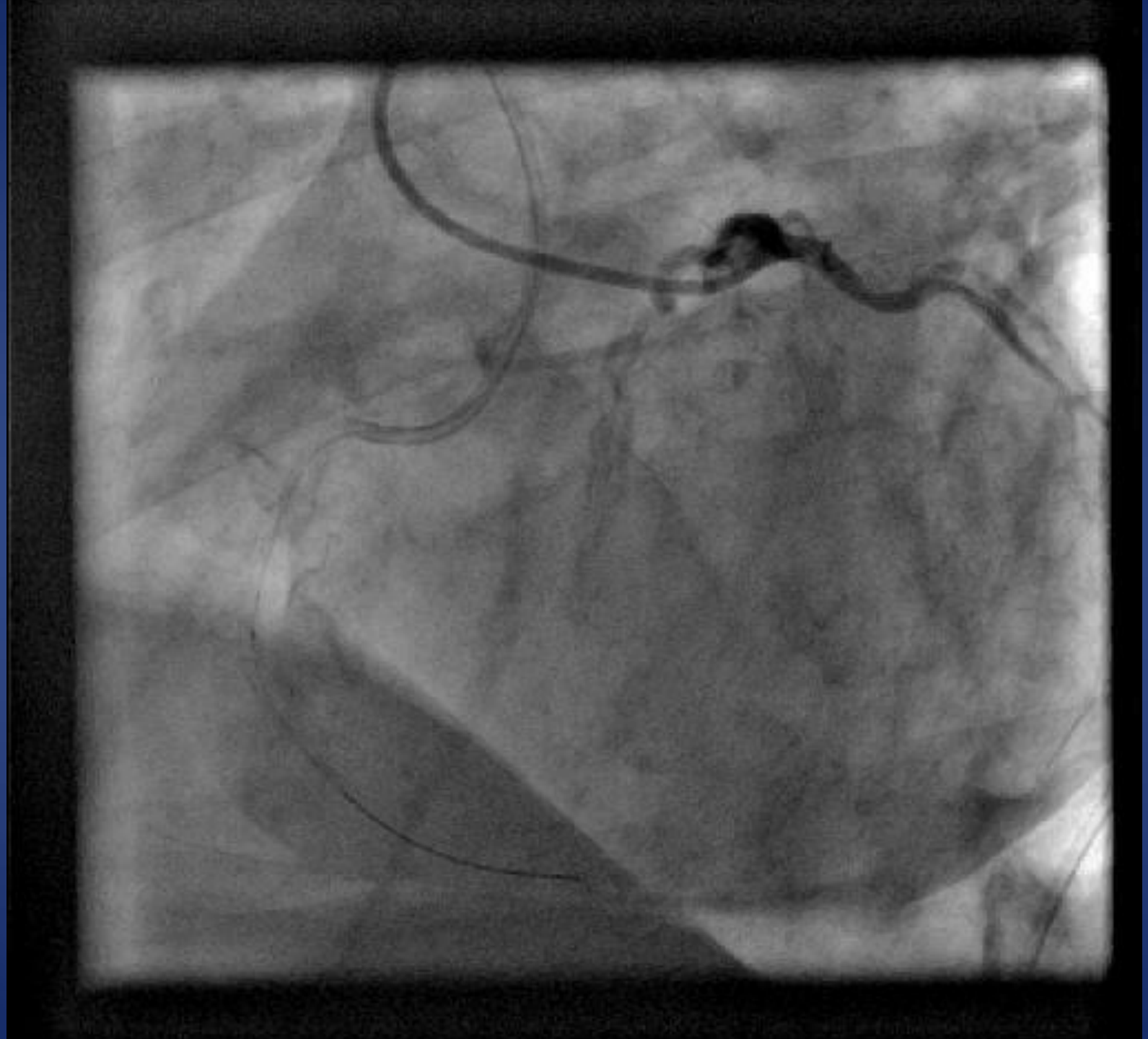


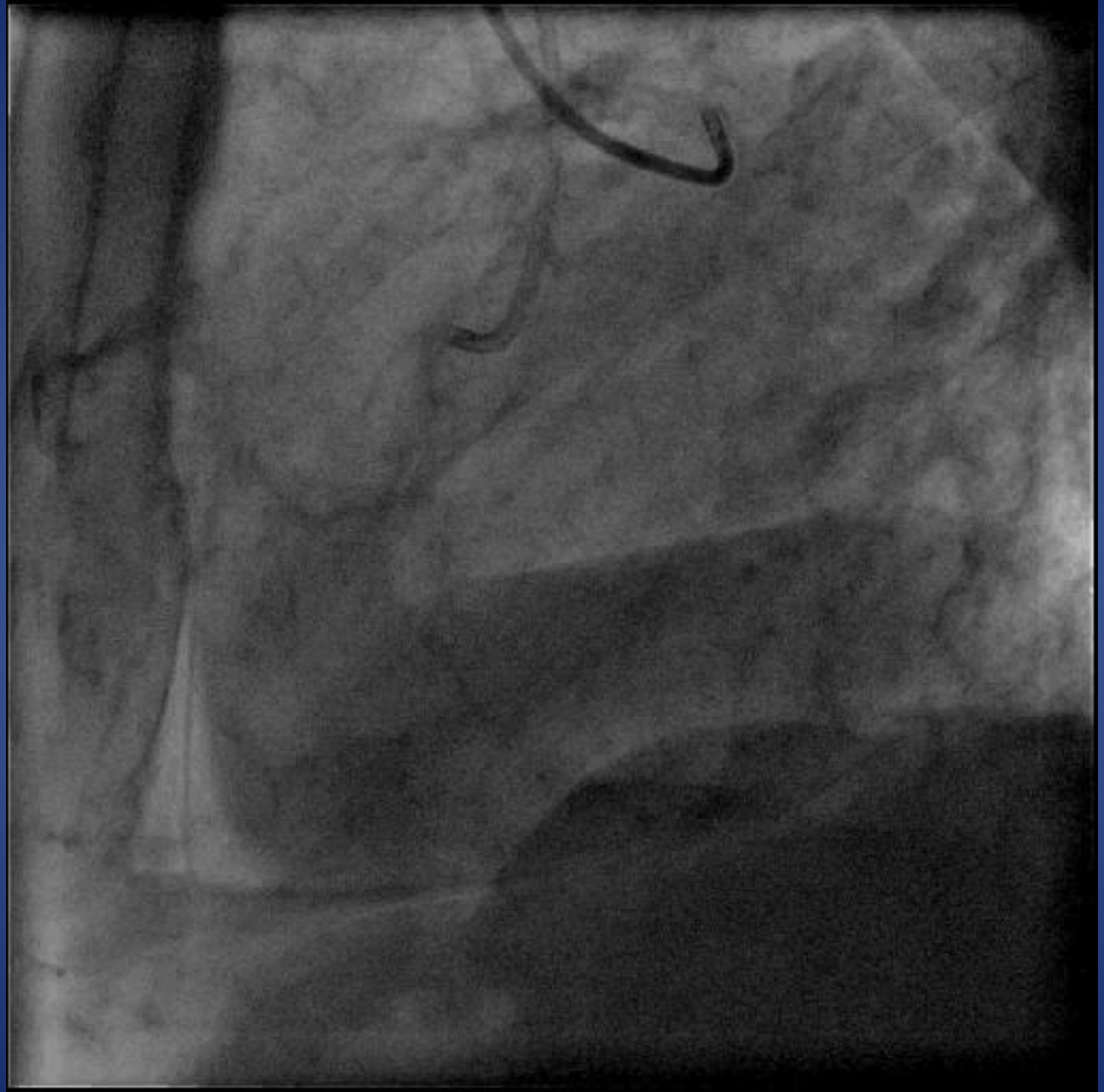


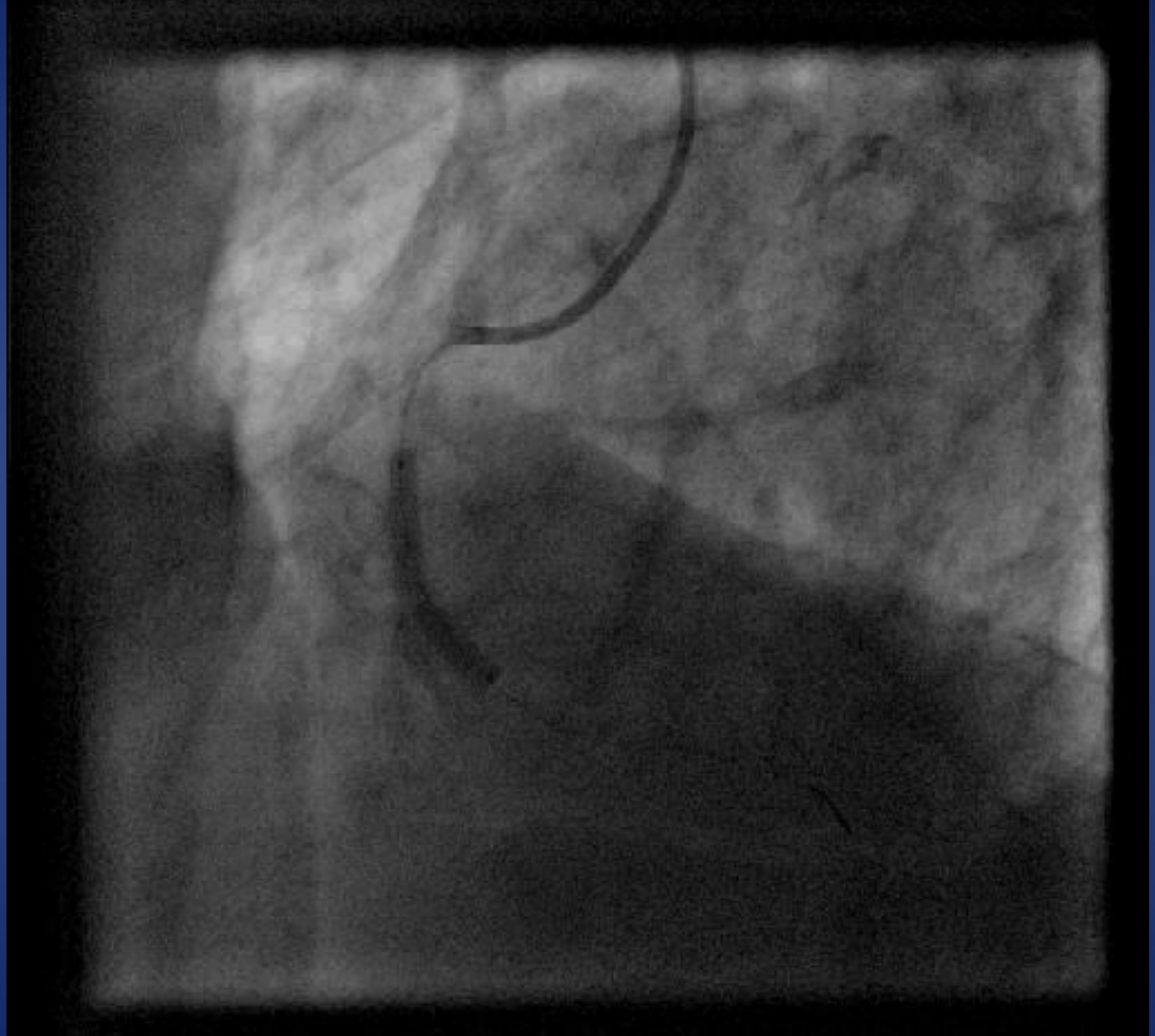


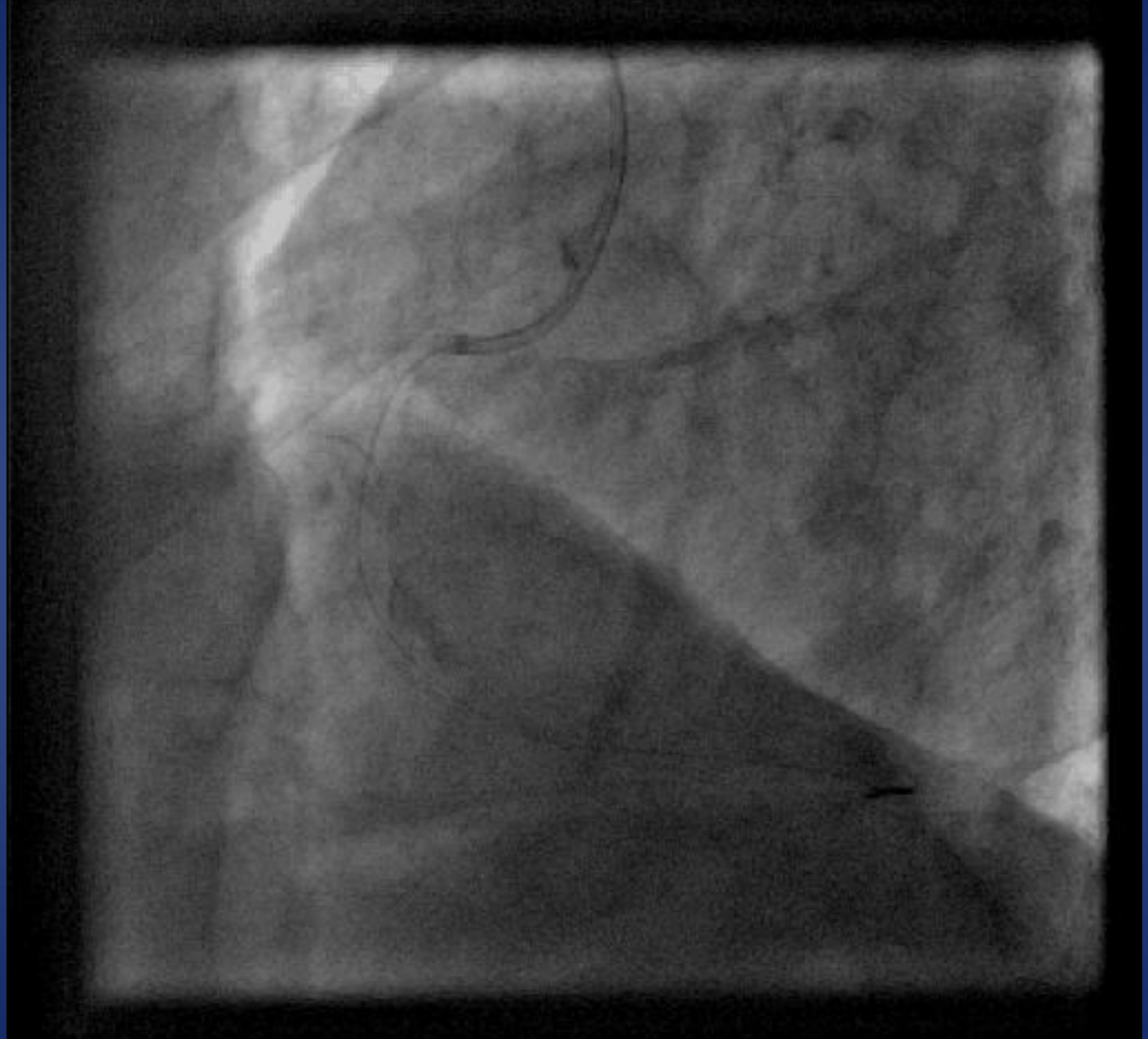


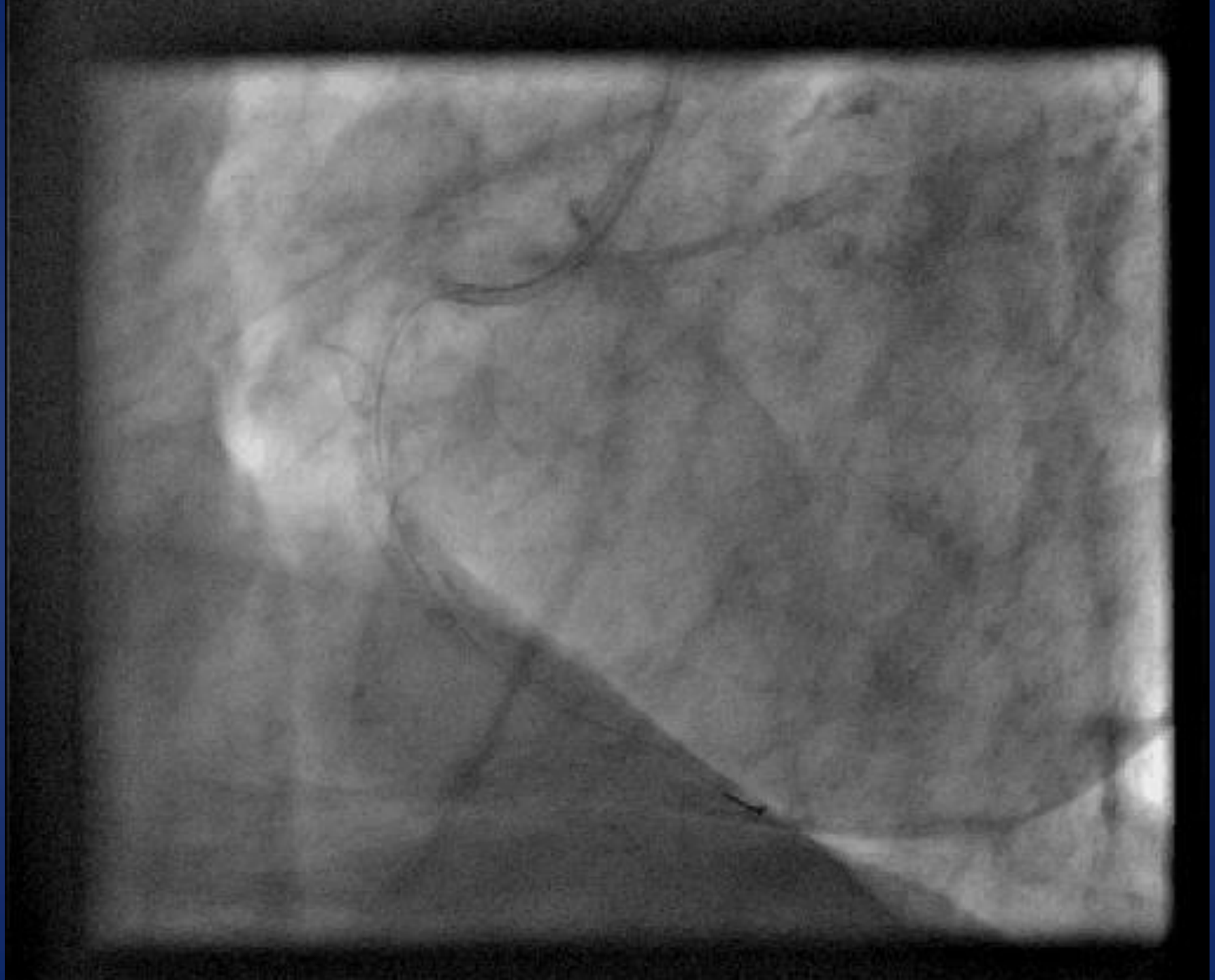












TYPE III

Dramatic. Life threatening

- Prolonged balloon inflation (at or proximal).
- Protamine sulfate. Platelets (IIb / $IIIa$).
- Pericardiocentesis. Resuscitation measures.
- Coil. Microsphere. Adipose tissue. Thrombin (distal).
- Stent Graft (lateral).
- Emergent cardiac surgery.

CLASSIFICATION

(Ellis et al. Circulation 1994; 90 : 2725-30)

Type I : Extraluminal crater without extravasation.

Type II : Pericardial or myocardial blush without contrast jet extravasation.

Type III : Extravasation through franc (>1 mm) perforation.

Type IV : Spilling into anatomic cavity chamber o cardiac vein.

TYPE IV

Non emergent

- Wait and see.
- Coils (distal).
- Stent Graft (lateral).

