Transcatheter Closure of Acute Myocardial Infarction VSD

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The 10th Anniversary, Interventional Vascular Therapeutics
“ANGIoplasty Summit 2005”
TCT ASIA PACIFIC
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, Moderate 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*
• 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,
  - Moderate PAH

- 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
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<td>PROC. SUCCESS</td>
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<td>REPEAT PROCEDURE</td>
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<td>30 DAY MORTALITY</td>
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<td>FOLLOW – UP</td>
<td>11 (332 days)</td>
<td>4 (326 days)</td>
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♣ 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