The 10th Anniversary, Interventional Vascular Therapeutics

"ANGIOPLASTY SUMMIT 2005"

TCT ASIA PACIFIC

Transcatheter Closure of Acute Myocardial Infarction VSD

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Post Infarction VSD

- Uncommon (incidence:0.2%) ***yet*** **fatal** complication of Acute MI (commonly seen in AWMI).
- Anatomically different from congenital VSD
  - rims of the defect are smooth
  - easy device closure
- Extensive tissue loss causing septal rupture indicates *large area of necrotic* myocardium

Post Infarction VSD

- Hemodynamic compromise seen even before full extent of rupture is reached; increases in setting of myocardial dysfunction
- Thrombolysis → myocardial hemorrhage → may accelerate development of VSD

Case 1

- 61 yr old male, diabetic, hypertensive,
- AWMI, Thrombolysed
- Developed CCF after 24 hours.

- Echo: 8-9mm muscular VSD, akinetic distal septum,
  Moderately severe LV dysfunction.

- Cath (8 days post MI): Diffuse Triple Vessel CAD
  (Poor calibre target vessels),
  9 mm muscular VSD,
  Moderate PAH

MY FIRST THOUGHT → Medical Management

BUT

Patient continued to be in heart failure ***2 weeks*** post – MI

Hence successful device closure of VSD carried out using
10 mm Amplatzer Muscular Occluder

Trans Catheter Device Closure (TCC) of Post-Infarction VSD (PIVSD)

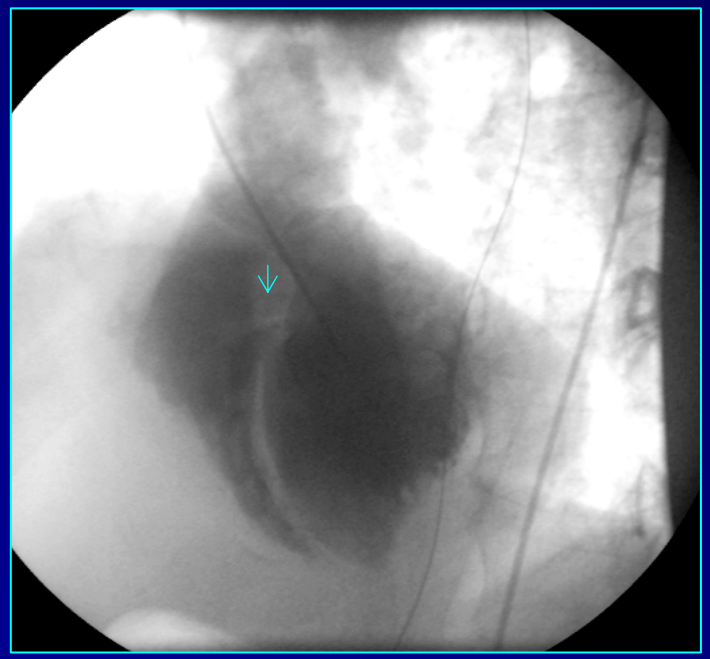
- Under GA, RFA, RFV, LFA and Right IJV cannulated.
- TEE done to profile & size the VSD.
- VSD crossed via *retrograde* arterial approach; Exchange wire which was placed in the RPA snared using the Amplatz Goose–neck snare and placed in the RIJV.

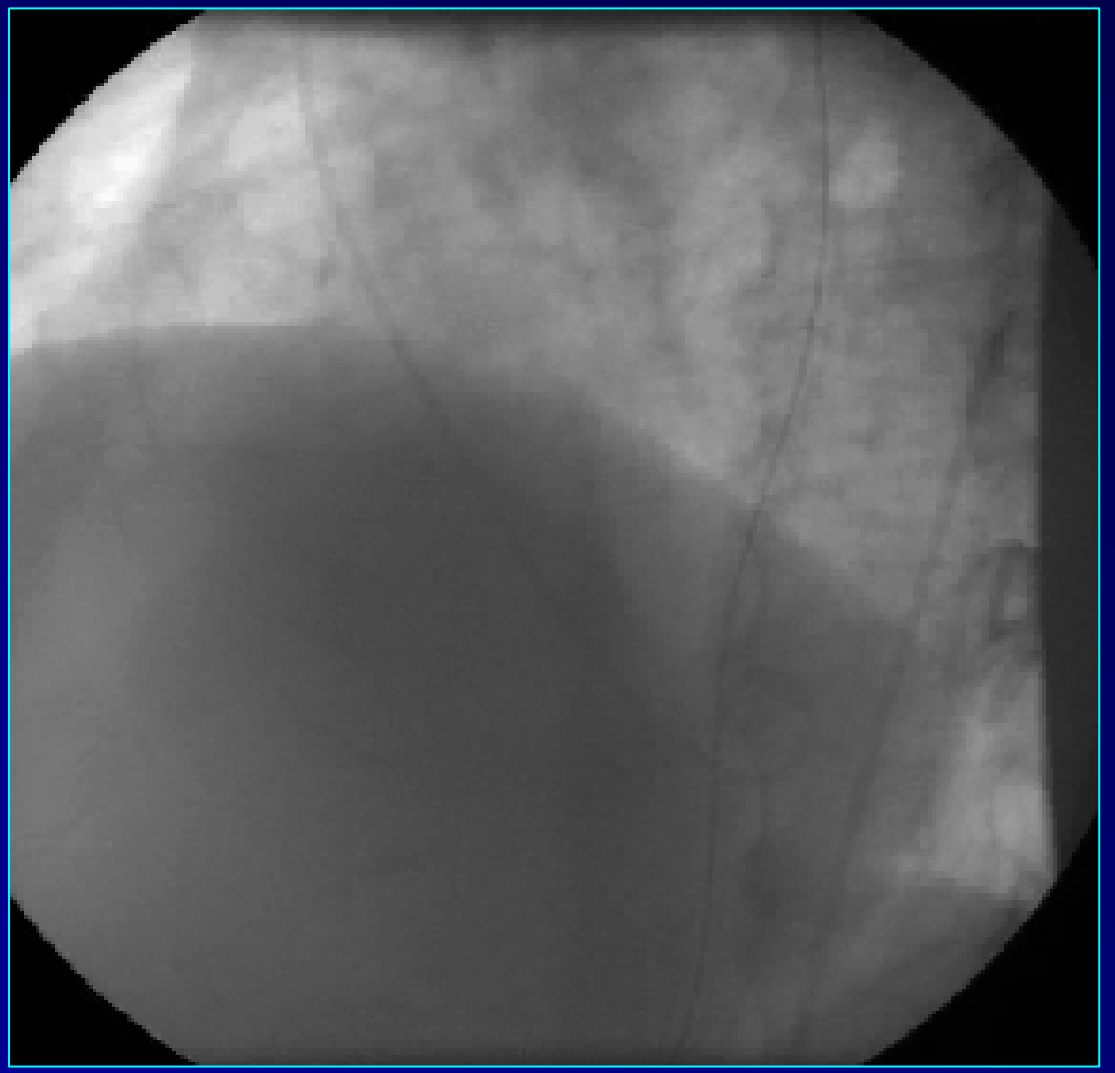
Mullasari AS et al. Cathet Cardiovasc Intervent 2001;54:484-487

