

Successful Closure of Post-Myocardial Infarction Ventricular Septal Defect with Transcatheter Occluder



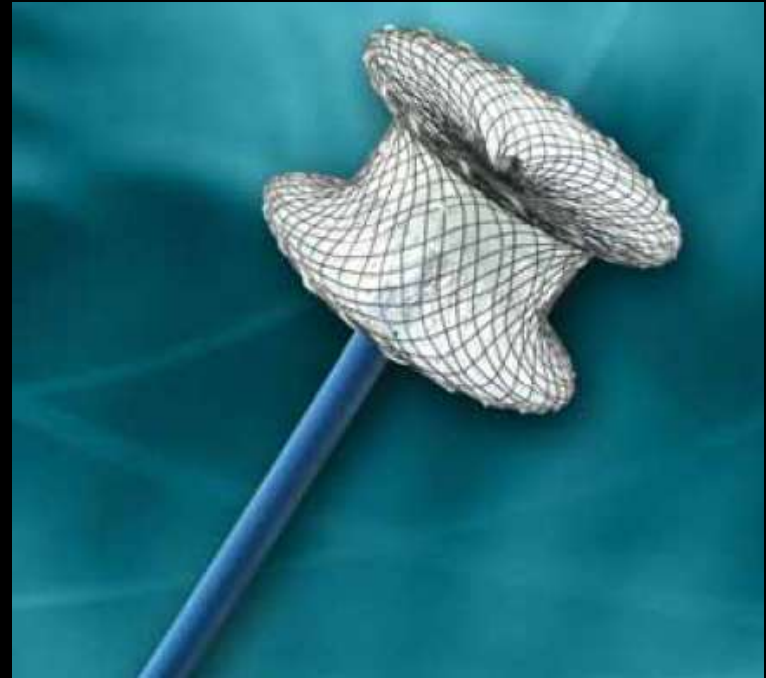
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Background

- The incidence of Ventricular septal defect (VSD) in acute myocardial infarction (AMI) is reported to be 0.2 %.
- Mortality rates of surgical closure remain high in most series (20-87%).
- Transcatheter closure by VSD occluder is an accepted alternative to surgery.



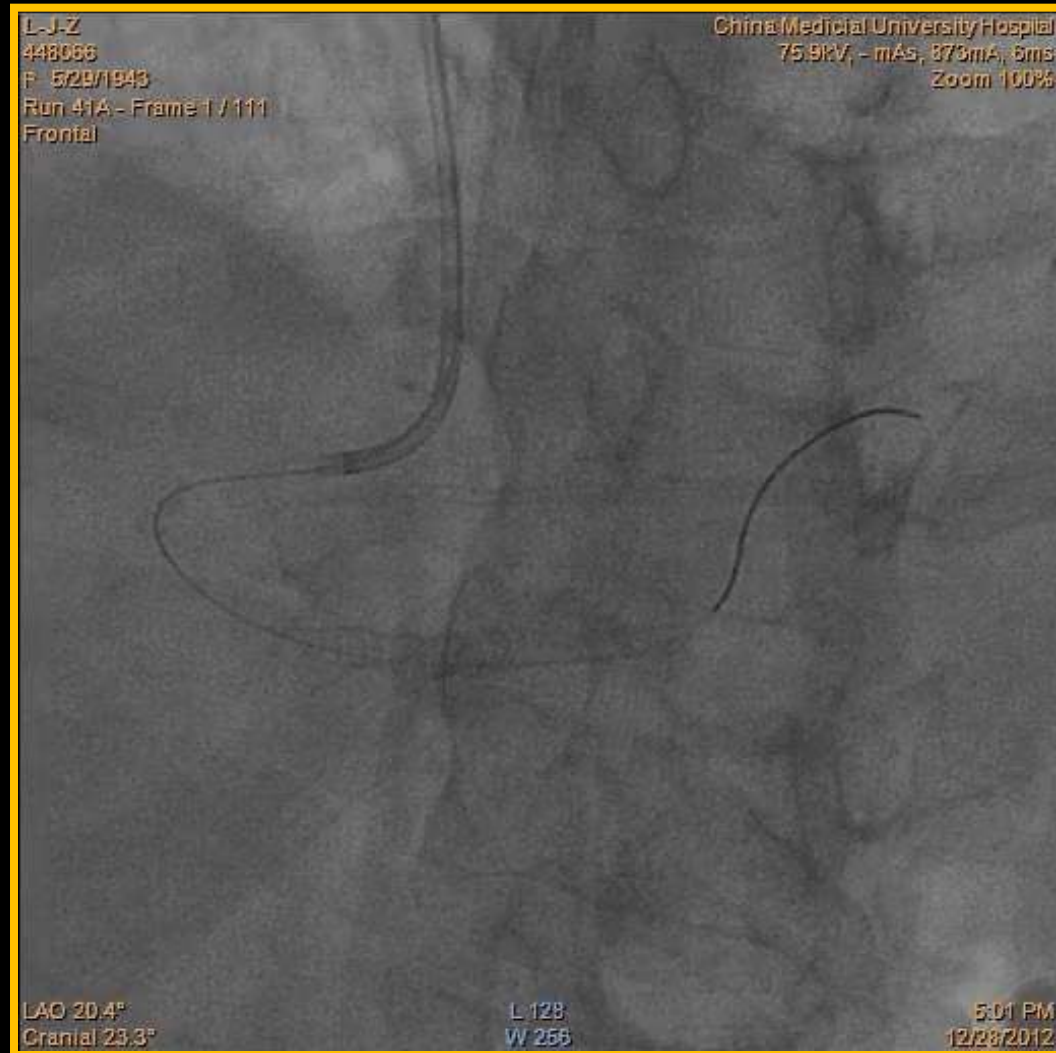
Brief History (1)

- 69 y/o female with HTN, hyperlipidemia & ESRD on CAPD
- Drug history: amlodipine, bisoprolol, doxazocin, Fenofibrate
- Family history: No remarkable
- In 2012/12, she suffered from progressive exertional and resting chest tightness.
- Worsening dyspnea and dizziness developed on the next week.
- She was sent to CMUH emergency department.

