



Percutaneous Closure of Perivalvular Leaks

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BACKGROUND

- The incidence of paravalvular leaks is variable (from 2% up to 17%). More frequent in mechanical valves.
- Surgical approach has been traditionally considered the treatment of choice
- In high risk surgical patients an alternative approach has been sought

Percutaneous Closure Experience

- Percutaneous closure of aortic leak with Amplatzer Duct Occluder *
- Percutaneous closure of paravalvular mitral leak using an ASD occluder **
- Percutaneous closure with Radskind device ***
- Percutaneous closure of mitral leak with Amplatzer duct occluder ****
- Coil embolization of mitral leak *****

*Webb et al. *Am J Cardiol* 2005; 65: 69-72

** Pate et al. *Can J Cardiol* 2004; 20: 452-55

*** Hourihan et al. *JACC* 1992; 20: 1371-77

**** Kort et al. *CCI* 2004; 61:548-551

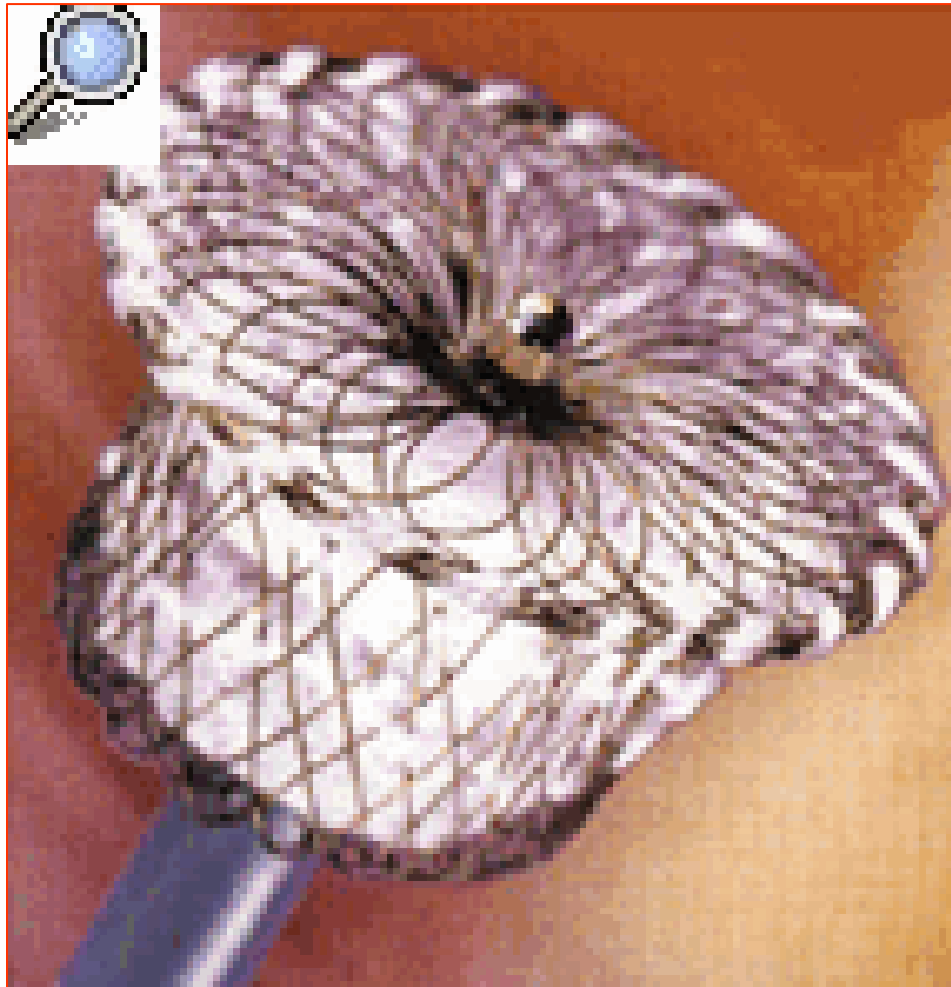
***** Moscucci et al. 2001; 104; 85-86

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Patient Selection

- **Congestive Heart Failure**
- **Hemolytic anemia**
- **Other prosthetic valve**
- **History of mediastinitis**
- **Euroscore > 6**

Ductus Amplatzer System



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AORTIC PERIVALVULAR LEAKS

General considerations

- **Most frequent locations : Left and non-coronary sinus**
- **Right brachial access : more adequate to available technology**
- **Echocardiography : most important before, not during the procedure**
- **Access through leak : multipurpose and hydrophilic wire**
- **Size of device : important not exceed adequate size (average 6-8 mm)**

AORTIC PARAVALVULAR LEAKS

Demographics

N= 9

Age

62±17 yrs

Male gender (%)

77

Time since 1st surgery

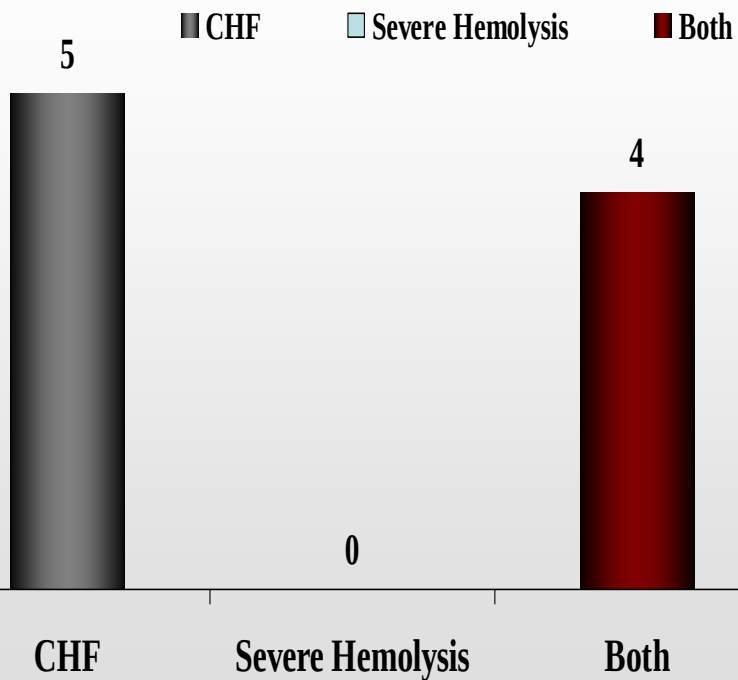
10 yrs

NYHA III or IV (%)