Trans Catheter Device Closure (TCC) of Post-Infarction VSD (PIVSD)

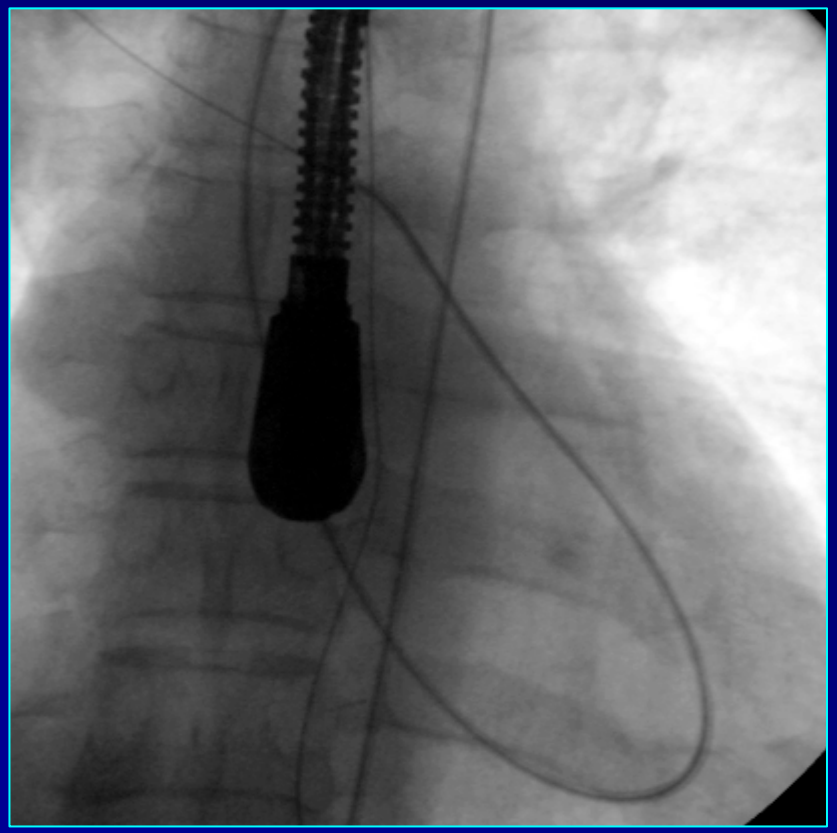
- A 9F long sheath is then advanced across the VSD from RIJV and the device introduced; the distal disc in the LV side is deployed first