Coronary Rupture and Perforation

Incidence

Coronary Perforations : 0.2%

Related to

Doctor: 100%

- **Wrong wire manipulation**
- **Oversized balloon-to-artery ratio**

Coronary Perforations

Outcomes

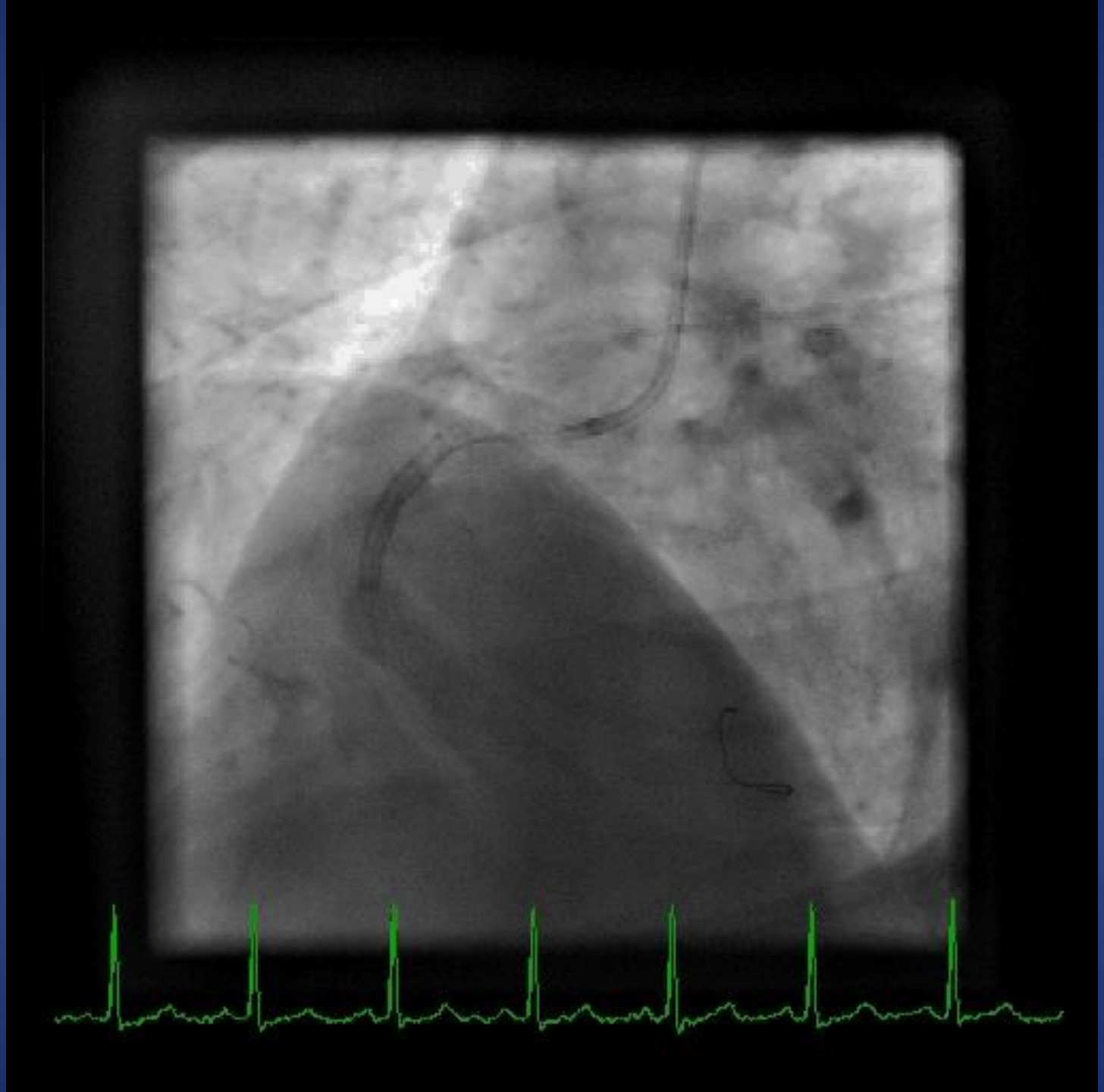
Tamponade:	17%
Acute MI:	27 %
Mortality rate:	9%

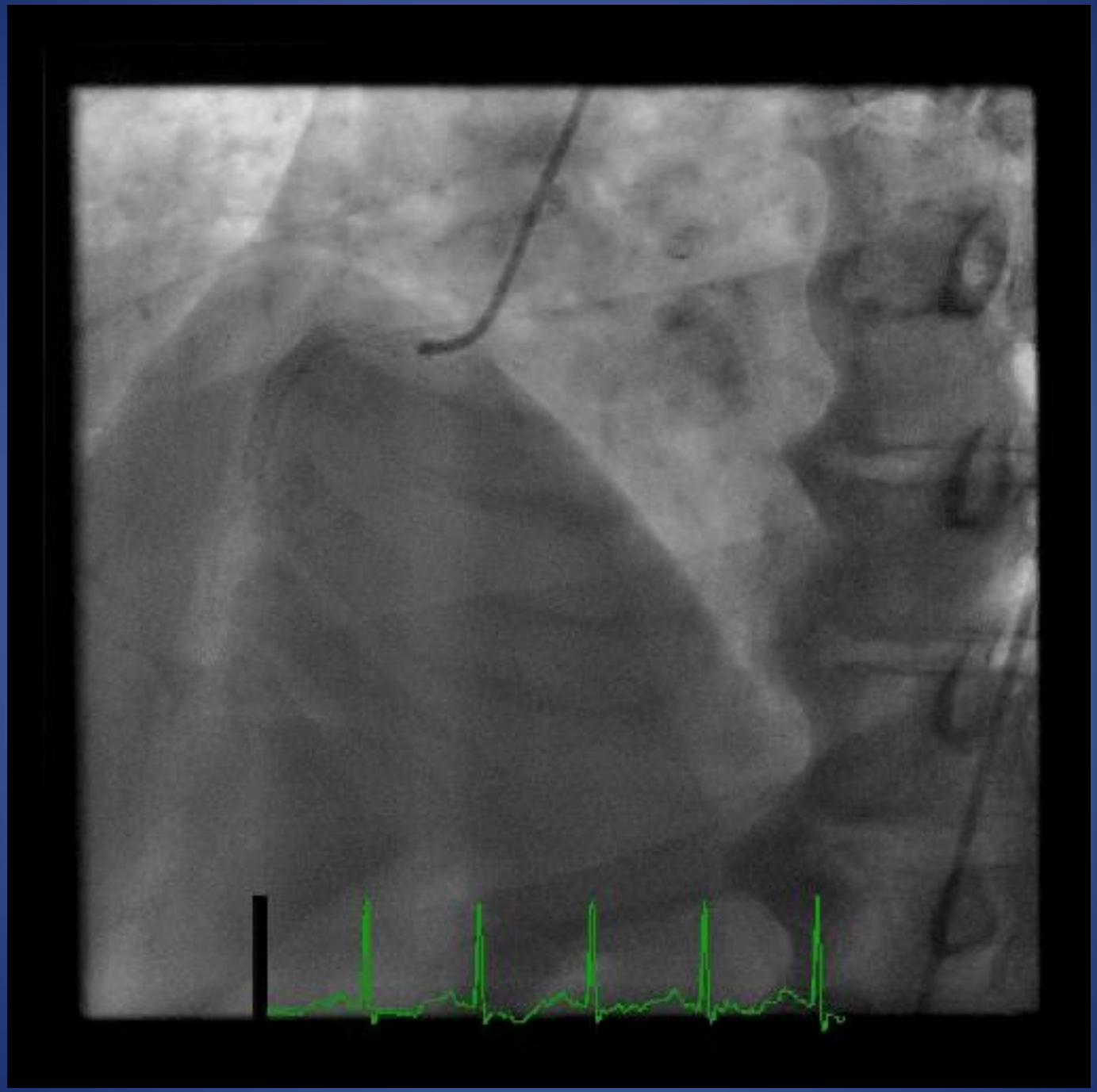
Alunji SC et al. Cathet Cardiovasc Diagn 1994;32:206_212