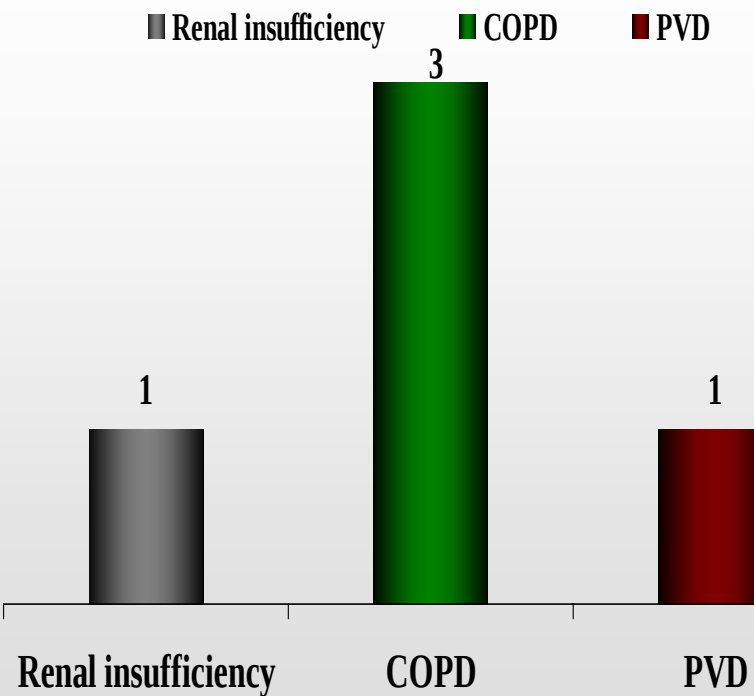
56%

AORTIC PARAVALVULAR LEAKS

Clinical Indication

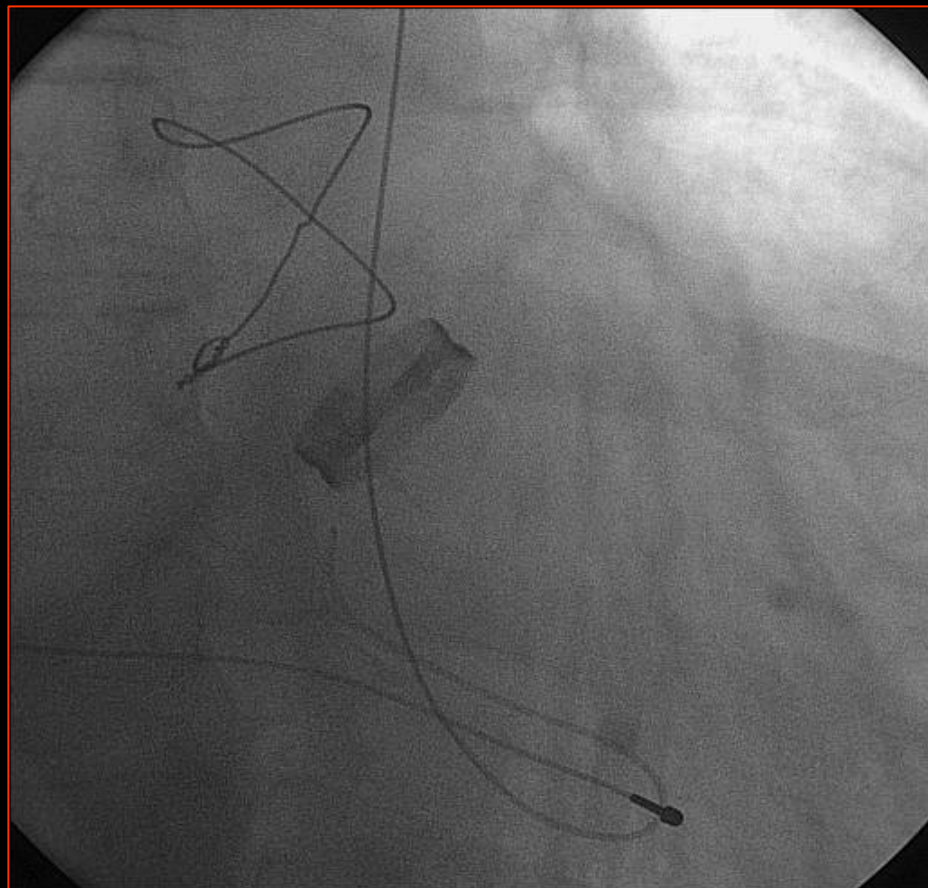
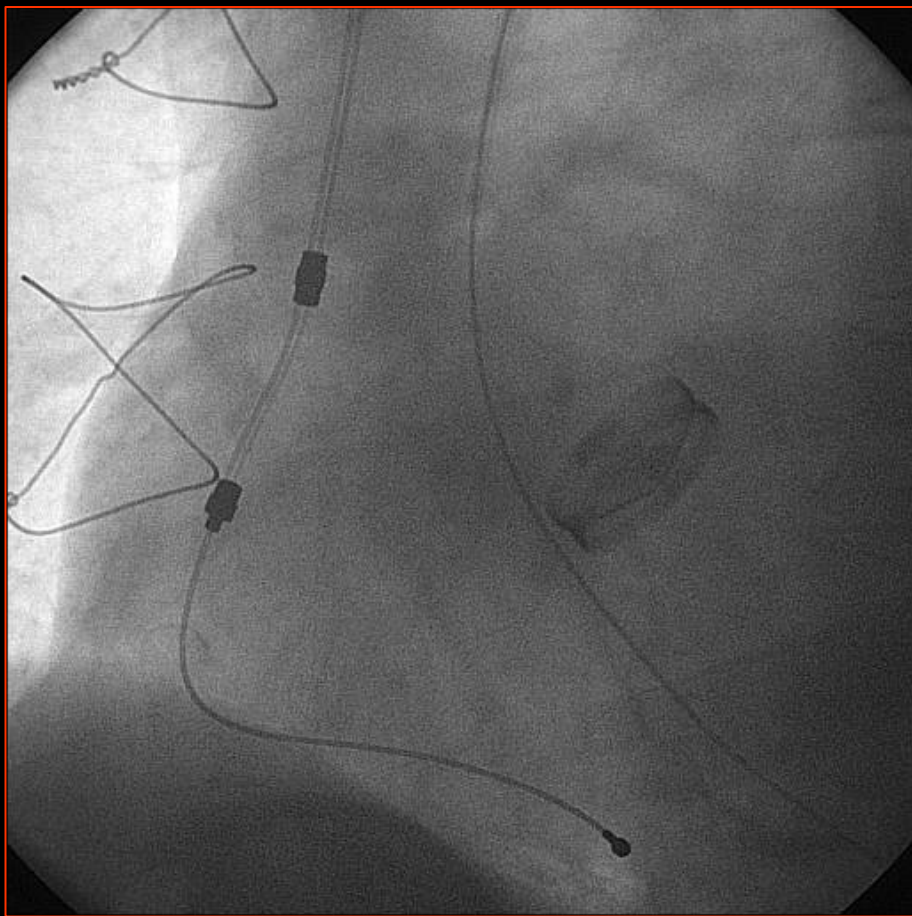