- The RV arm released after confirmation of adequate positioning

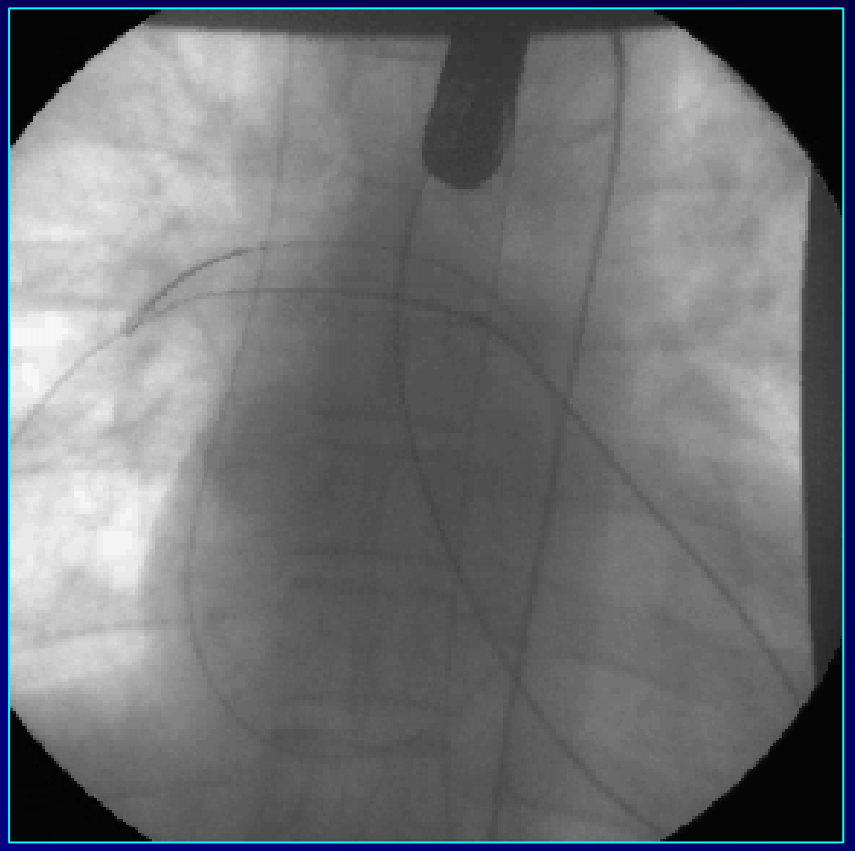




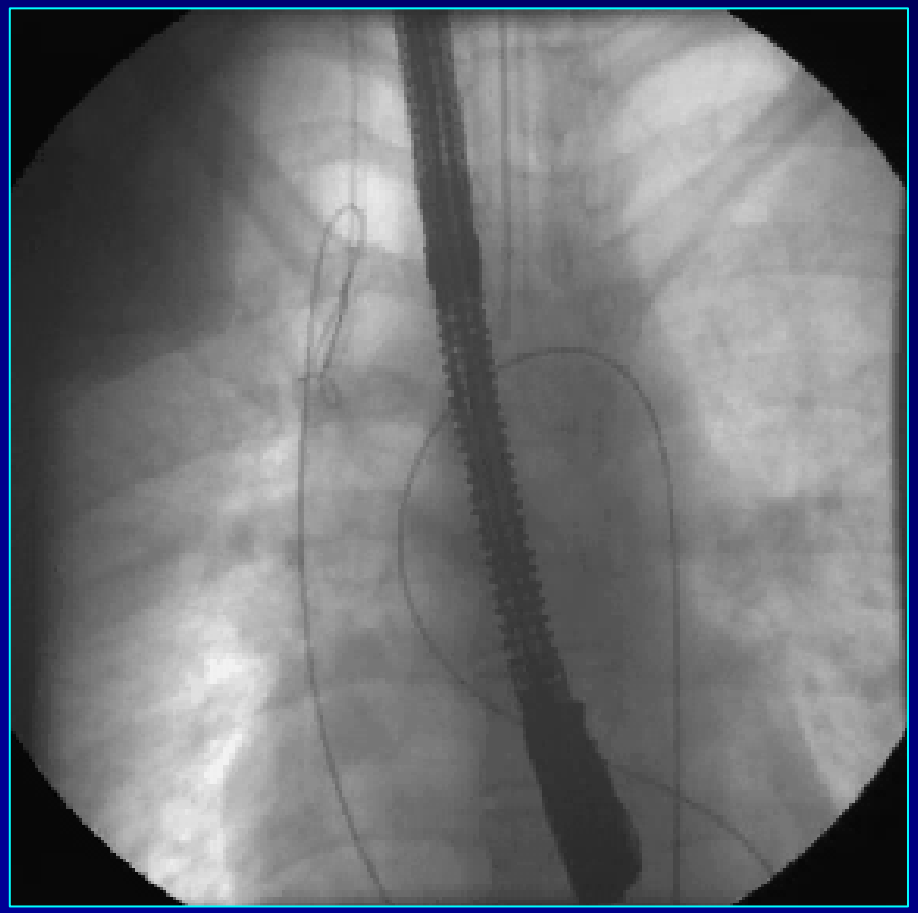
Apical Muscular VSD



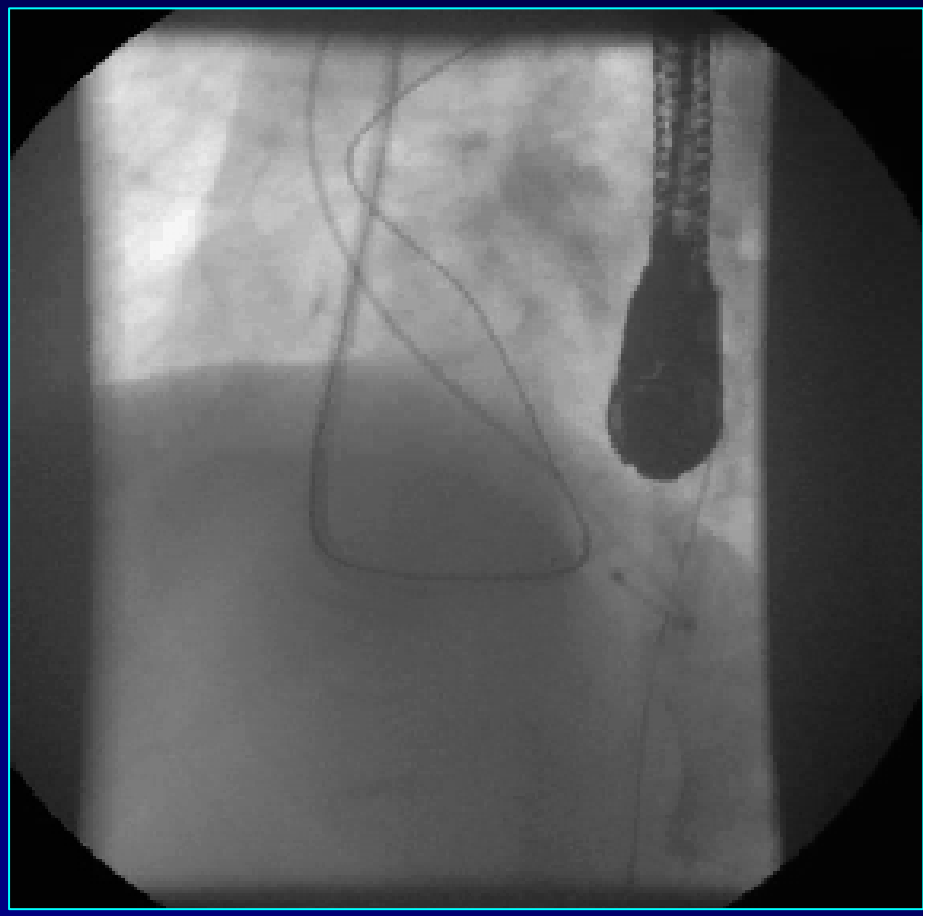
VSD crossed with 6F AR1 catheter & Angled Terumo wire



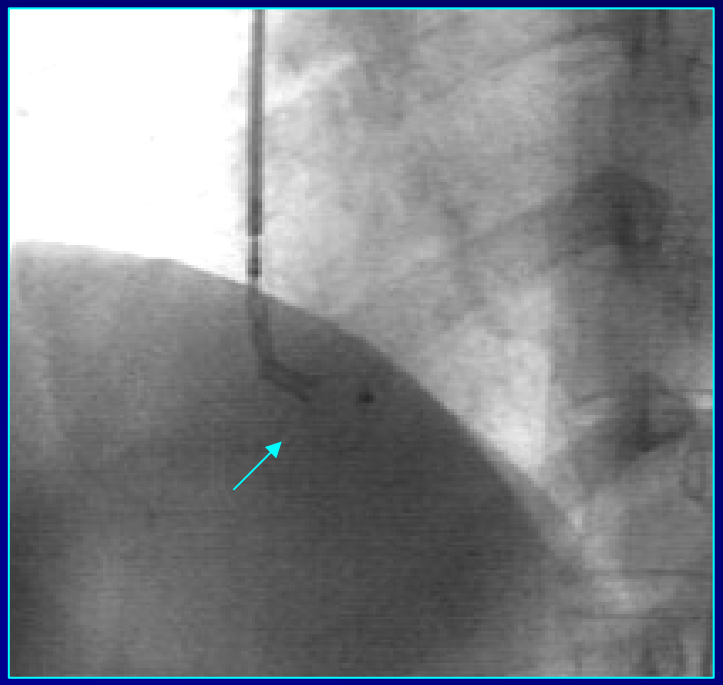
J Exchange wire is snared using Amplatz Goose neck snare