Holmes DR et al. J Am Coll Cardiol 1994; 23:330-5

Lansky A. et al. Circulation 2000; 35 (Suppl.A): 26A :825-I

Gruberg L. et al ; J Am Coll Cardiol 2000; 32A :1085-76





Complications are not uncommon

- Procedural Failure
- Perforation
- Guide Catheter Dissection
- No Reflow
- Bleeding
- Thrombosis
- Renal Failure
- Device Loss
- Myocardial Infarction
- Death

Device loss and retrieval

I. Sheiban

Interventional Cardiology
University of Turin
San Giovanni Battista Hospital
Turin / Italy

e-mail: isheiban@yahoo.com

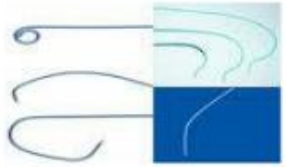
ESC CONGRESS 2010
28 August - 1 September 2010
www.escardio.org

Percutaneous devices currently used by interventional cardiologists & radiologists

Venous cannula and central catheters , sheaths, angio wires & catheters







Coronary balloons



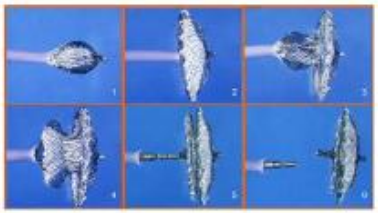
Coronary stents



Atrial septal occluders



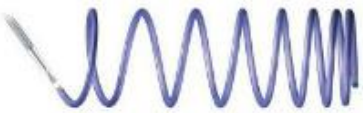




Soly

http://www.google.it/imgres?imgurl=http://my.clevelandclinic.org/PublishingImages/heart/GORE-HELEX.jpg&imgrefurl=http://my.clevelandclinic.org/disorders/atrial_septal_defect
hic_atrial_septal_defect_asd.aspx&usg=__KwbAvz6eMqOwsaoBnl5Sa5civfE=&h=143&w=199&sz=37&hl=it&start=38&zoom=0&um=1&itbs=1&tbnid=y1Z6TFeKU5C0AM:&tbnh=75
images%3Fq%3DAtrial%2Bseptal%2Boccluders%26start%3D36%26um%3D1%26hl%3Dit%26sa%3DN%26rlz%3D1R2GFRE_itIT378%26ndsp%3D18%26tbs%3Disch:1

Coronary guidewires



Coils

Filter Wire EZ

Caval Filter

Percutaneous valves

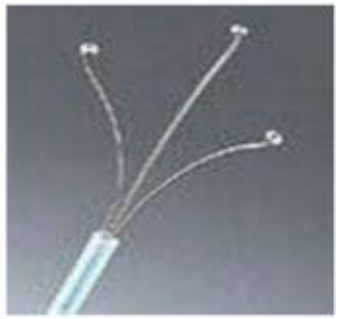


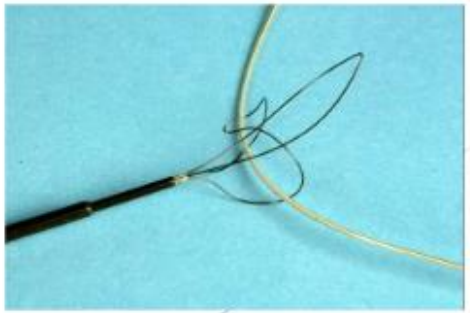
The tools available for foreign body retrieval have rapi evolved in the past decade…