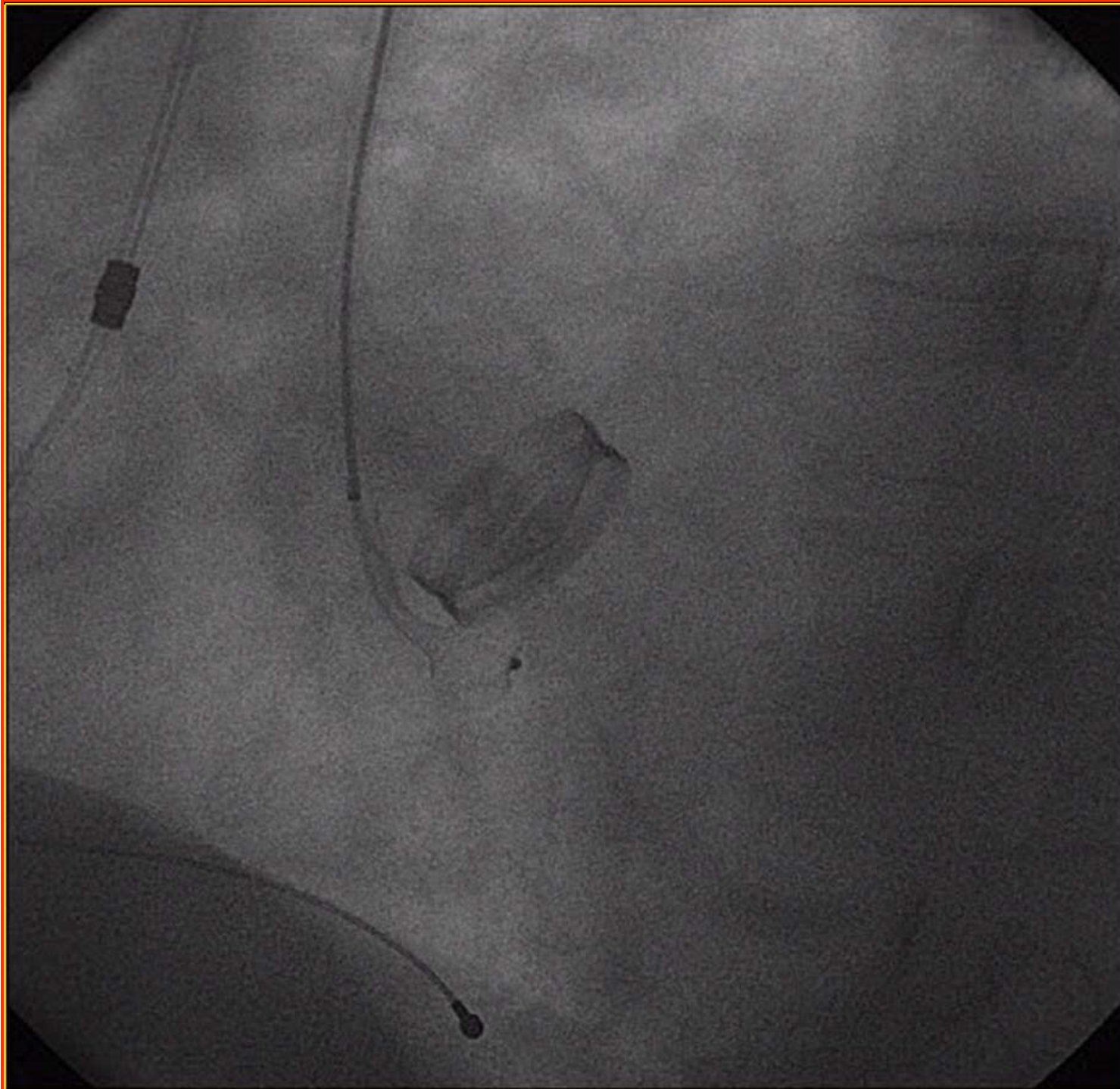
Comorbidities

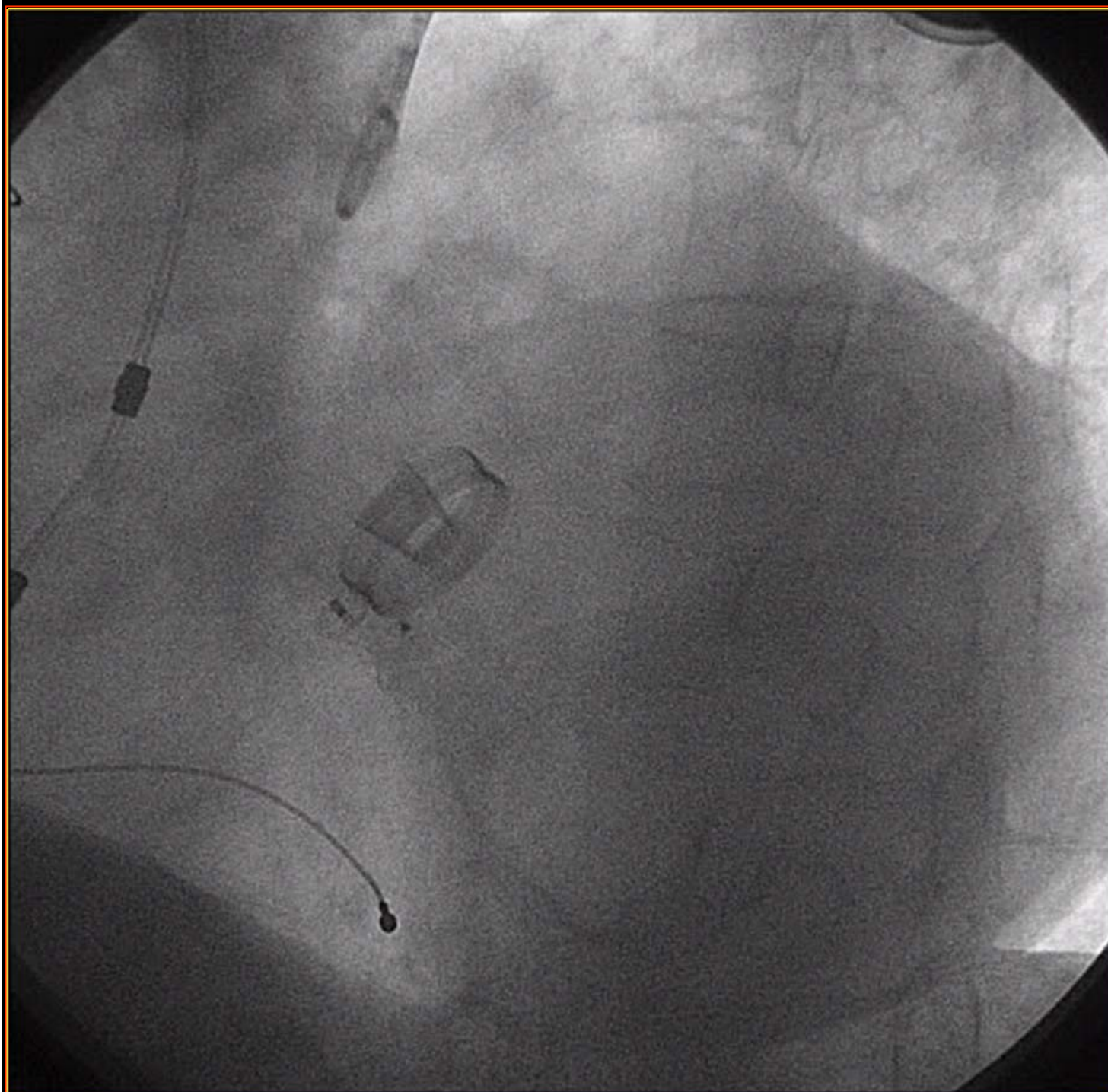


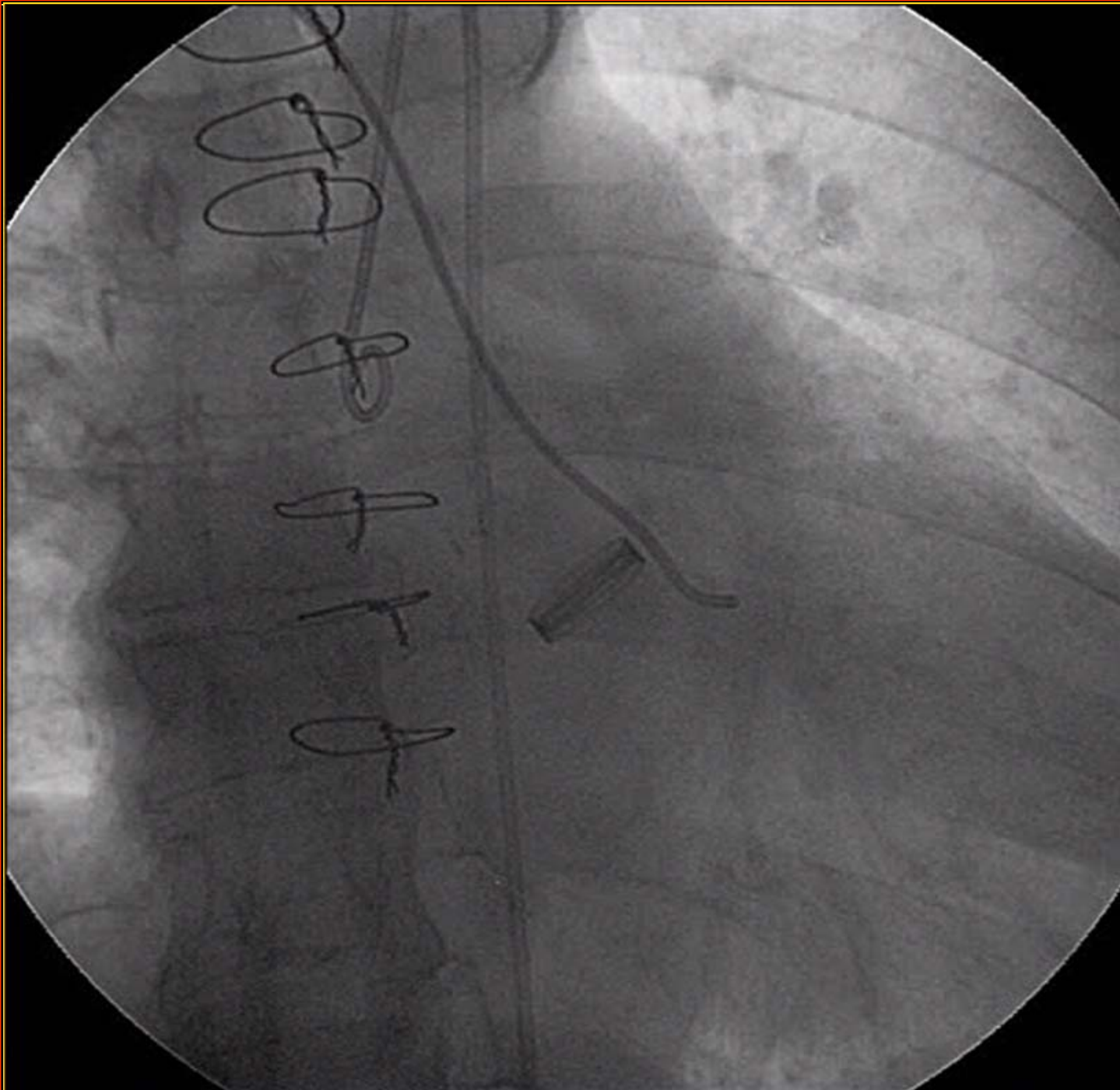
PROCEDURE (Ao Leak)

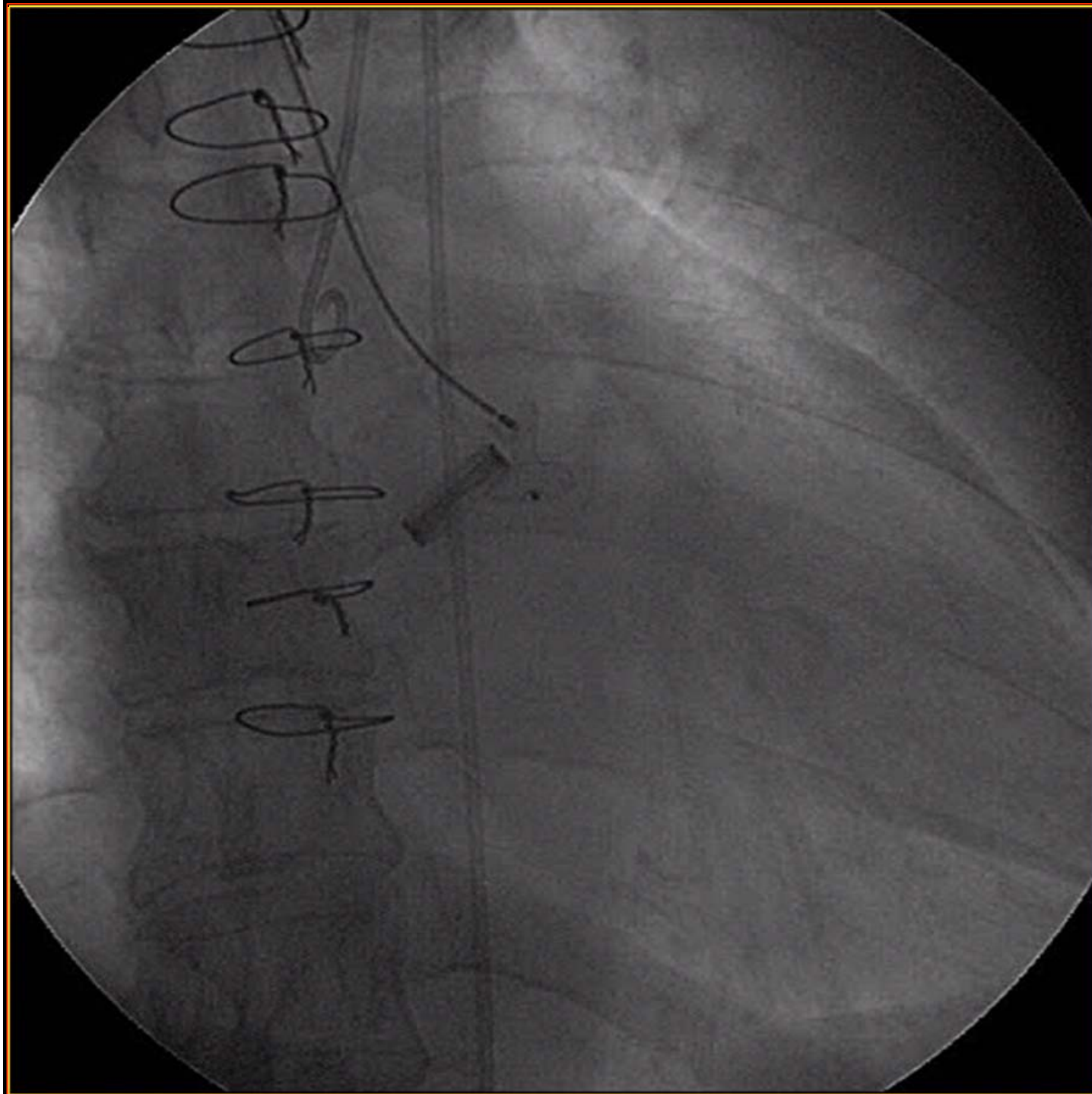
- **Right braquial approach**
- **Aortogram**
- **Left ventricular access through the leak using a Terumo wire**
- **Multippurpose catheter to LV**
- **High support exchange wire**
- **Amplatzer sheath**
- **Amplatzer duct occluder device deployment**
- **Aortogram**