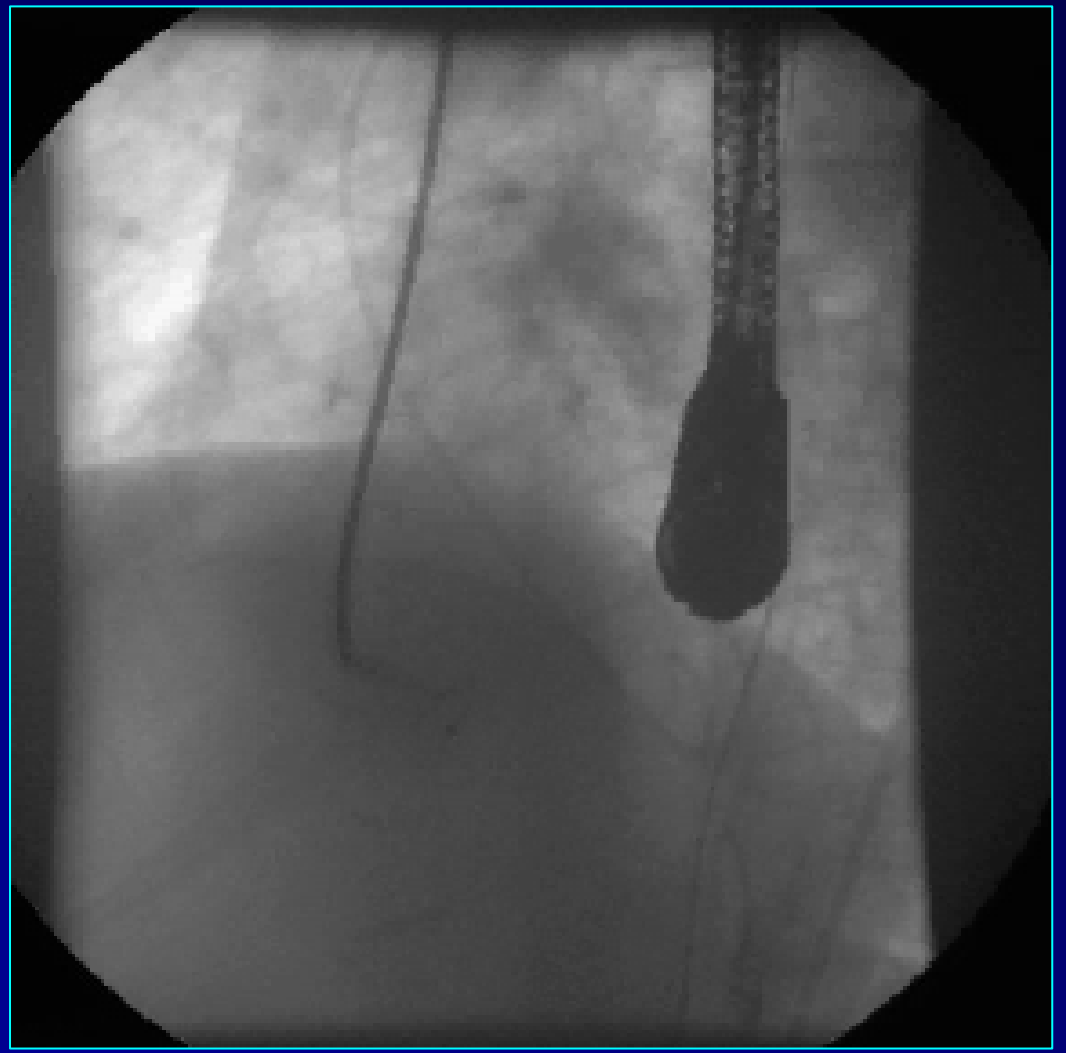


Snaring of wire into the RIJV



Long sheath across VSD

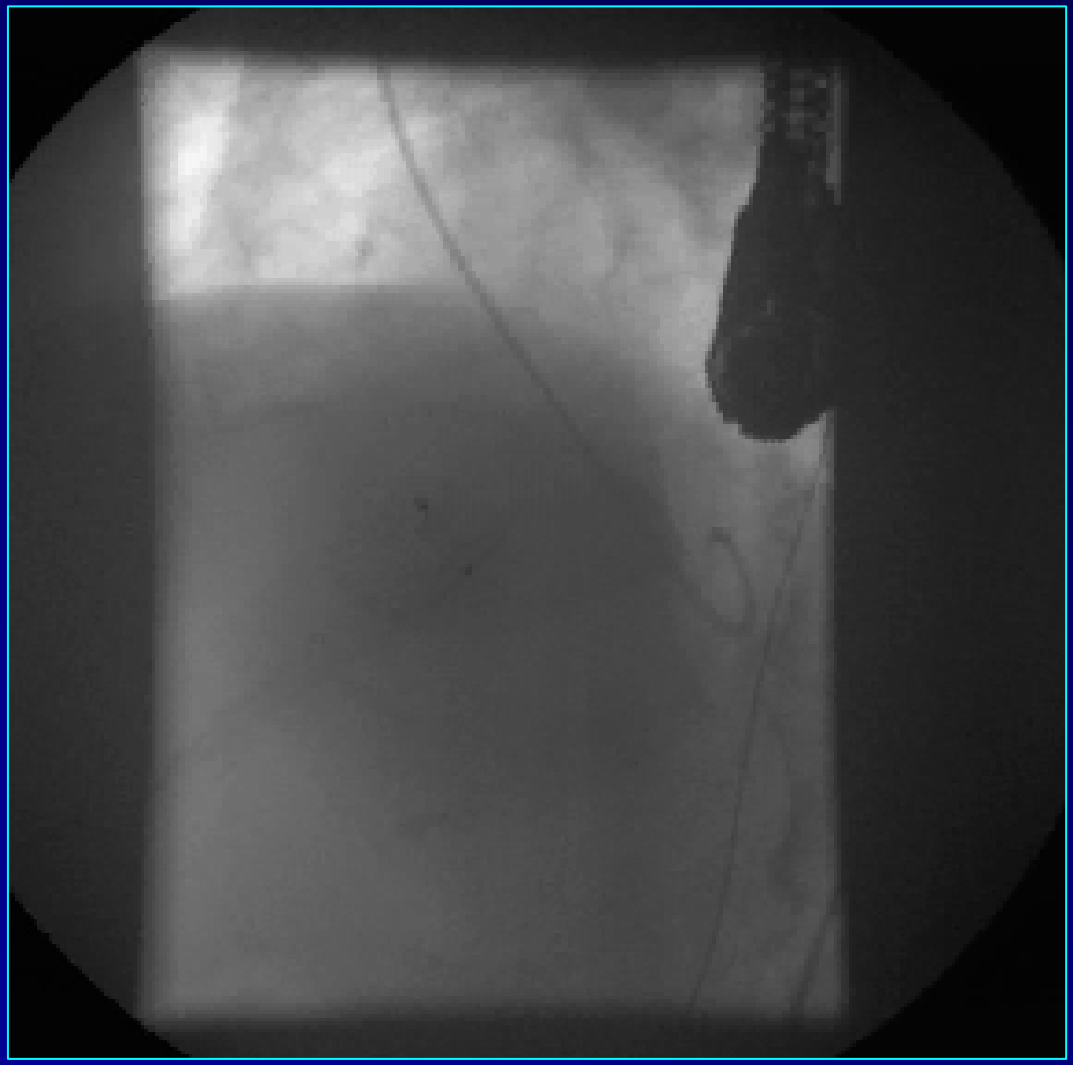




The LV rim is deployed first

The Device

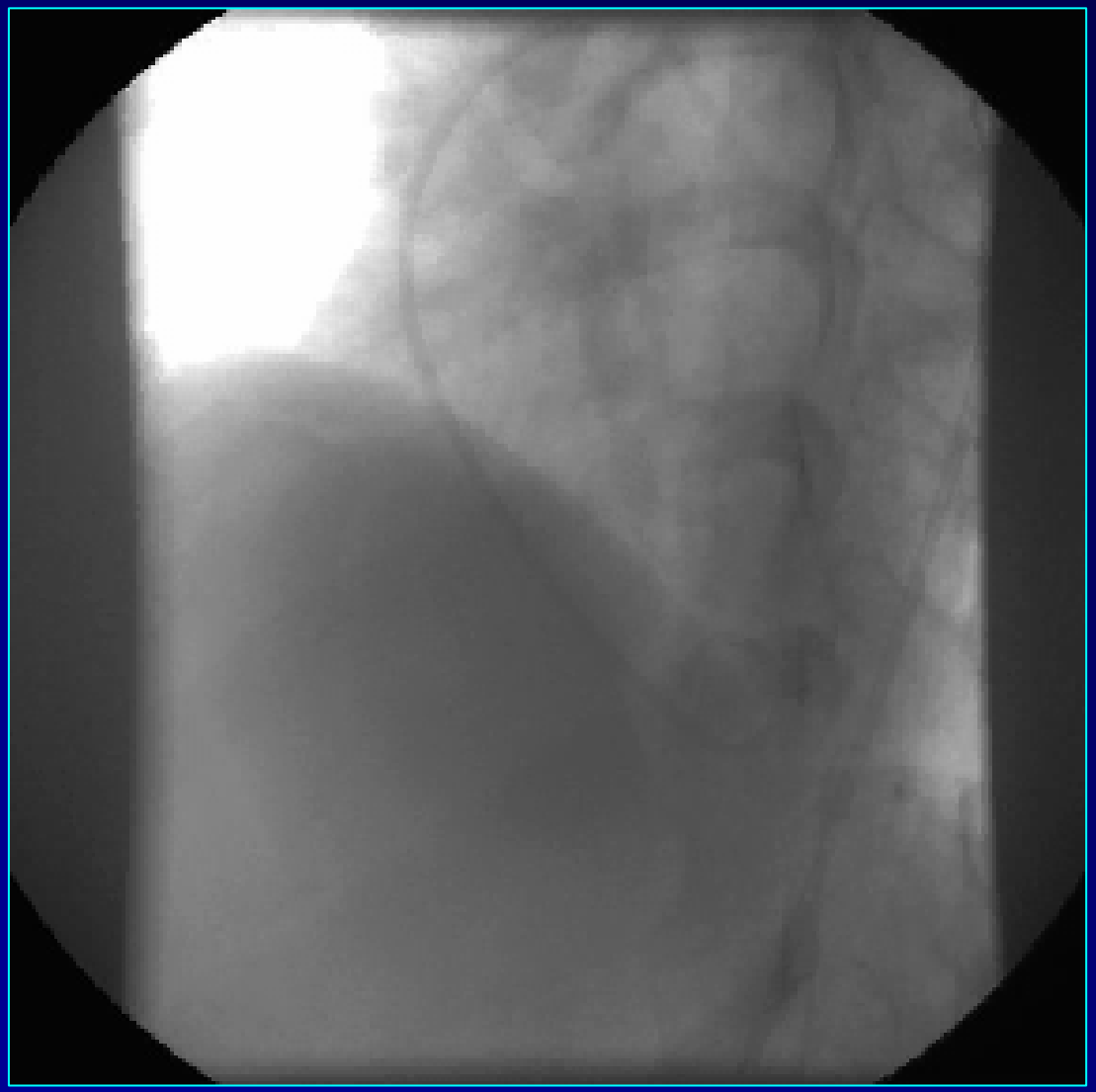
Positioning & Deployment