NSTEMI with cardiogenic shock was noted...

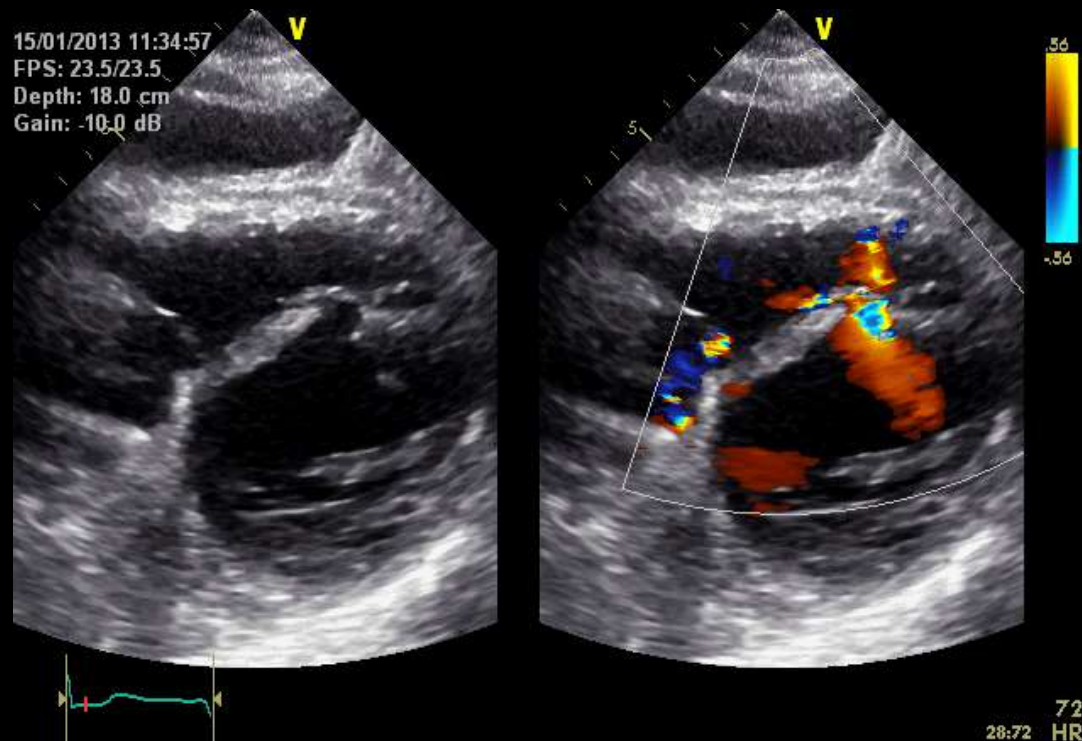


PCI to distal RCA with DES and IABP support...



Post-PCI Echocardiography

- Preserved LV systolic function (EF 59%)
- Type IV, muscular VSD, 1.5 mm with left to right shunt
- Trace TR, MR, AR



What is the most adequate timing
for post-MI VSD closure?

Early or delayed ?

Early vs. delayed surgical closure of post-MI VSD

- Emergent surgical closure of post infarction VSD had been the standard treatment.
 - Technically complicated by soft and fragile myocardial tissue.
- Retrospective studies: better results when surgery was delayed by **6 weeks**
 - Myocardial fibrosis occurred.
 - Scarring at tissue edge permit more secure closure.

Early vs. delayed transcatheter closure of post-MI VSD

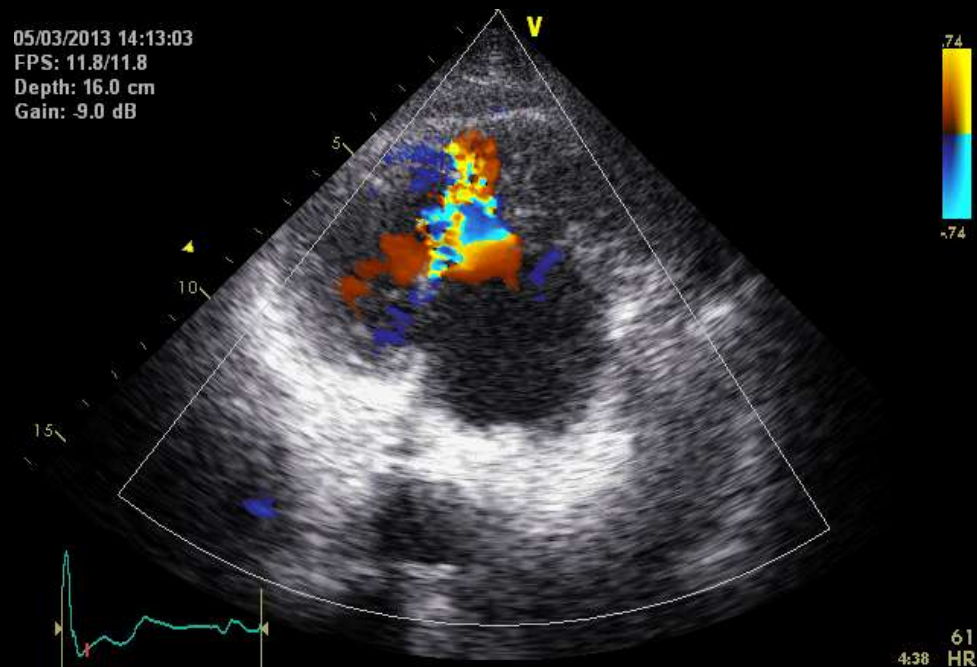
- The rate of complete closure by transcatheter procedure is reduced in the acute setting.
 - The peri-VSD tissue may subsequently necrose and scar
 - Retraction from the device causing an increasing shunt.
- Device closure in acute stage:
 - Higher mortality
 - More complications: device migration, embolization, major shunting, malignant arrhythmia, or ventricular rupture.