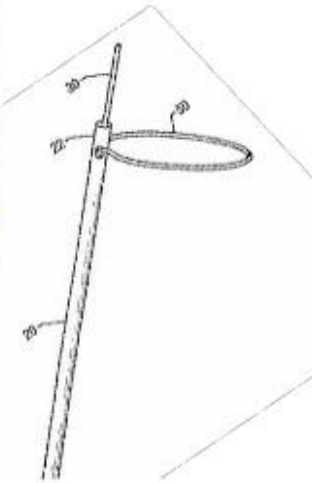
EN Snare , Merit Medical Systems

Allegator Retrieval Device , eV3

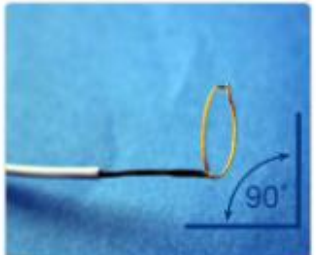
In-Time Retrieval Device ,Boston Sc



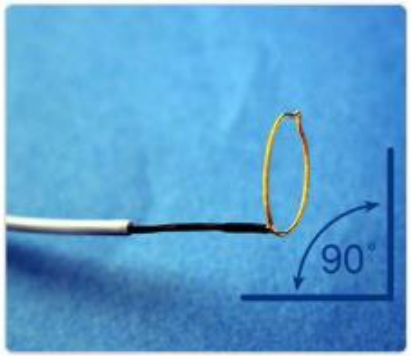


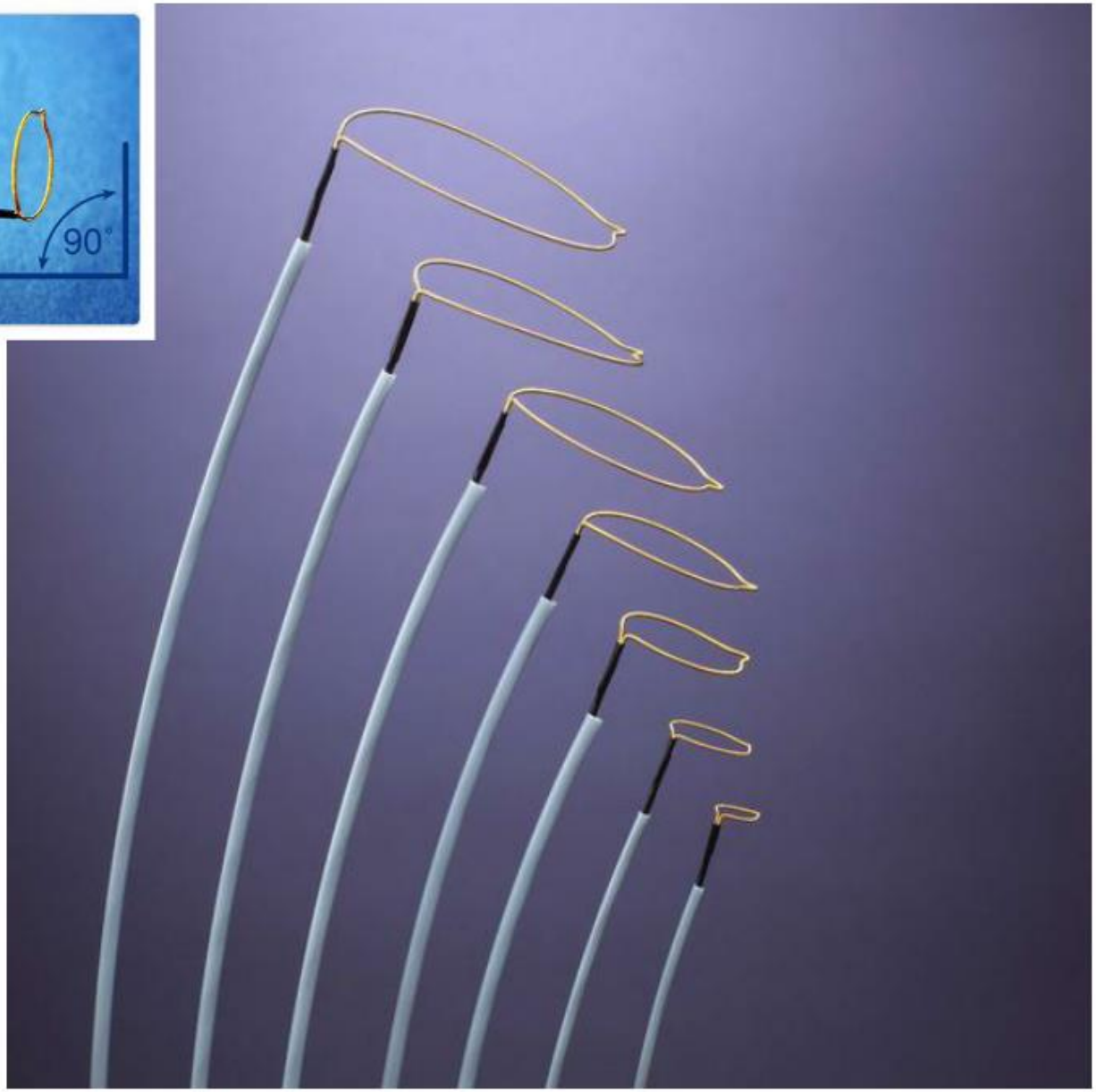


Segura Basket



Texan Foriegn Body


90°



PCI : The Twelve Commandments

- 1. Know your patient well, select the lesion well, plan well and anticipate problems
- 2. Do not fall victim to the Occulo-stenotic reflex
- 3. Choose a good guide catheter
- 4. Keep it simple
- 5. Have excellent knowledge of your equipment
- 6. Know your limitations
- 7. Know when to stop
- 8. Maintain absolute concentration
- 9. Learn from your own and others misfortunes
- 10. Select new therapy wisely
- 11. Do not be too proud to ask for help
- 12. Remember that Perfect is the enemy of Good

Some of Colombo's commandments...