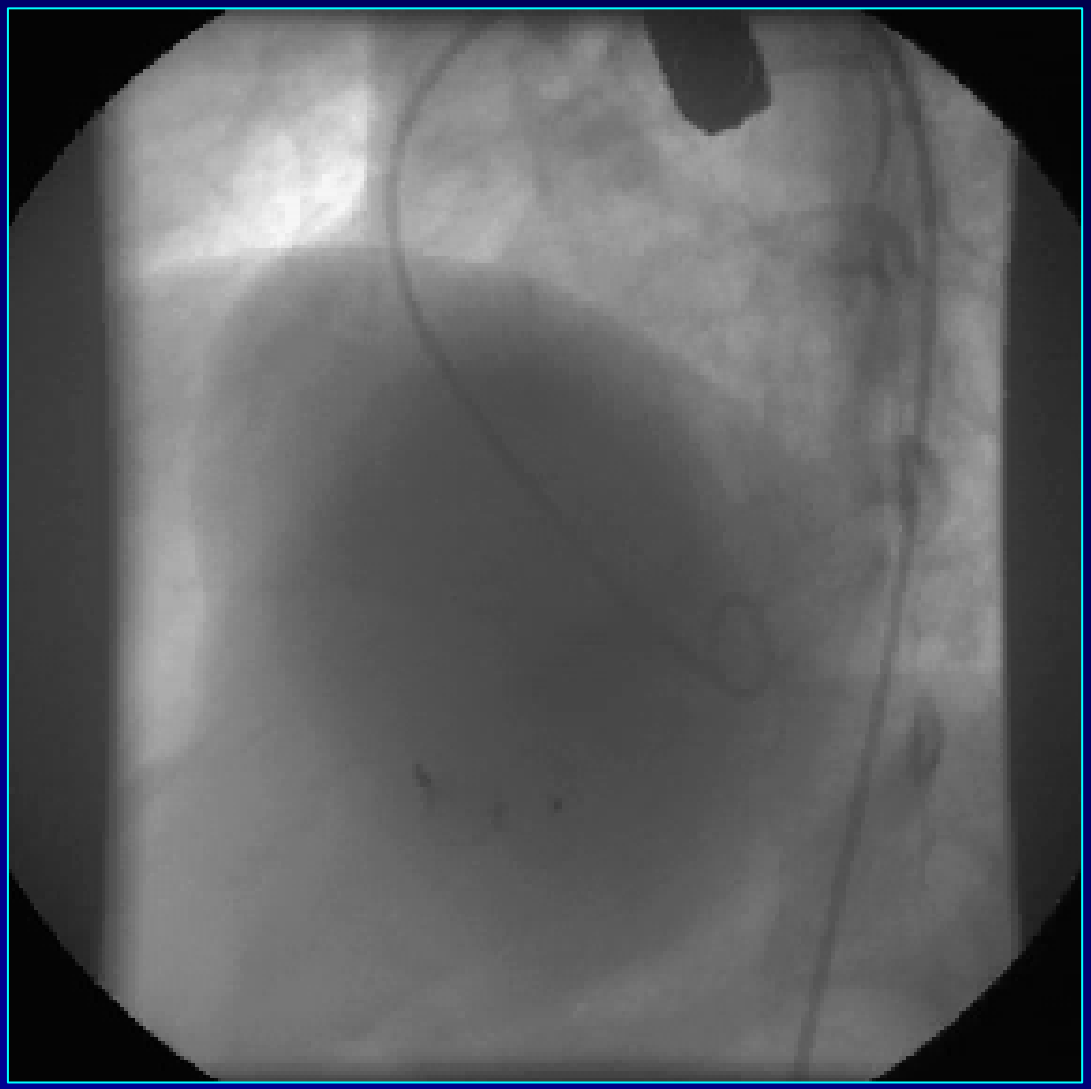
Final Result

Case 2

- 43 yr female
  - – Apical muscular VSD (L →R shunt)
  - - Normal PA pressures
- Successful device closure of VSD done using 14 mm Amplatzer Muscular Occluder



Apical Muscular VSD



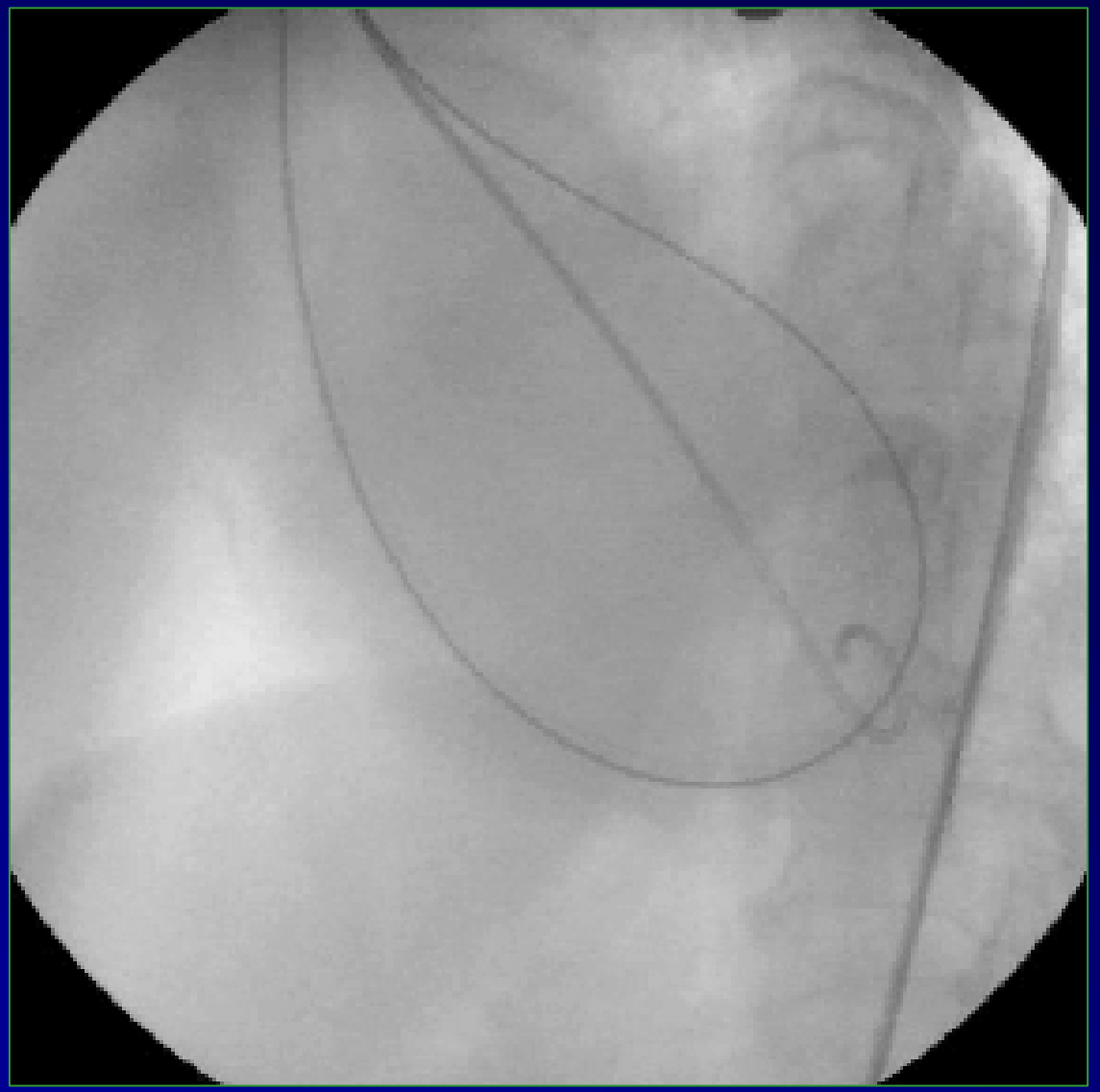
Post Device Closure

Case 3

- 55 yr old female (AWMI, thrombolysed)
  - 10 mm apical muscular VSD in post-infarction period
- Cath (7 days post MI) –
  - Apical Muscular VSD
  - 90% LAD stenosis,
  - ModeratePAH
- Plan: PTCA ± Stent to LAD after Device closure of VSD