Brief History (3)

- After cardiovascular surgeon consultation:
 - Medical control first with close observation
 - Scheduled delayed VSD closure may be arranged later
- She was discharged 2 weeks later under relative stable condition.

Brief History (4)

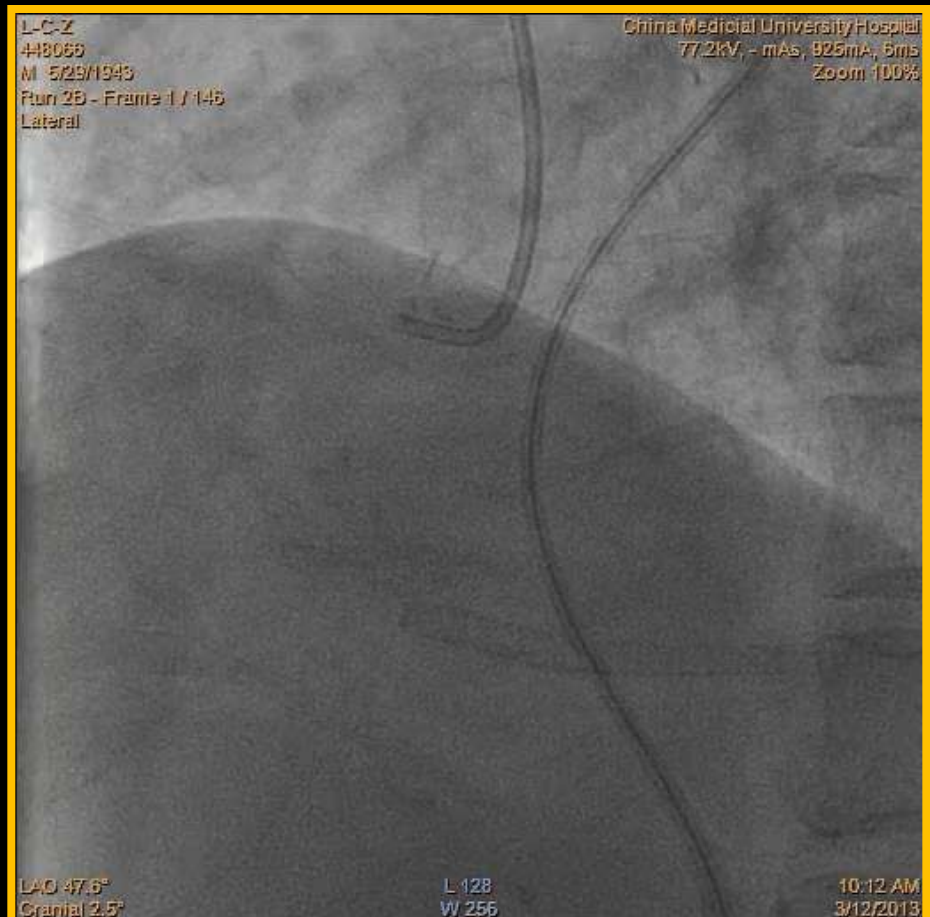
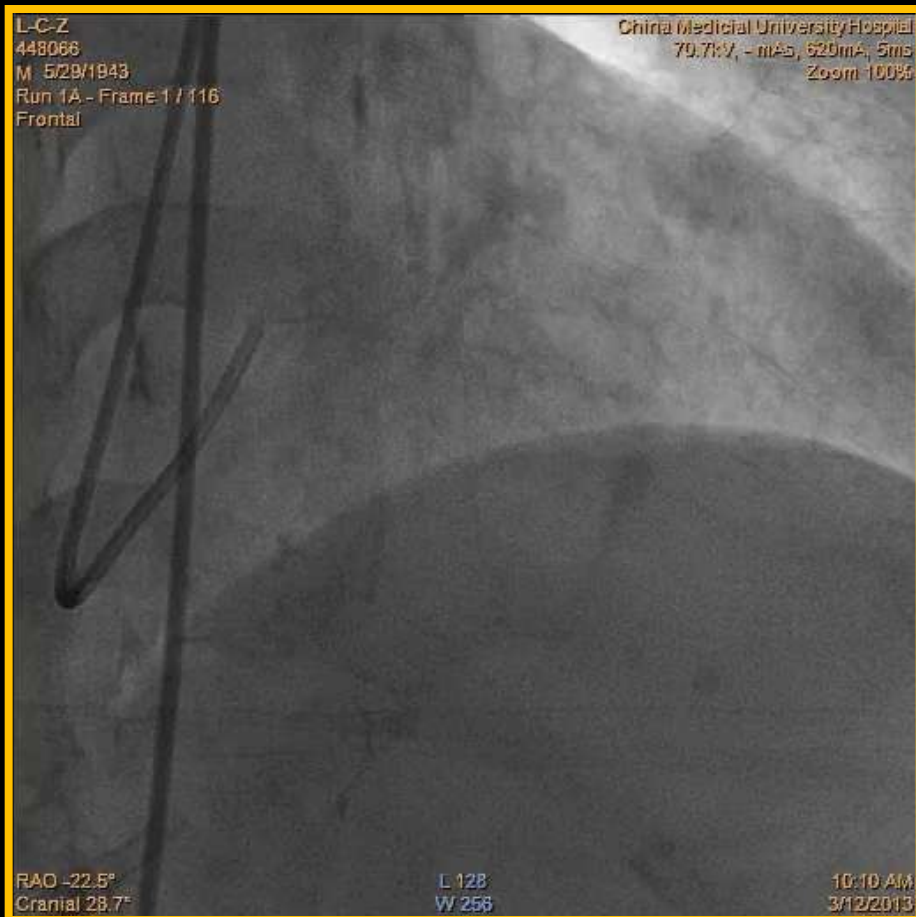
- Echocardiography follow up 2 months later
 - Depressed LV systolic function (EF 41%, WMSI=1.5)
 - Trace TR, MR
 - Persistent muscular VSD, left to right shunt



