Outcome of transcatheter closure of Post MI ventricular septal defects

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Disclosure Statement of Financial Interest
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Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship	Company
• Grant/Research Support	• Abbott Vascular, Boston Scientific, Gore Medical, CardioKentix, St Jude Medical
• Consulting Fees/Honoraria	• Abbott Vascular, Boston Scientific, Gore Medical, Coherex
• Other Financial Benefit	• Coherex, Biosensors International

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Background

- Ventricular septal defect is a rare (0.3%) mechanical complication of myocardial infarction.. It results in poor cardiac output, multiorgan failure and death.
- Bimodial presentation with a higher incidence in the first 24 hours, and then again 3-5 days after initial MI.
- Natural history data suggest a 90% mortality rate within 2 months of diagnosis in patient who do not undergo defect closure. (3)

Egidy Assenza et al. Circ 2013
Lee WY, et al. Arch Intern Med. 1962

Treatment options

- Expert opinion and guideline suggest that immediate cardiothoracic surgical repair should be considered.
- Surgical mortality is very high.
- Transcatheter closure of post-MI VSD is an increasingly utilized alternative approach for this population..

Cooley DA., et al. Surgery, 1957
Deja MA., et al. Eur J Cardiothorac Surg, 2000
Papdopoulos N., et al. Ann Thorac Surg, 2009
Egidy Assenza et al. Circ 2013

Transcatheter closure

- There is a paucity of data of the outcomes following trasncatheter closure.
- Survival rates in the literature of transcather survival is reported to be 35-75%, and vary significantly in this heterogenous population.

Sathananthan, J., et al., J Invasive Cardiol, 2013.
Calvert, PA., et al., Circulation, 2014.
Thiele, H., et al., Eur Heart J, 2009.
Assenza, GE., et al., Circ Cardiovasc Interv, 2013.