- Do not PUSH the wire if you cannot see where you are going.
- You can usually get away with ONE mistake. Do not follow it with a SECOND mistake ....that can be FATAL.
- Never be in a HURRY.
- Send the Surgeons an occasional case.
- Place a Stent or Place a Balloon if there is trouble

How to stay out of trouble

1. Schedule the procedure when you have enough time to do the case
2. Go slow !
3. Careful monitoring of GW progression.
4. Use multiple angiographic projections
5. Think about what you are seeing
6. Don´t be afraid to stop and bring the patient back another day!

When to stop ?

1. Complications - major or minor :
   - large false lumen
   - impairement of collateral blood flow

2. Contrast limits (400 - 600 cc) in a non-diabetic patient with normal renal function; much less in patients at risk for contrast nephropathy
   (Do not exceed 4 times creatinine clearance).

3. Limit fluoroscopy time (60 min)

4. Case time limits (2-3 hours)

5. Excessive patient or operator fatigue

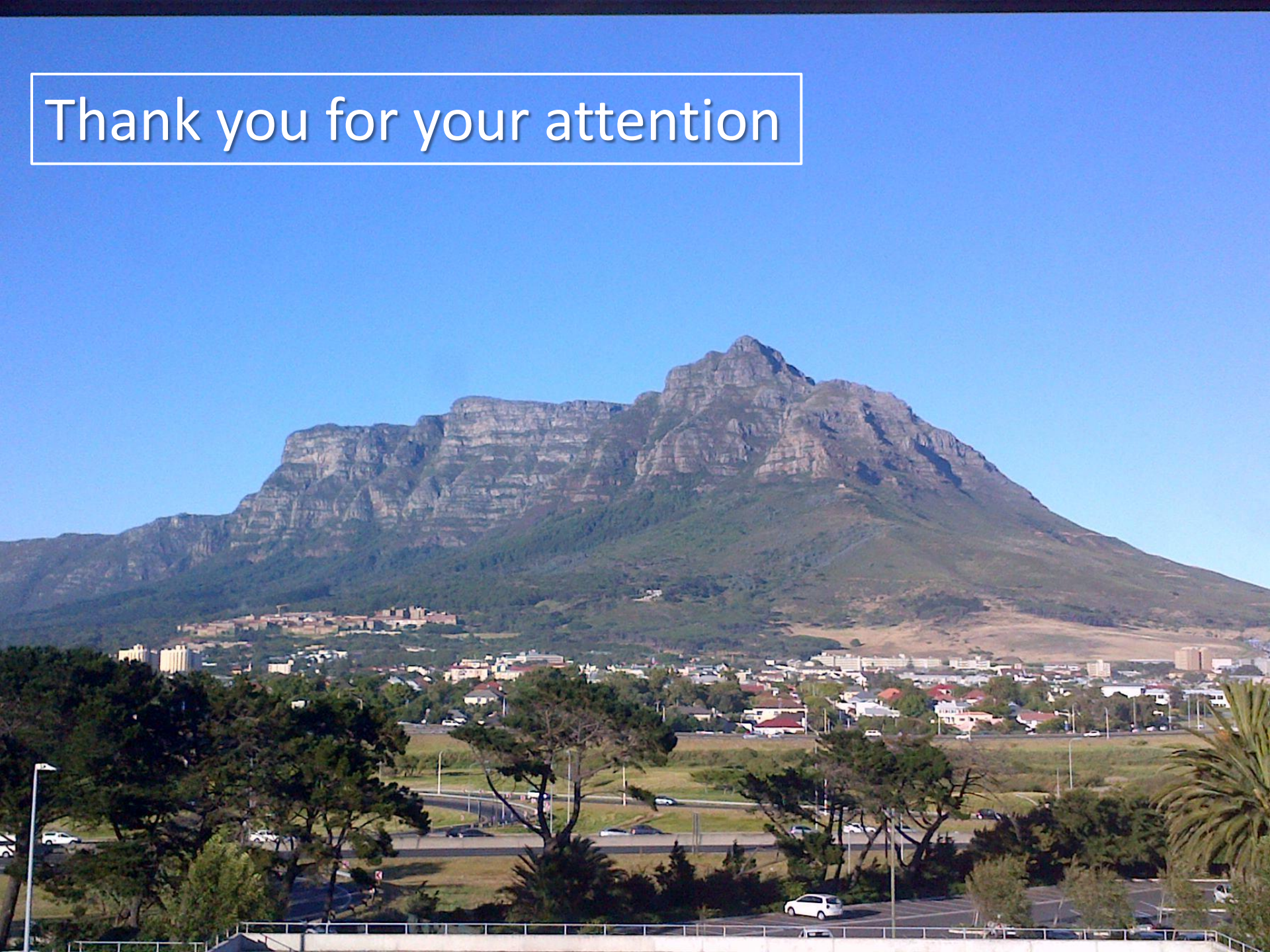
PCI and all the P's

- Patience
- Persistance
- Perseverance
- Passion
- Perspiration
- Persuasion
- Pee

FUCK IT

I'm going home.

Thank you for your attention




Baboons


POTHOLES
NEXT 9600 Km


KEEP
WELL
LEFT


AHEAD