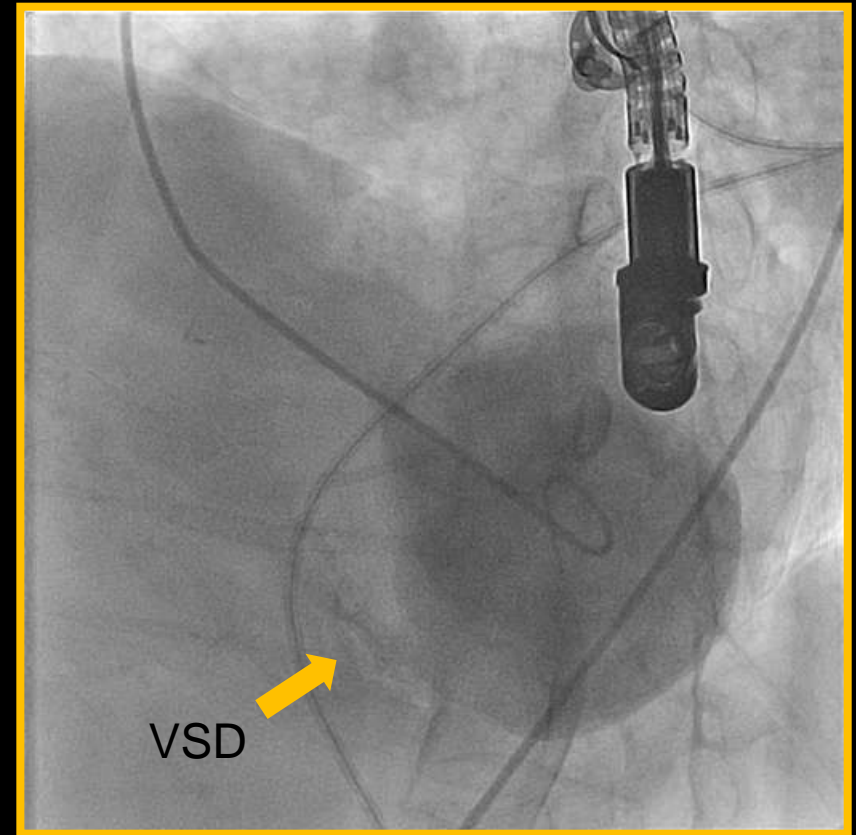
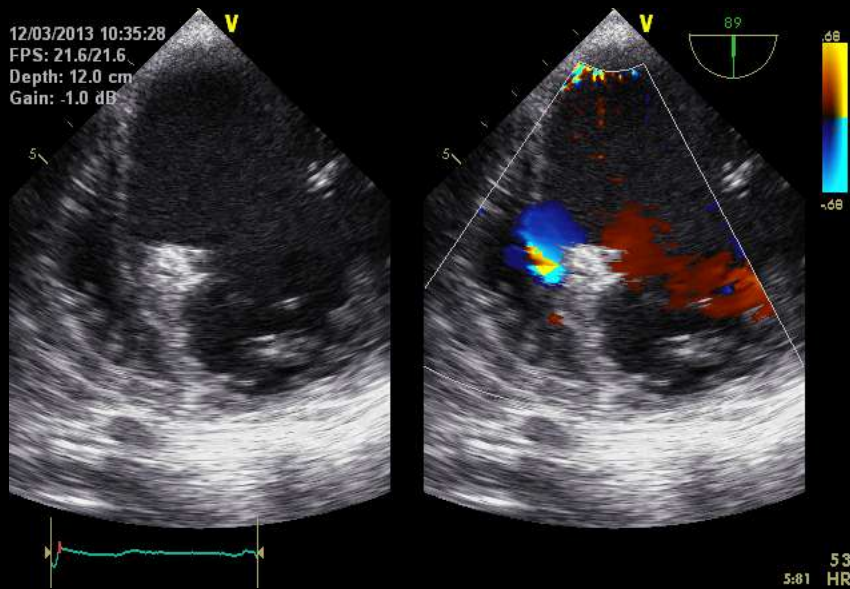
Brief History (5)

- Patient refused operation and preferred minimal invasive treatment.
- She was admitted again for elective muscular VSD occluder implantation.
- We totally delayed the VSD closure by 10 weeks after RCA revascularization.
 - Allow scarring of the surrounding tissue
 - Allows for better anchoring of devices.