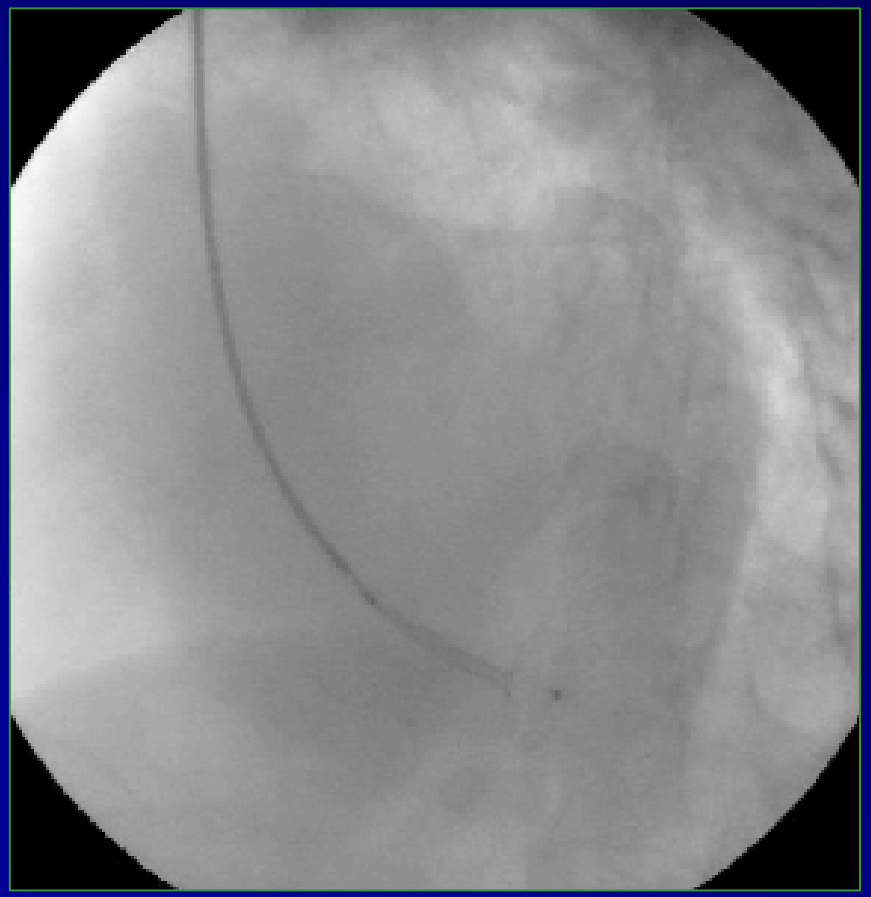
Case 3

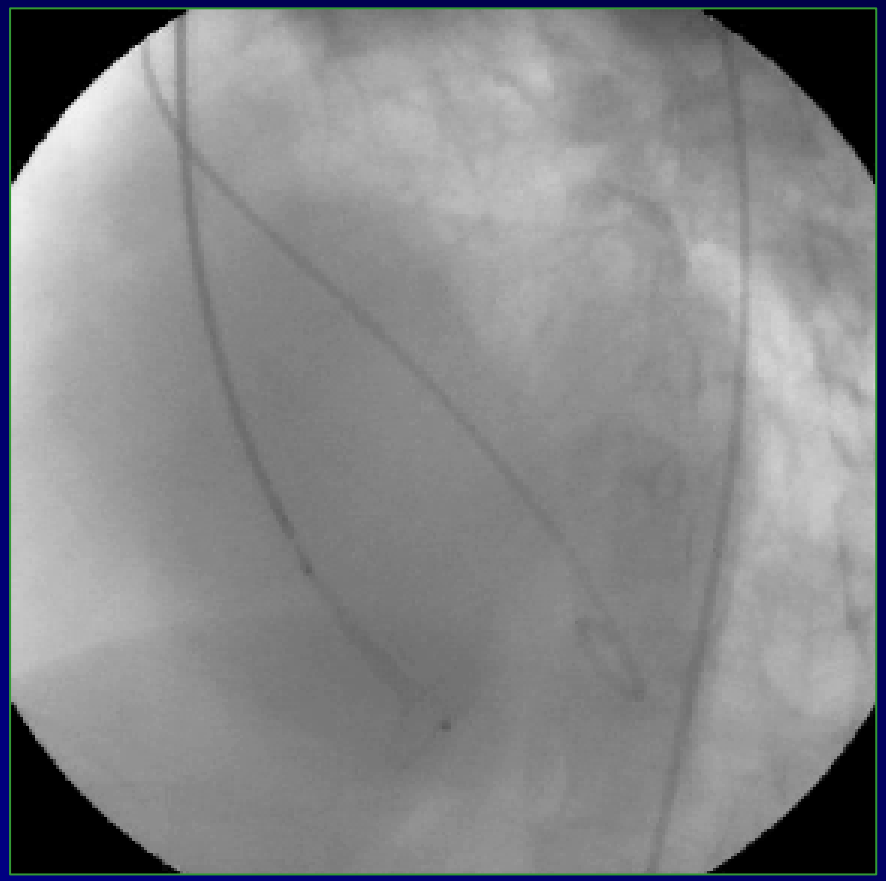
- Attempted Device closure with 10 mm & 16 mm Amplatzer devices - both of them cut into the RV side
- Deterioration of hemodynamic status requiring IABP insertion & Inotropic support
- Successful emergency surgical repair carried out.



High Apical VSD

LV rim of 10mm Device in RV *after* cutting through VSD





16 mm Device cutting through VSD leading to hemodynamic instability - procedure abandoned