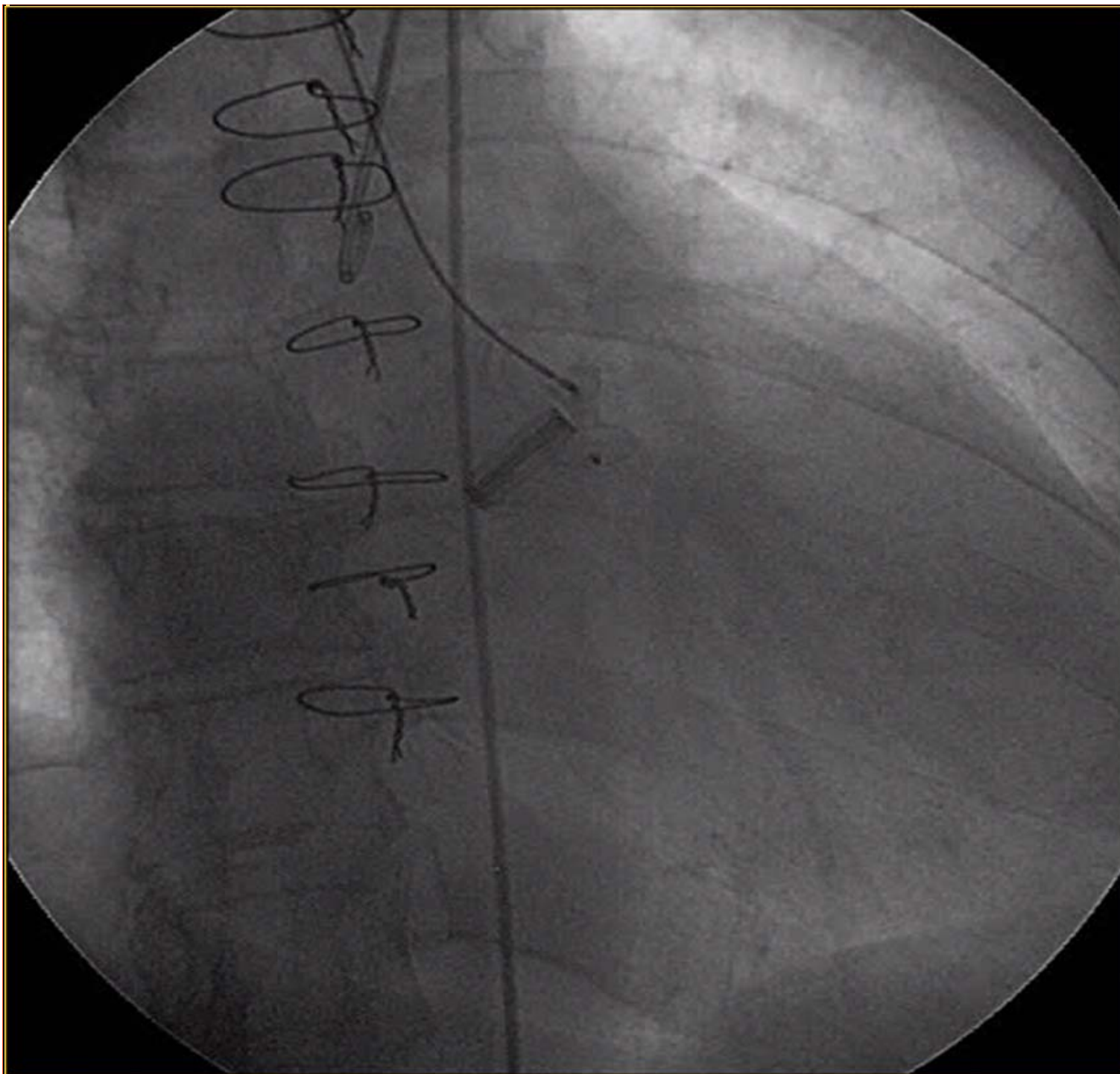












AORTIC PARAVALVULAR LEAKS

Results

Procedural success	8/9
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Clinical improvement	6/9
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Mortality (> 3mo)	1/9
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Surgery (> 3 mo)	2/9
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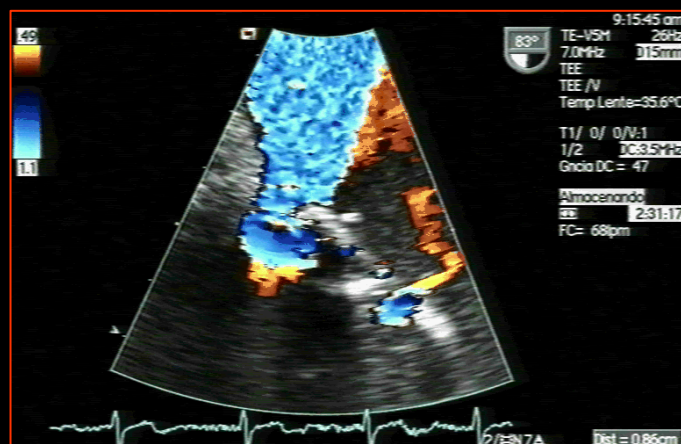
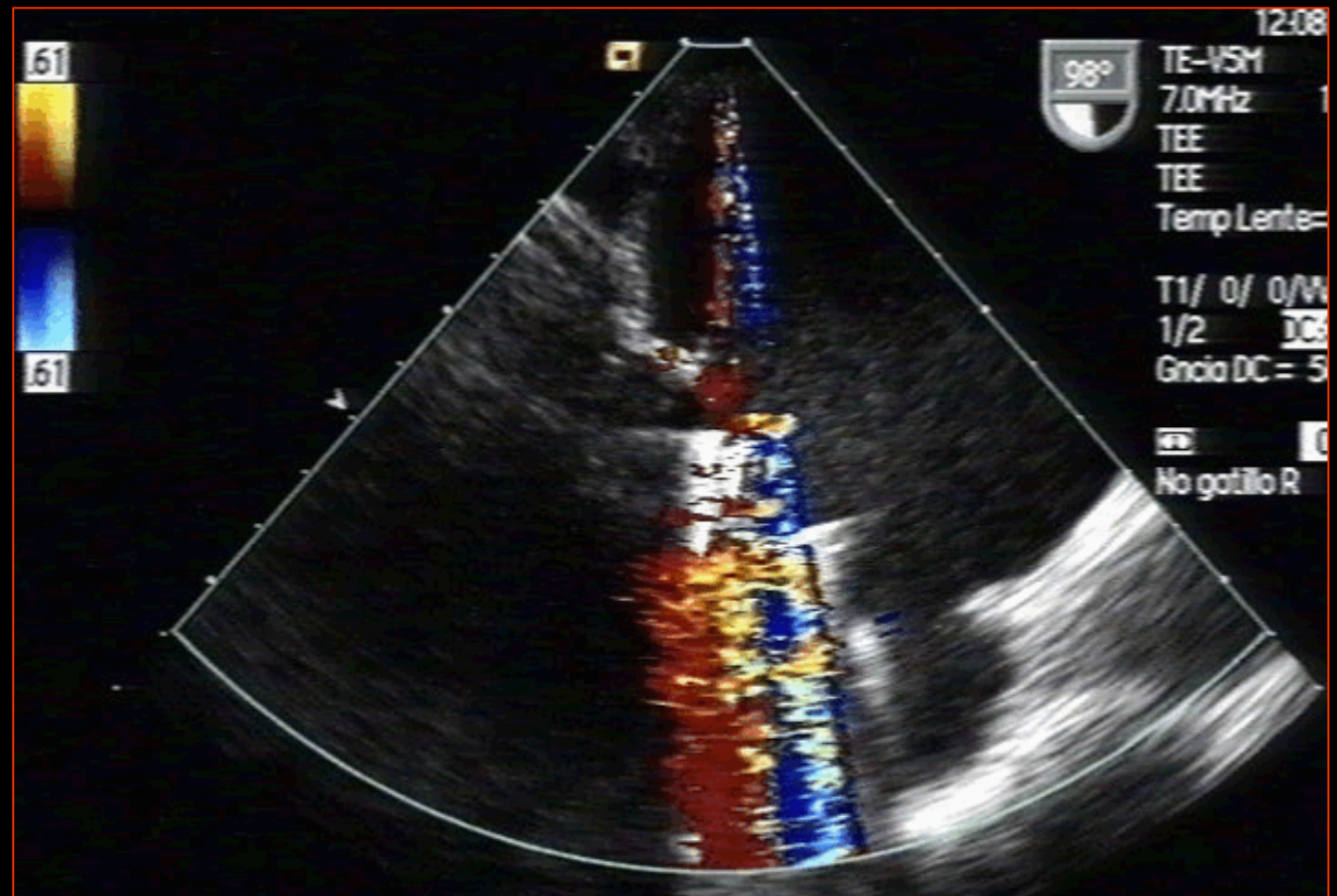
MITRAL PERIVALVULAR LEAKS

General considerations

- **Location** : Careful analysis of leak location by TEE
- **Transeptal** : Difficulty increased by previous surgery
- **Anticoagulation** : Generous – heavy manipulation in LA
- **TEE** : Important coordination echocardiographist-operator

Mitral leak

- **Right femoral vein and left femoral artery approach**
- **Transeptal puncture**
- **Anterograde or retrograde leak approach**
- **Amplatzer sheath to LV through the leak**
- **TEE procedural guidance**
- **Amplatzer duct occluder positioning and release**



MITRAL PERIVALVULAR LEAKS

Tips & Tricks

Leak access : LA- LV

- **Postero-septal:** hydrophilic multipurpose and hydrophilic straight wire (big loop in the roof of LA)
- **Antero-lateral:** IMA catheter or Simmons(head hunter)
- **Lateral:** luck and RCA catheter

MITRAL PERIVALVULAR LEAKS

Tips & Tricks

Retrograde: LV- LA

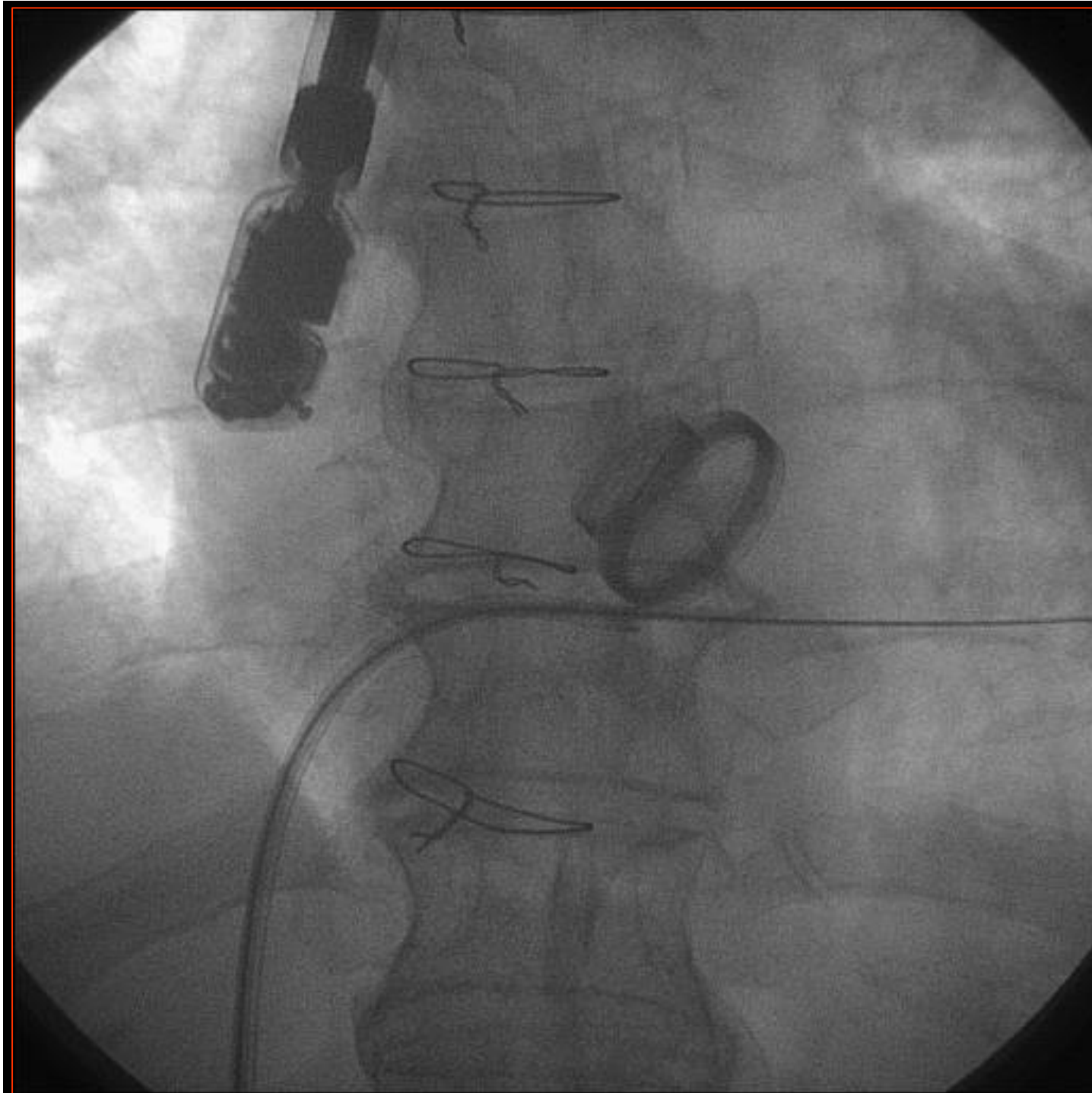
- **Multipurpose hydrophilic and hydrophilic wire – snare in LA – establish arterio-venous loop.**
- 2. **9 Fr. Multipurpose guiding catheter
AO-LV-LA**