Coronary Angiogram

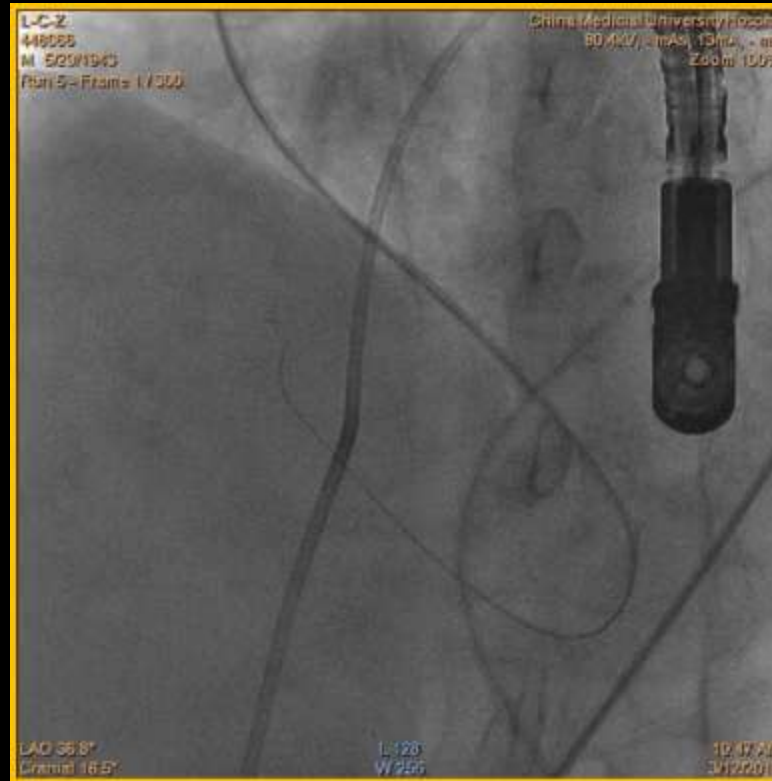


LV Ventriculogram and intra-procedure TEE



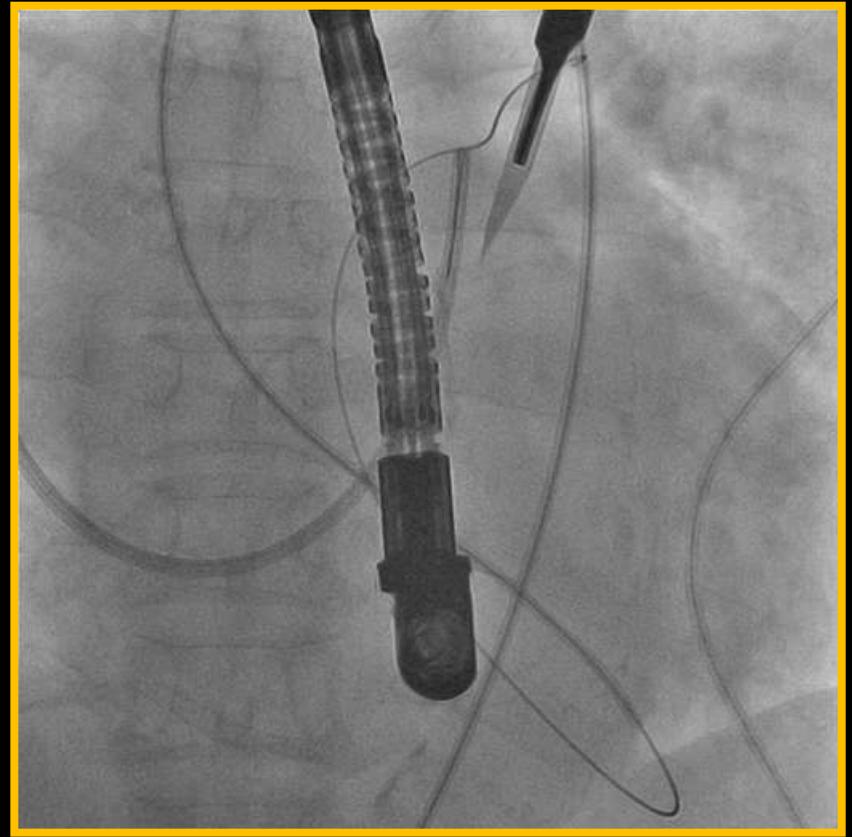
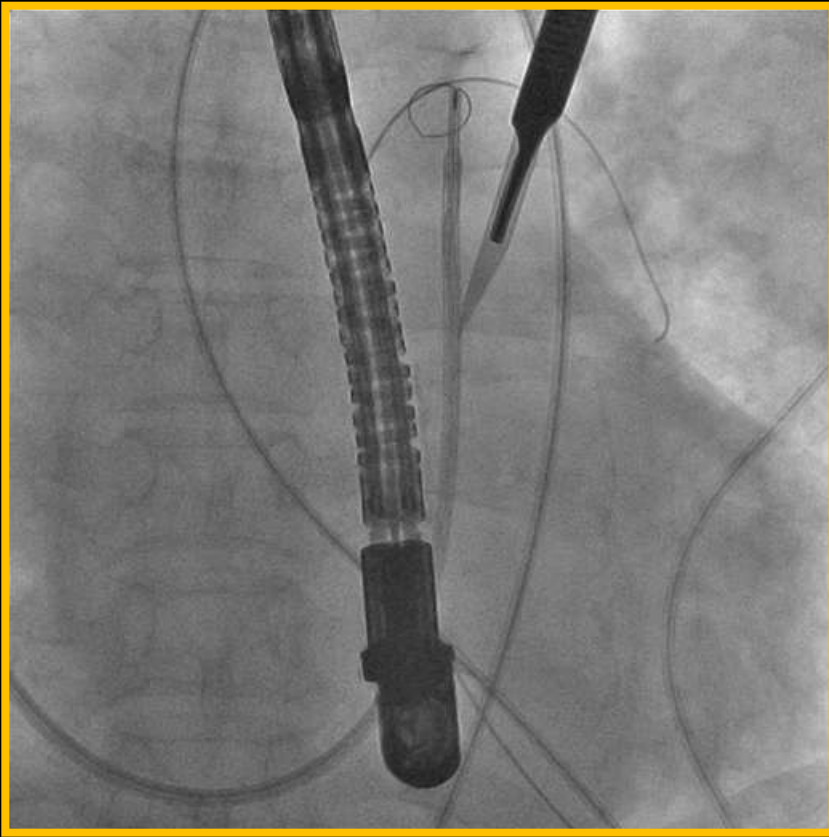
$$Q_p/Q_s=2.38$$