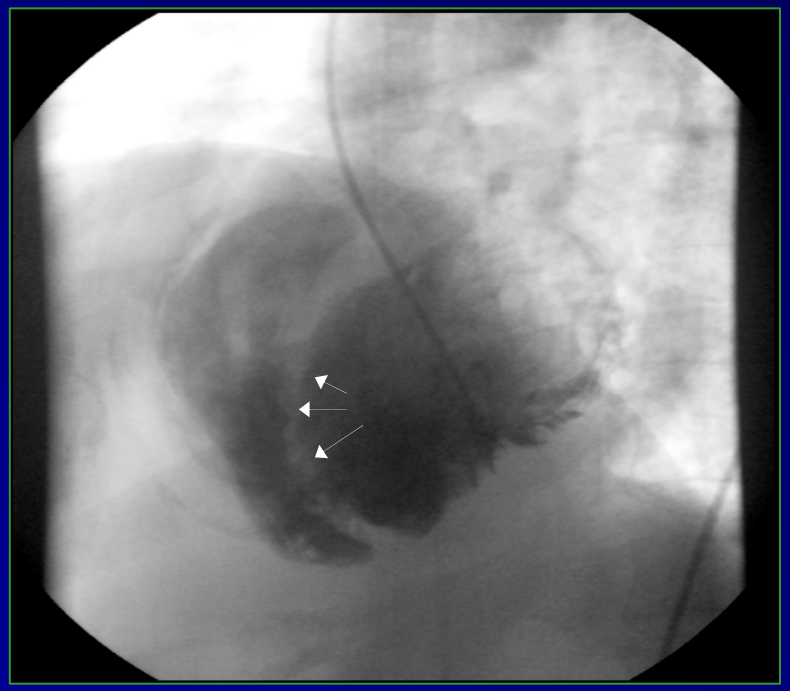
Case 4

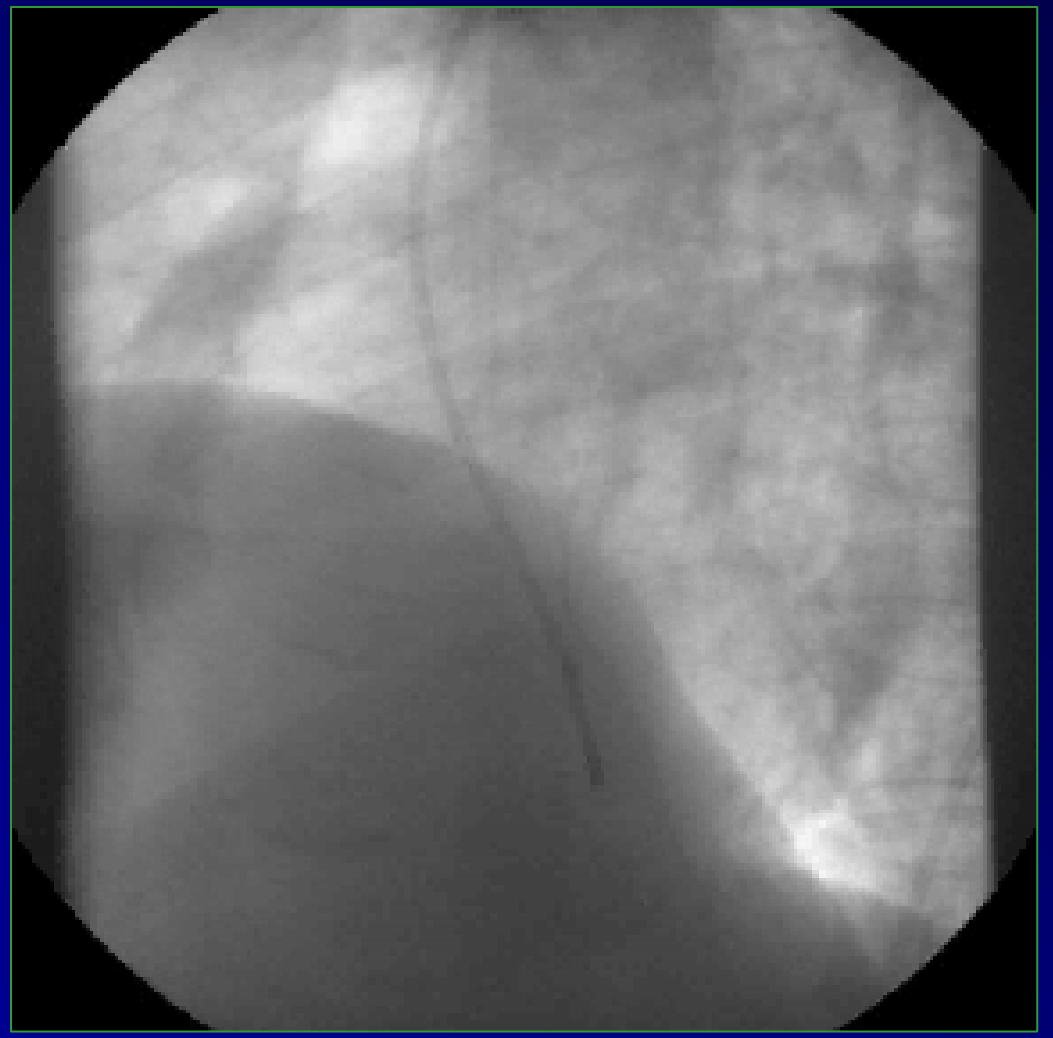
- 55 yr old male (Extensive AWMI, thrombolysed)
  - 2.5 – 3 mm acquired VSD in the post-infarction period

- Cath (7 days post MI):
  - Multiple sieve –like Apical VSDs,
  - Septal aneurysm,
  - Total occlusion of LAD,
  - Mildly elevated PA pressures.

Case 4

- Plan: In view of dyskinetic septum, advised surgical repair of VSD + Graft to LAD.





Multiple ‘sieve-like’
VSDs +
Bulging IVS

	US REGISTRY n-18 *	POLISH EXPERIENCE n-7♣
PROC. SUCCESS	16	5
RESIDUAL SHUNT	6	4
REPEAT PROCEDURE	2	1
30 DAY MORTALITY	28%	28%
FOLLOW – UP	11 (332 days)	4 (326 days)

* **Holzer et al, Device closure of post infarct VSD,** ***Catheter Cardiovasc Interv 2004; 61:196-201***

♣ **M Szkutnik et al, Postinfarction VSD closure with Amplatzer occluders** ***EJCTS 23 (2003) 323-327***

When & How do we Intervene ?

- Maximal medical management (IABP, Inotropes etc.,) prior to intervention carries a high mortality rate.

- Early surgical correction offers good results

but

High rate of recurrent / residual VSDs (patch dehiscence, development of new or overlooked VSD) & high mortality rate (~ 11-35%)

- Trans catheter closure could be considered an interim measure prior to urgent surgery or a permanent alternative to primary or re-do surgery.

Unresolved Issues in TCC

- Large area of necrotic muscle will cause "**cutting-through**" of the device from the LV to the RV, thus enlarging defect resulting in hemodynamic instability

- Anatomical issues:
  - High apical VSDs: inadequate septal tissue
  - Posterior location of VSD: accessibility

- Septal aneurysm poses a major problem in positioning and optimal deployment of the device.

Can we….?

- Maximize medical management & wait for
  - improvement in clinical status
  - scarring of tissue reducing the friability
- Oversize devices
  - To cover maximal area of friable tissue & prevent ‘cutting through’
  - In cases with aneurysmal septum, to seal it along with the defect