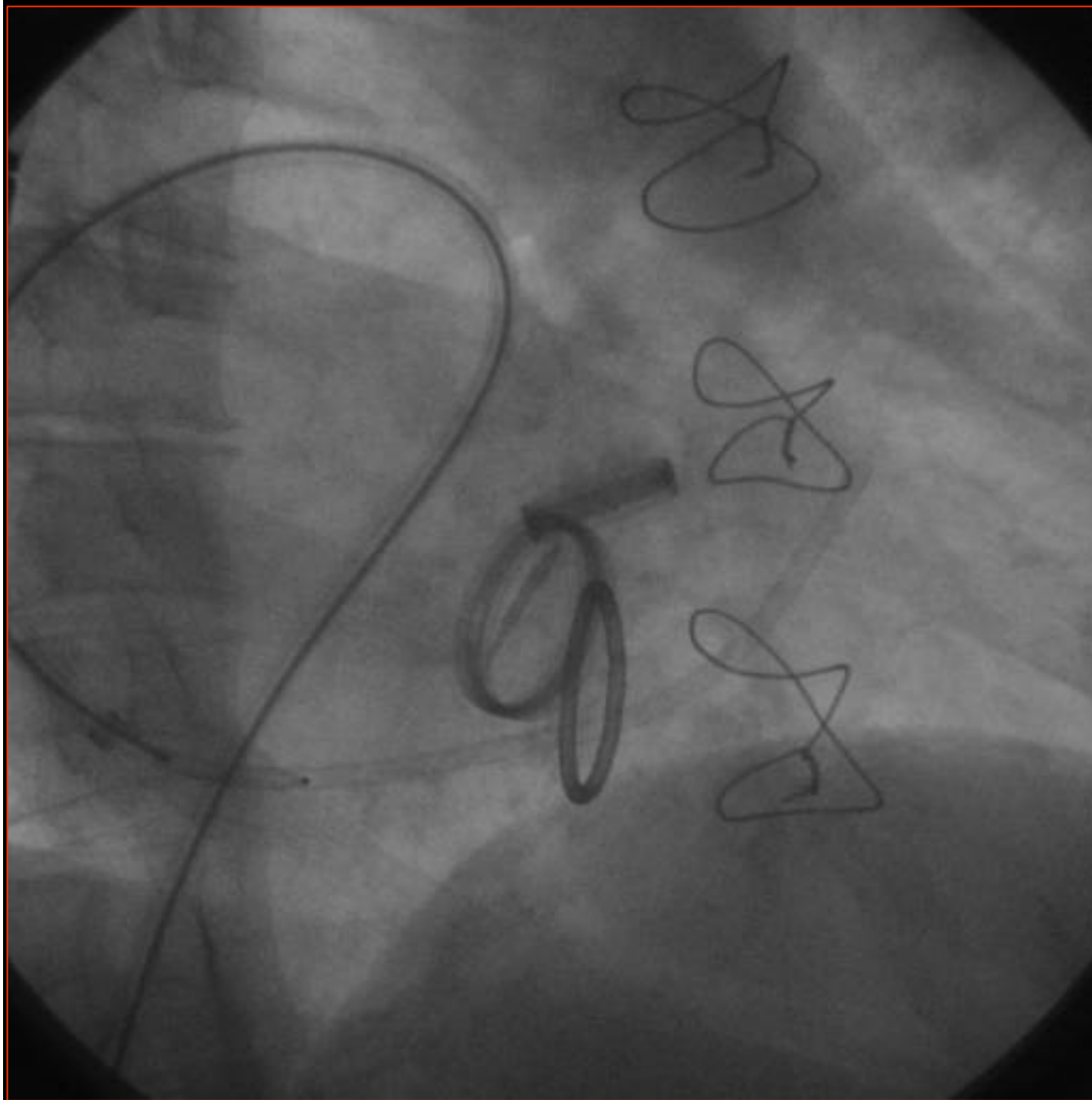
MITRAL PERIVALVULAR LEAKS

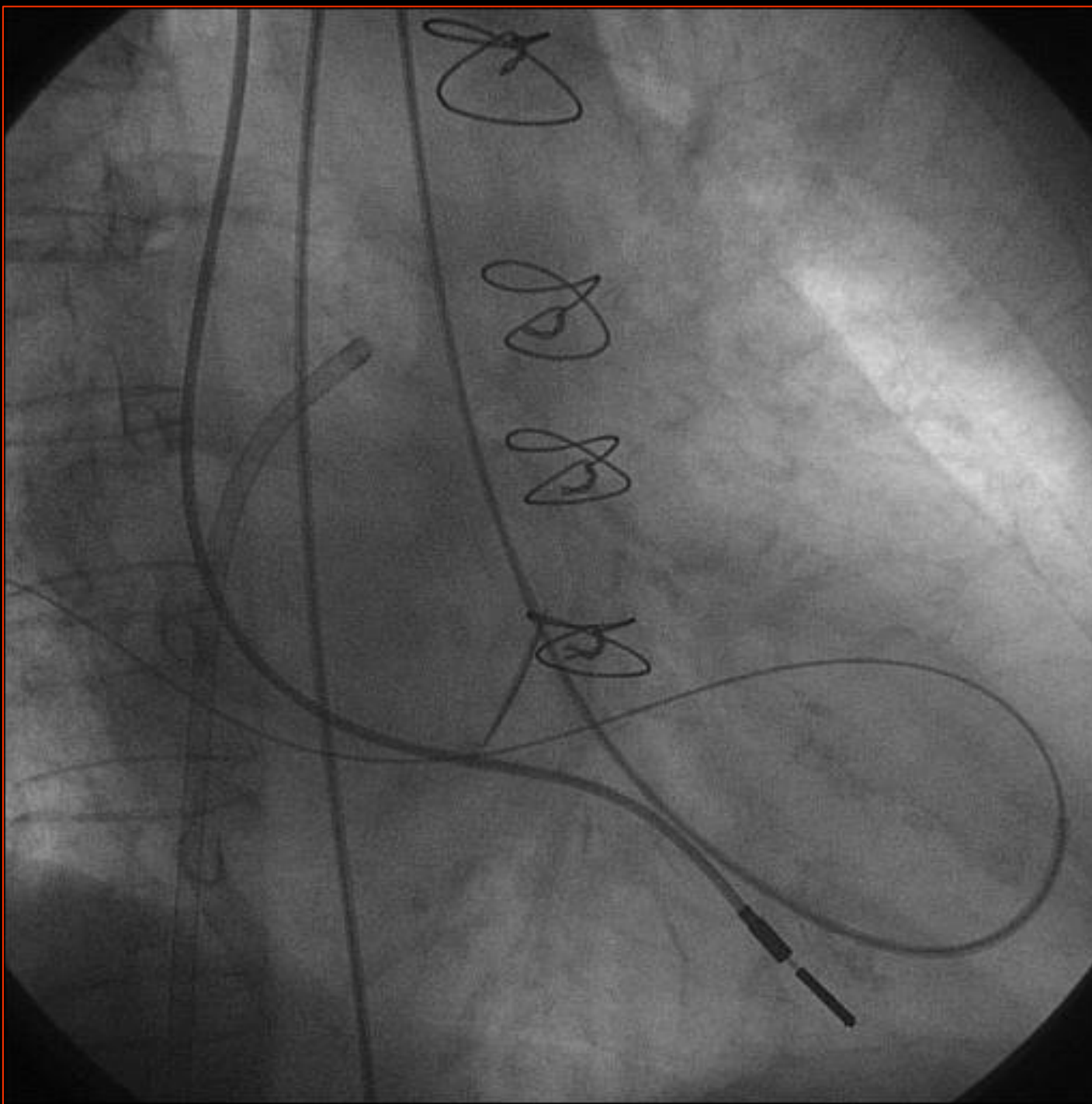
Loosen up your imagination

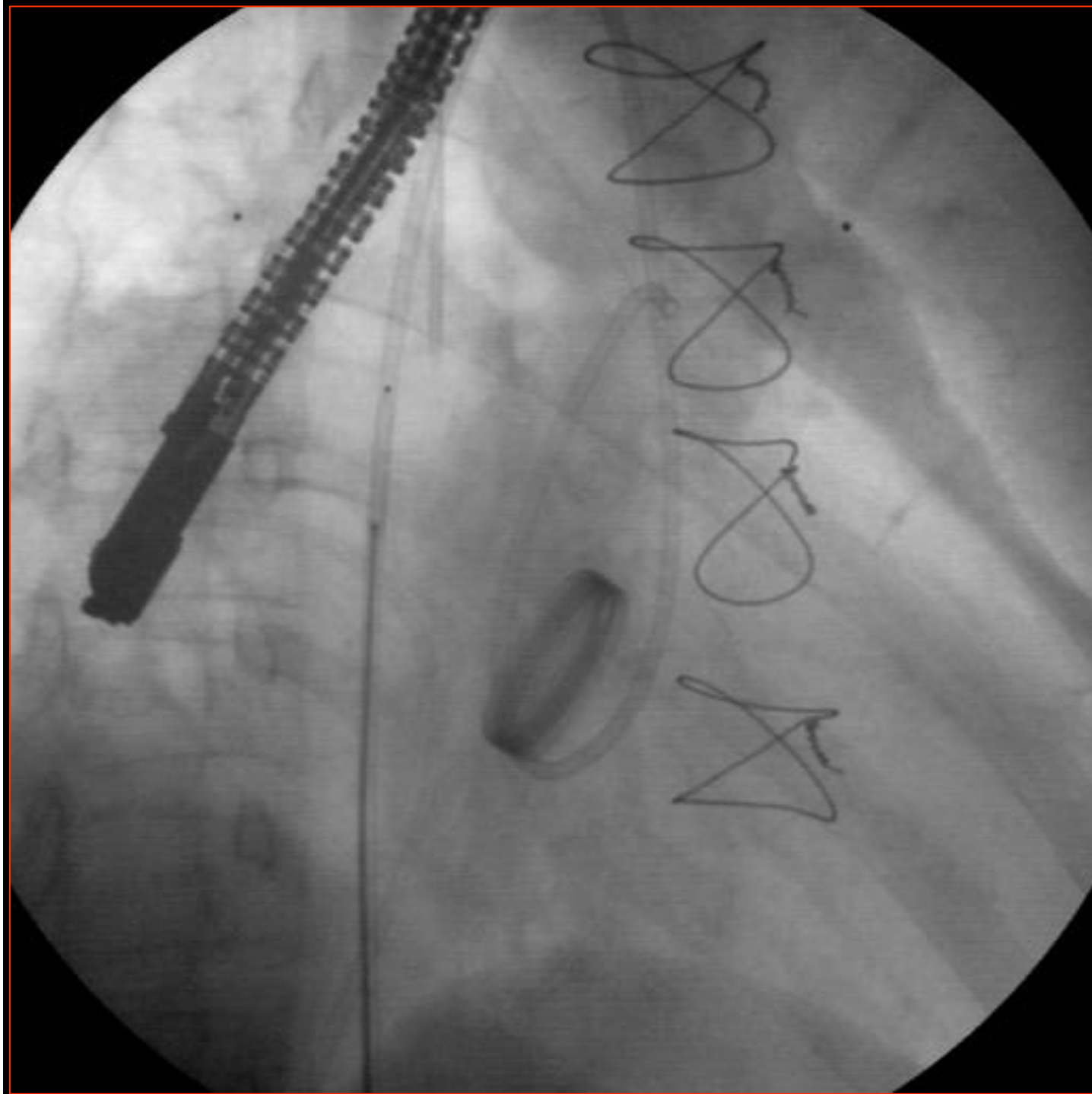
(Special tricks)

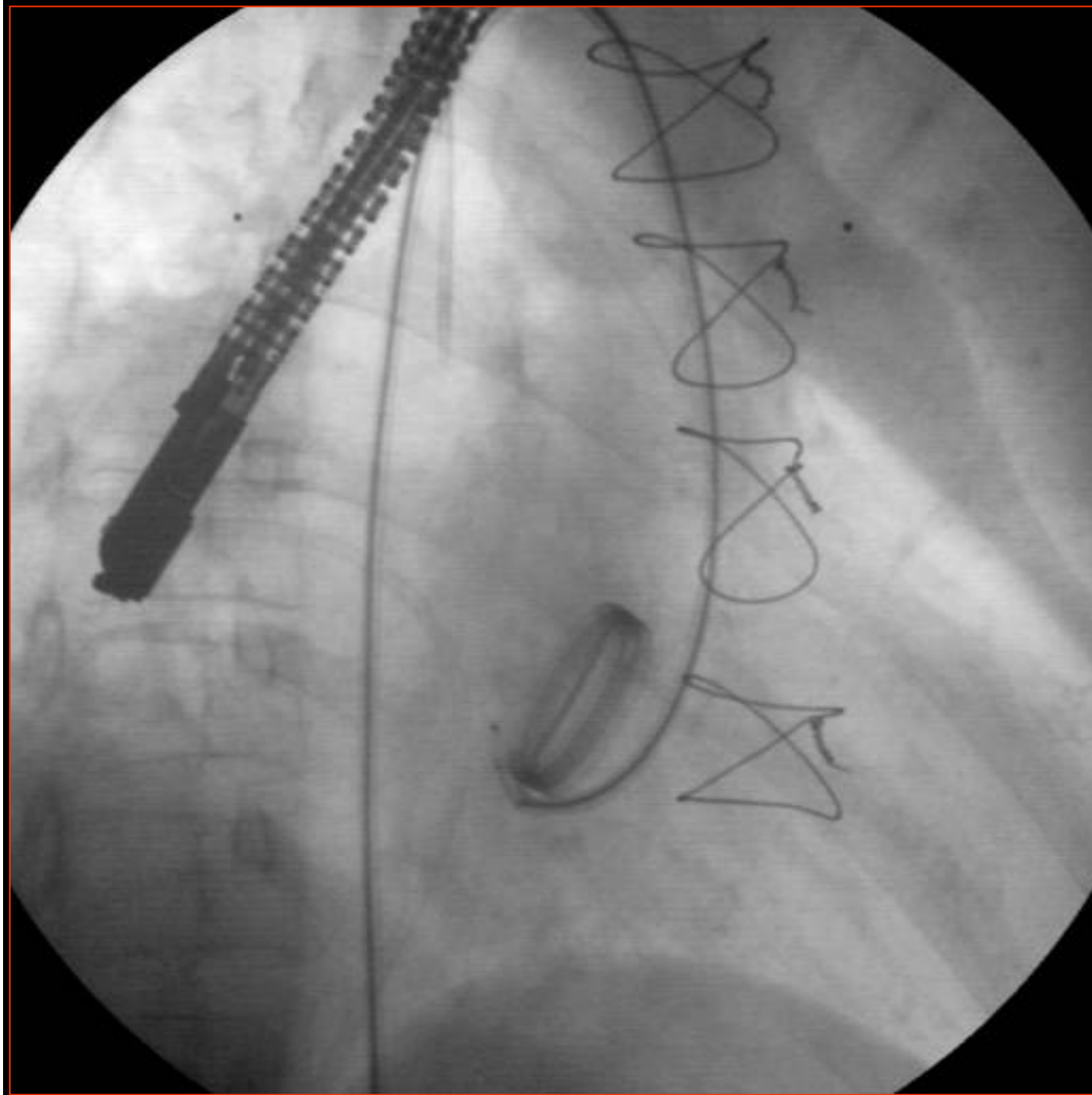
- 1. Use inflated Swan-Ganz catheter to undo LA loop**
- 2. LA-LV-Ao with hydrophilic wire for wire exchange**
- 3. Double transeptal for dual leak closure**
- 4. Mid opening of the Amplatzer distal disk to avoid valve mechanism interference**