Approach VSD

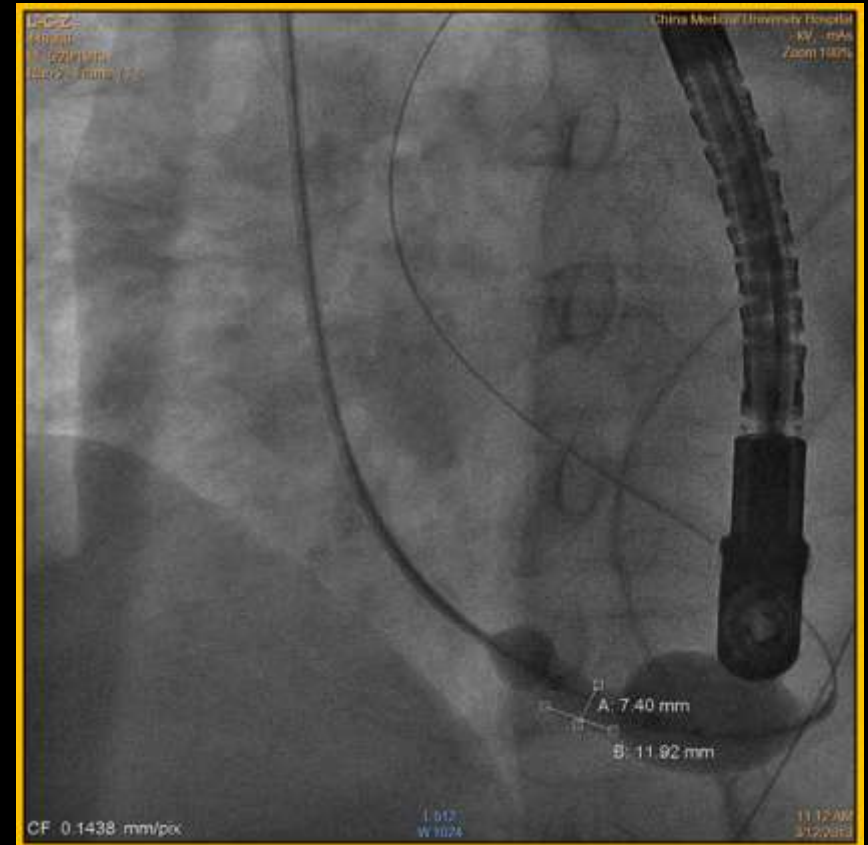
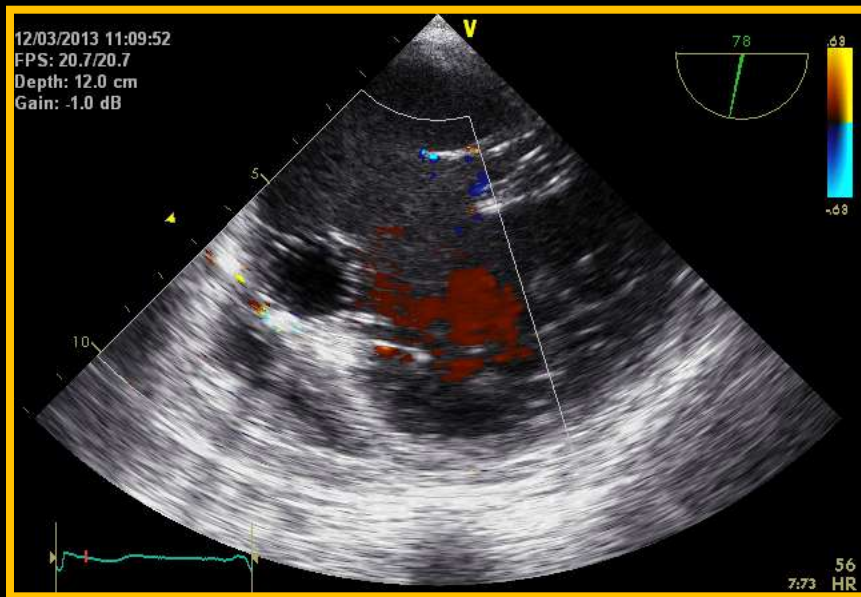


The VSD was retrograde approached by 0.035" 300cm Terumo wire with 6Fr JR4 guiding catheter via RFA

Exteriorize the Terumo wire via right internal jugular vein by Gooseneck snare in left pulmonary artery

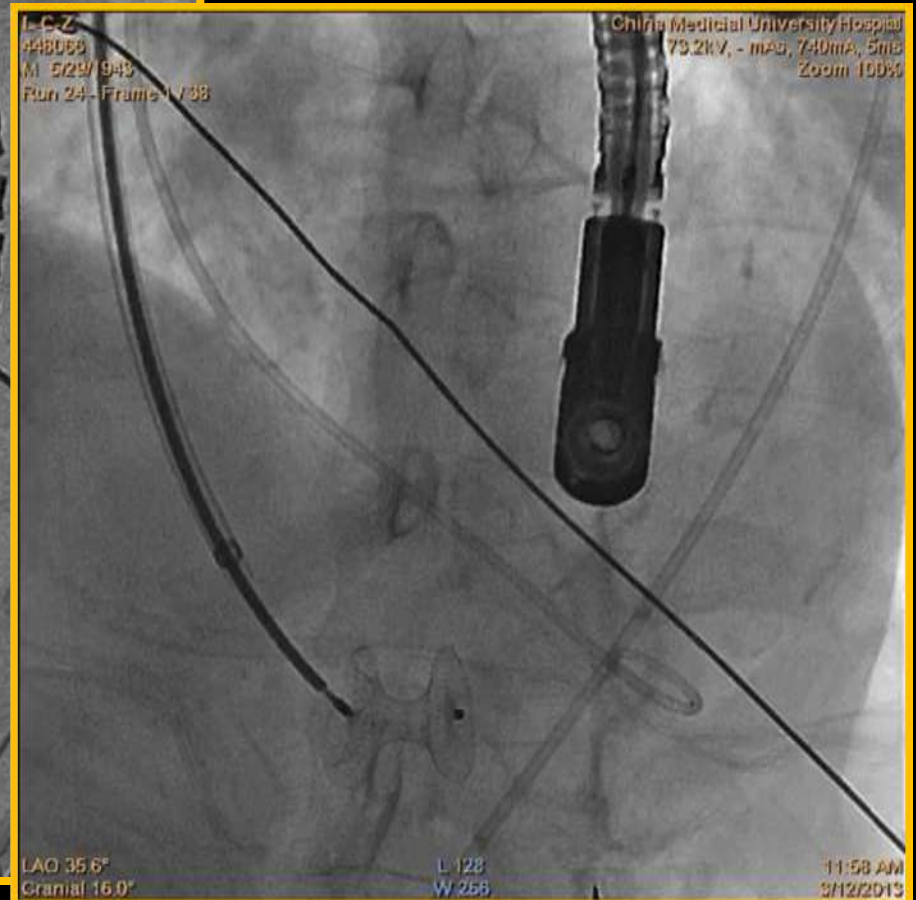
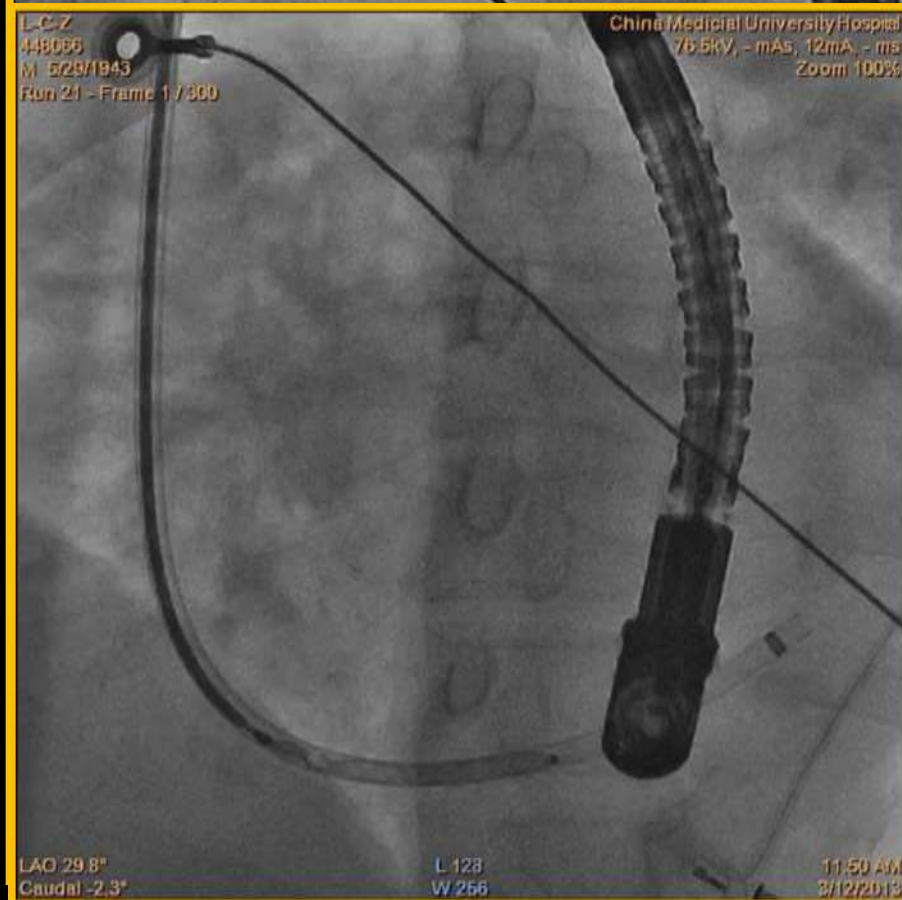