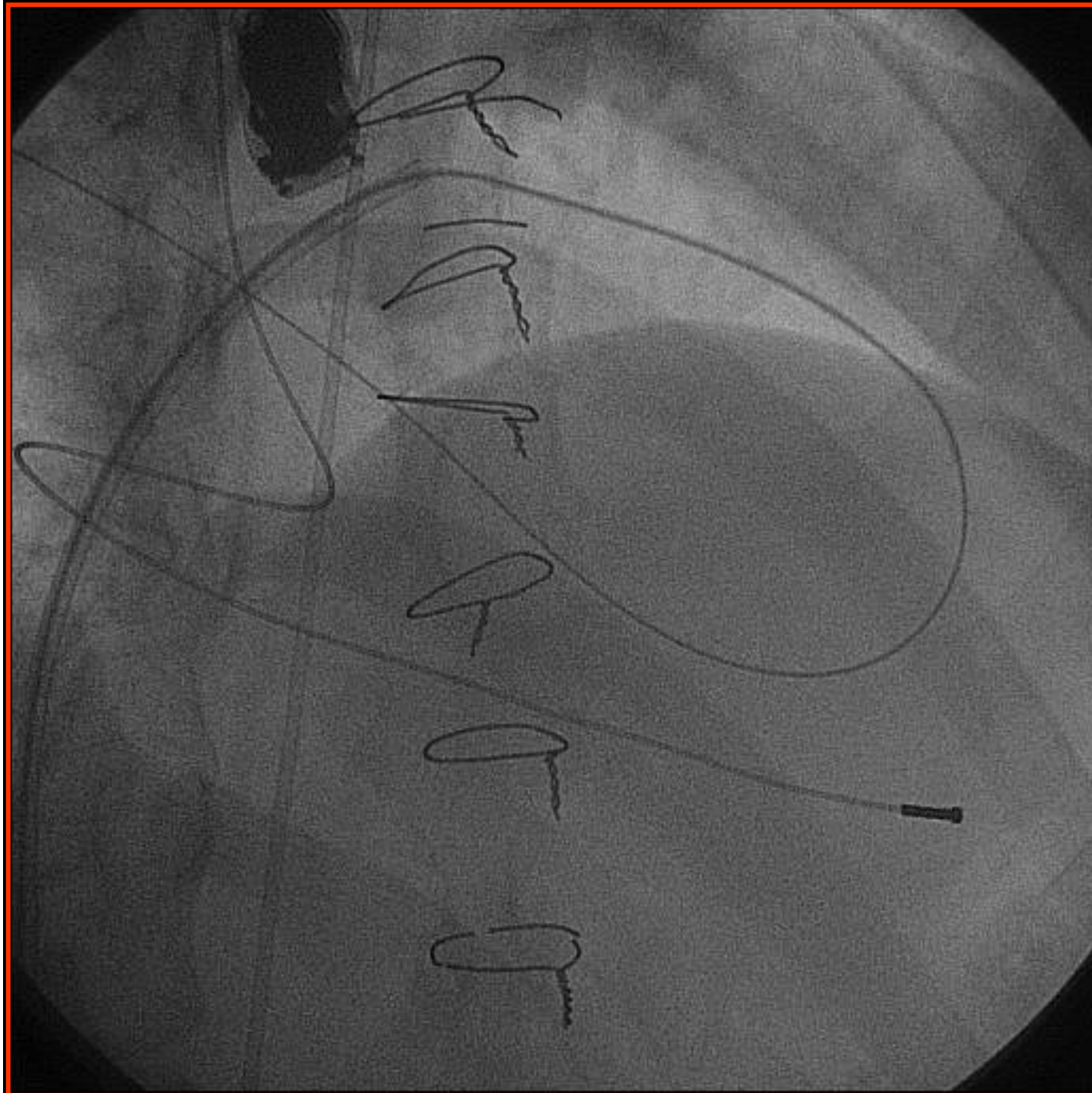


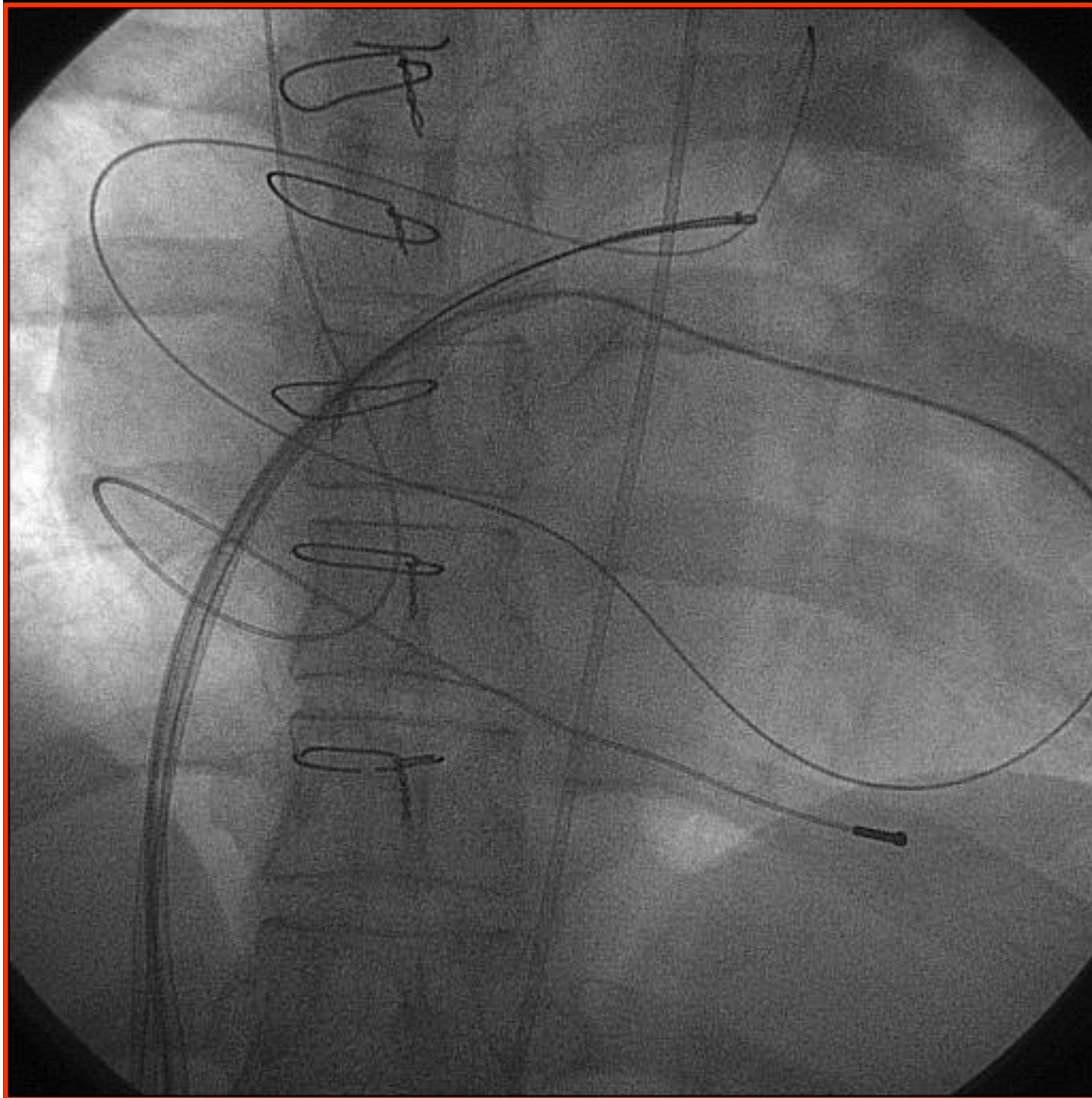


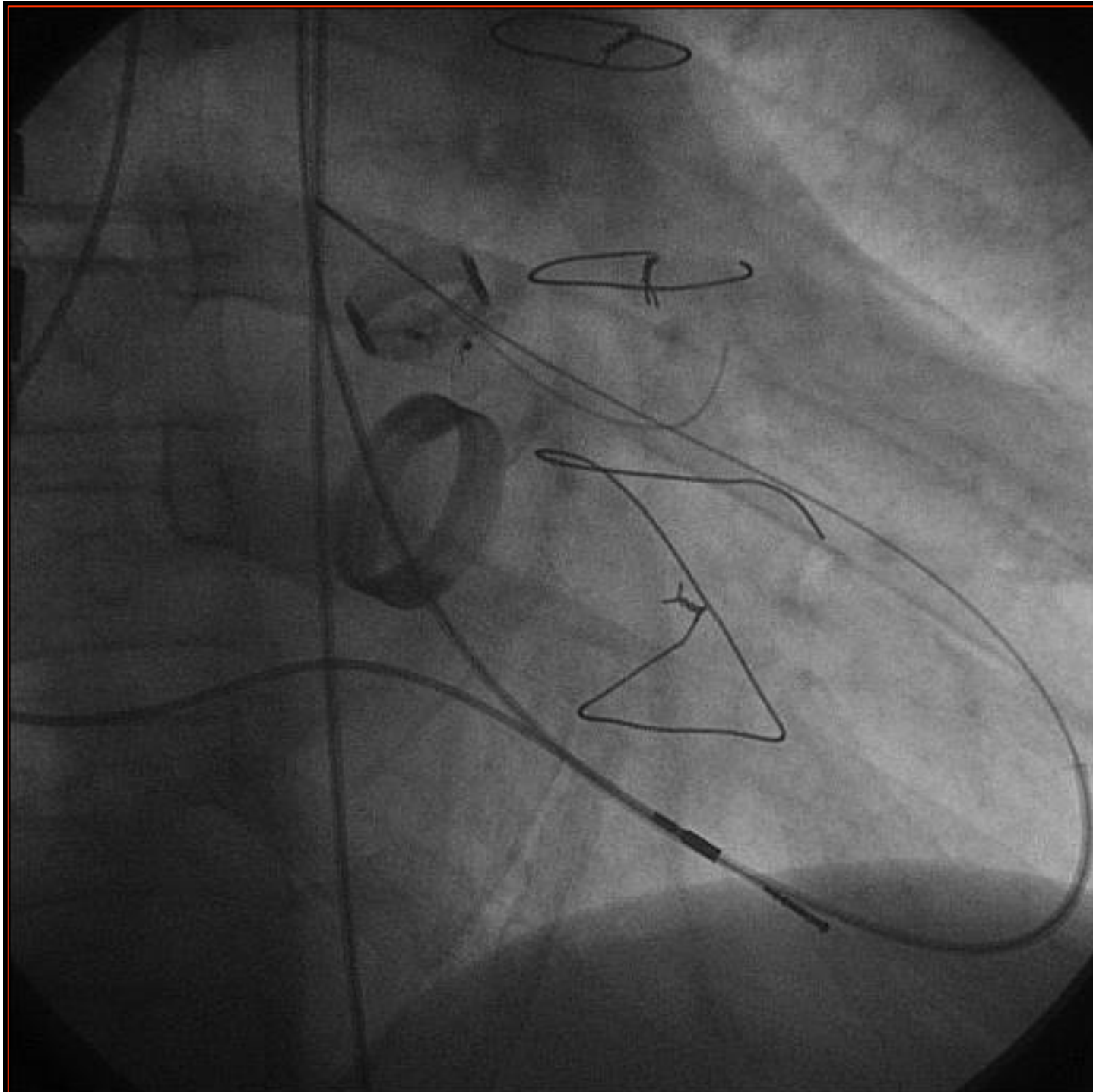


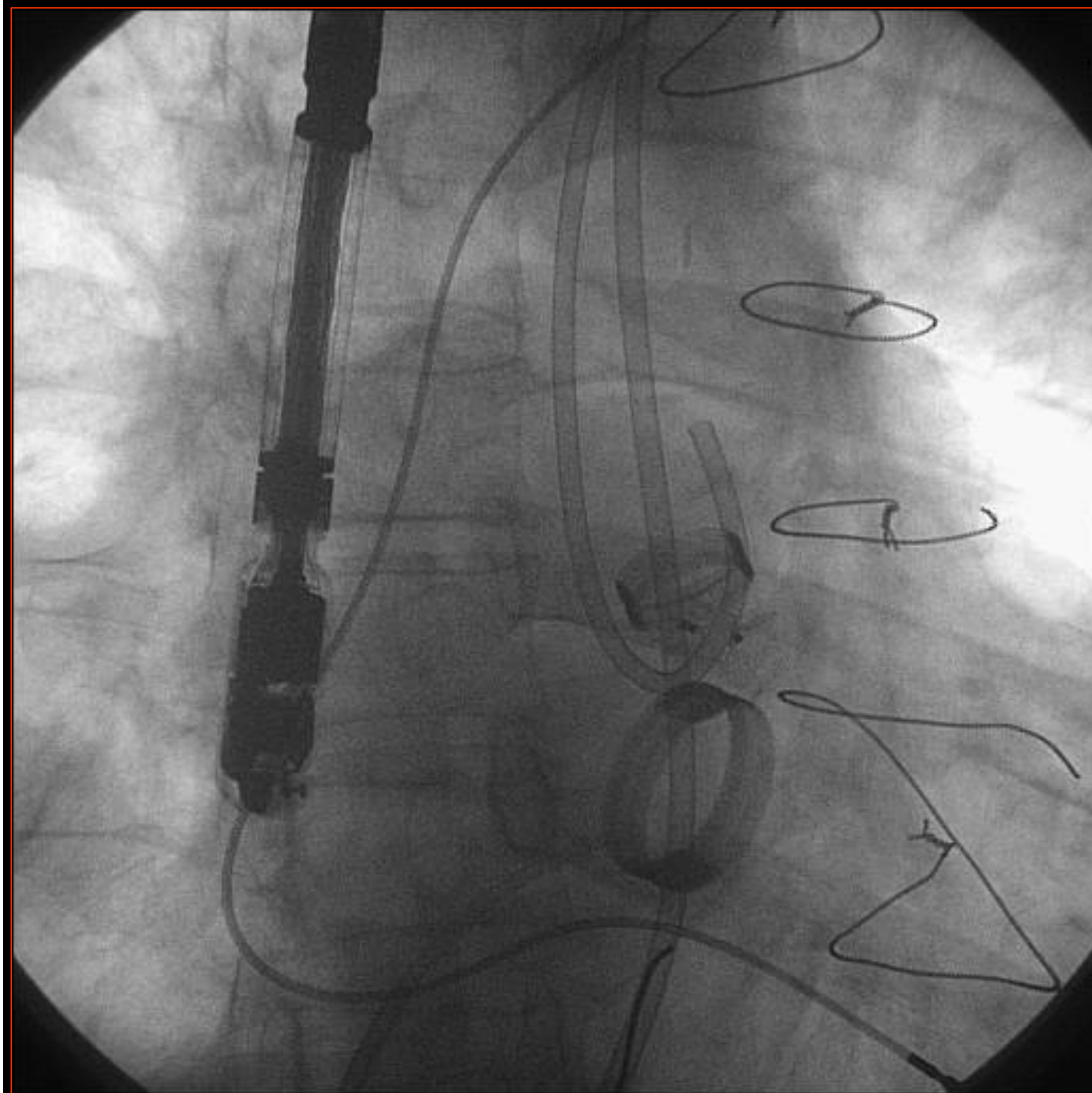












MITRAL PARAVALVULAR LEAKS

Demographics (36 pts, 44proc)

Age **63± 10 yrs**

Male gender **25 (69%)**

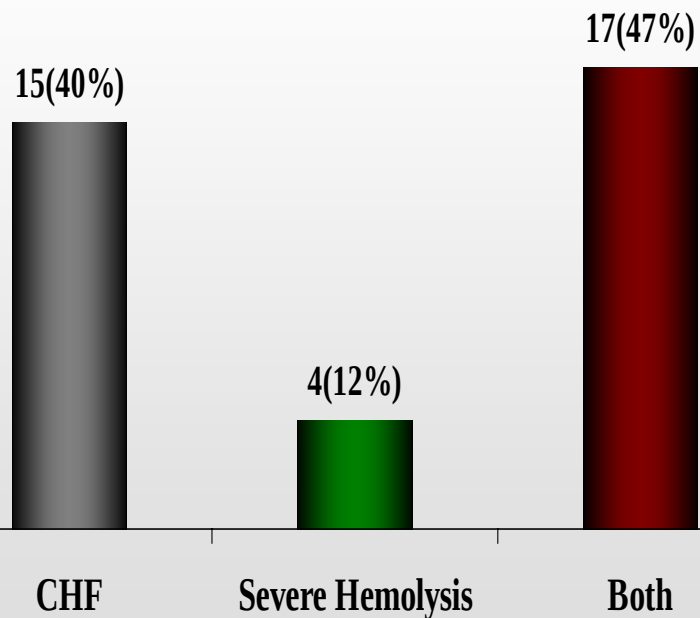
Time since 1st surgery **19 yrs**

NYHA III or IV **23 (64%)**

MITRAL PARAVALVULAR LEAKS

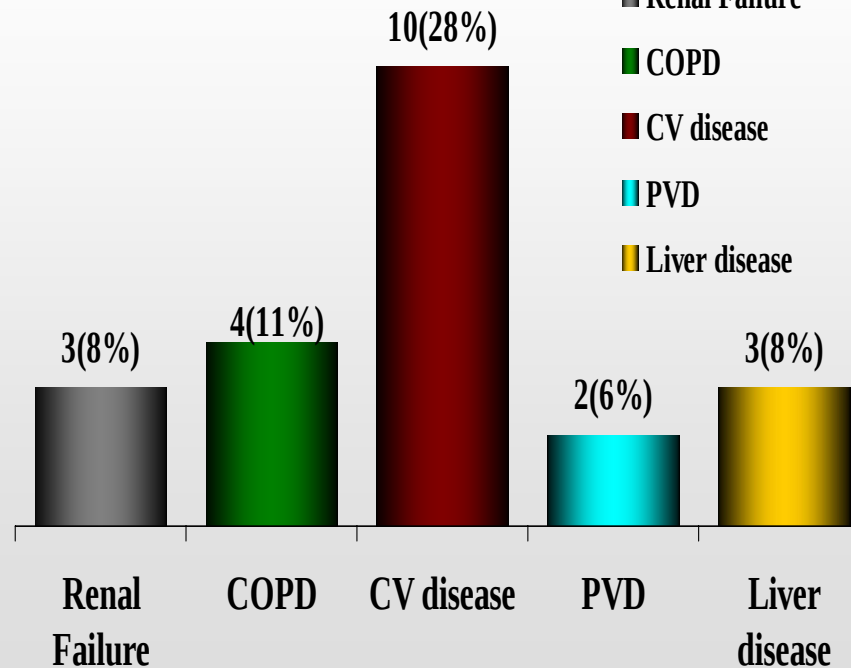
Clinical Indication

■ CHF ■ Severe Hemolysis ■ Both



Comorbidities

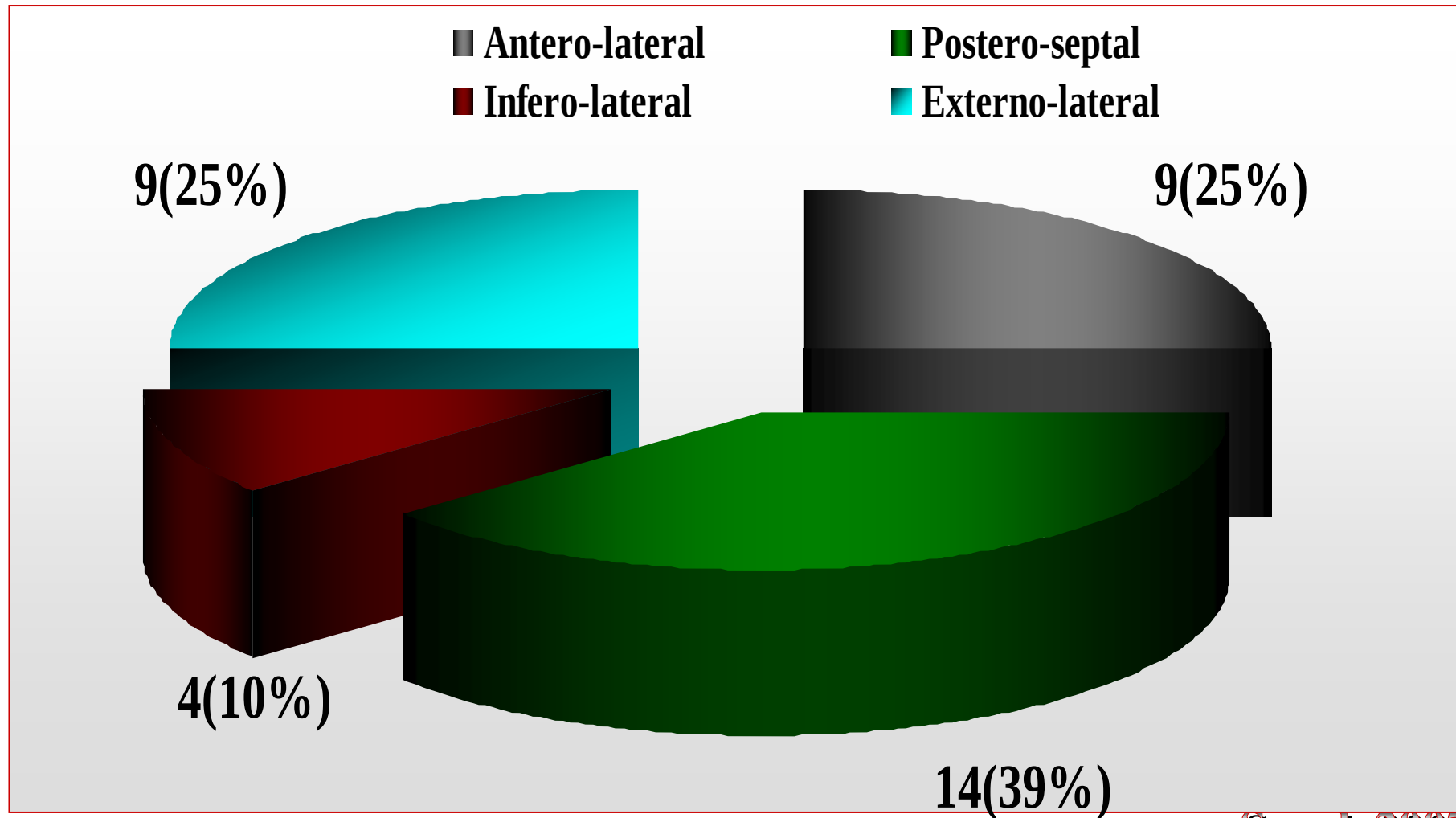
■ Renal Failure
■ COPD
■ CV disease
■ PVD
■ Liver disease



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MITRAL PARAVALVULAR LEAKS

Leak Location



MITRAL PARAVALVULAR LEAKS

Procedural events

Procedural mortality	0
Transient CVA	2
Myocardial perforation	1
Renal failure	1
Transient prosthetic block	1

MITRAL PARAVALVULAR LEAKS

FOLLOW UP RESULTS

Procedural success	24 /36 (66%)
Mortality (> 3 mo)	4/36 (11%)
Surgery (> 3mo)	3/36 (8%)
Clinical improvement	22/36 (61%)

Conclusions

- **Percutaneous repair of aortic paravalvular leaks is feasible in most patients**
- **Aortic paravalvular leak repair is not technically difficult and should be the first therapeutic option.**
- **Mitral paravalvular leak repair is technically demanding and can be contemplated in high risk surgical patients**
- **At this time there is not systematic procedural approach nor adequate device to repair these defects in a routine fashion. Every procedure is “ a la carte “.**
- **Efforts should be made to design device (s) to adequately treat these leaks.**