Introduce Amplatzer Sizing Balloon

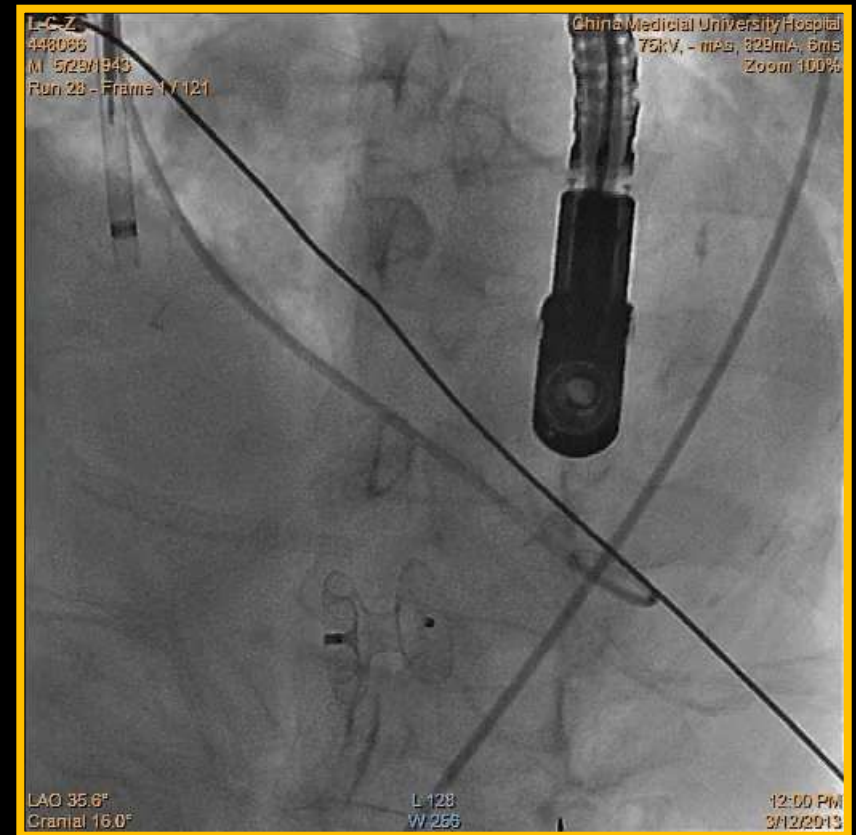
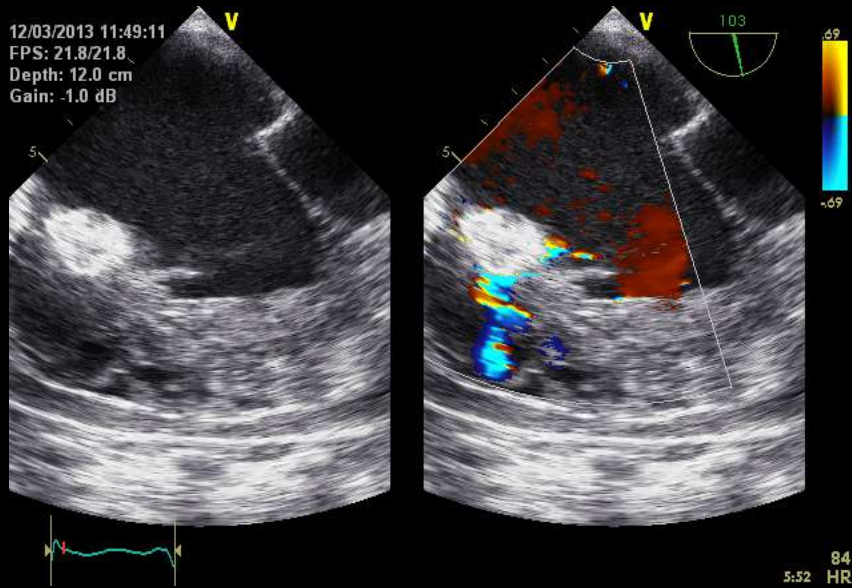


11.92mm X 7.40mm

Introduce Amplatzer Muscular VSD occluder with 16mm diameter of the central waist



Final LV Ventriculogram and TEE



Residual shunt after procedure:

How long should we wait ?

Reasons for incomplete VSD closure by transcatheter device

- Limited range of device sizes.
- Fragile and necrotic tissue in acute stage of MI.
- Large or multiple defects of VSD.
- The occluder requires time to thrombose and endothelialize before being efficient in preventing shunt across the high transventricular pressure gradient.

Post-procedural Trans-thoracic Echocardiography follow-up

3 days later



6 weeks later



6 months later



The residual VSD is eventually closed 6 months later !!

Residual shunt after procedure: How long should we wait ?

- In hemodynamic stable patients, the residual VSD after occluder implantation may deserve **3-6 months** observation for the possibility of final complete closure.

Clinical Follow Up

- 1 year after procedure:
 - No exertional chest tightness
 - No dyspnea on exertion

Take Home Message

- **Delayed closure** of post-MI VSD permits better results and less complications.
- In hemodynamic stable patients with favorable VSD anatomy, **transcatheter muscular VSD occluder** is an reasonable therapy for post-MI VSD closure with satisfactory clinical results.
- Residual VSD after occluder implantation may deserve **3-6 months** observation for the possibility of final complete closure.

Thank you for your attention!!



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