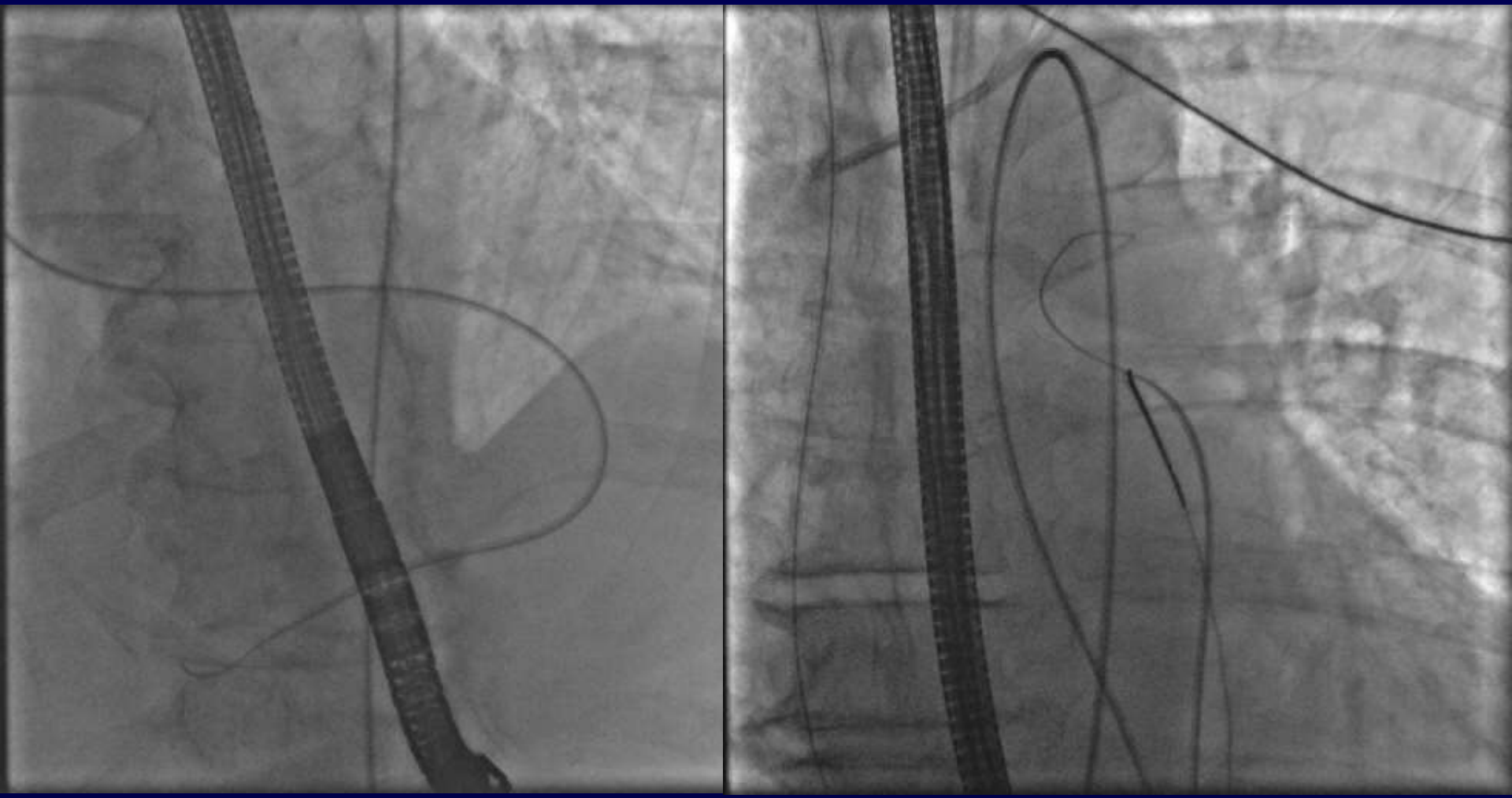
Post MI VSD : challenges

- Patient are usually in shock
- Septum if friable, and there are may be more than one defect
- Cross the defect with balloon floatation catheter
- Careful during creation of AV loop (prevent cheese cutting of septum
- Often multiple devices are required

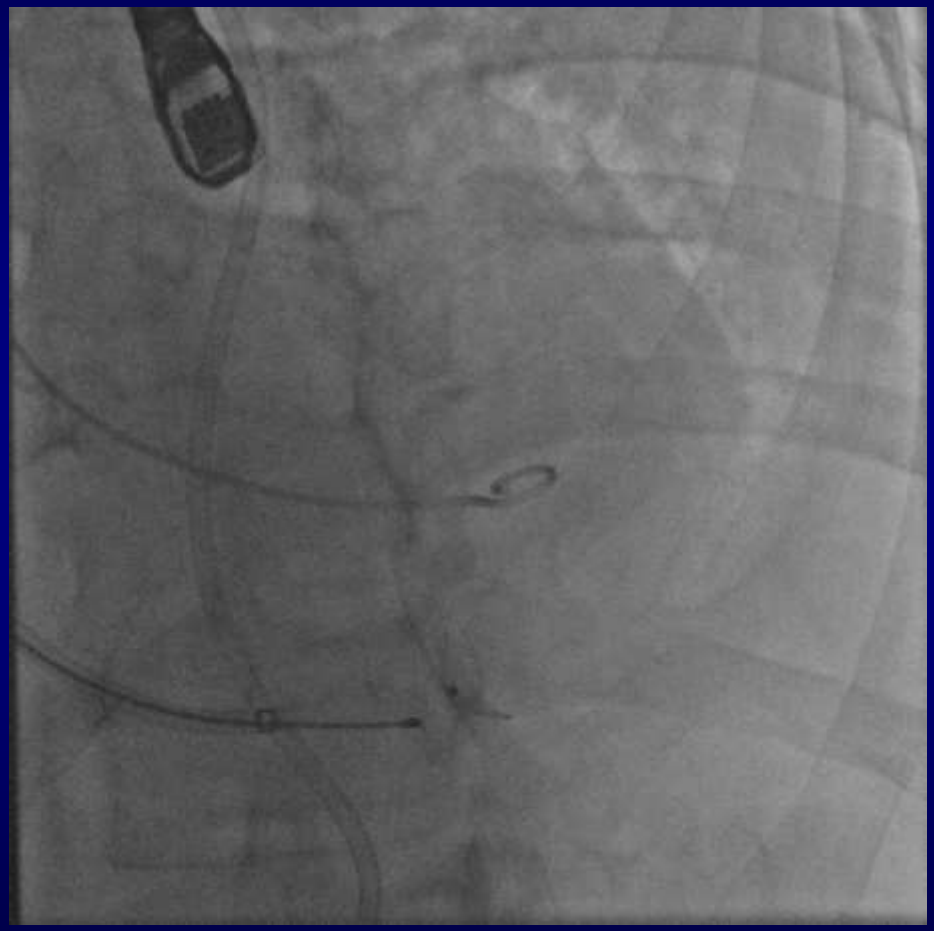
Baseline LVG

Crossing the defect with the Balloon tipped catheter

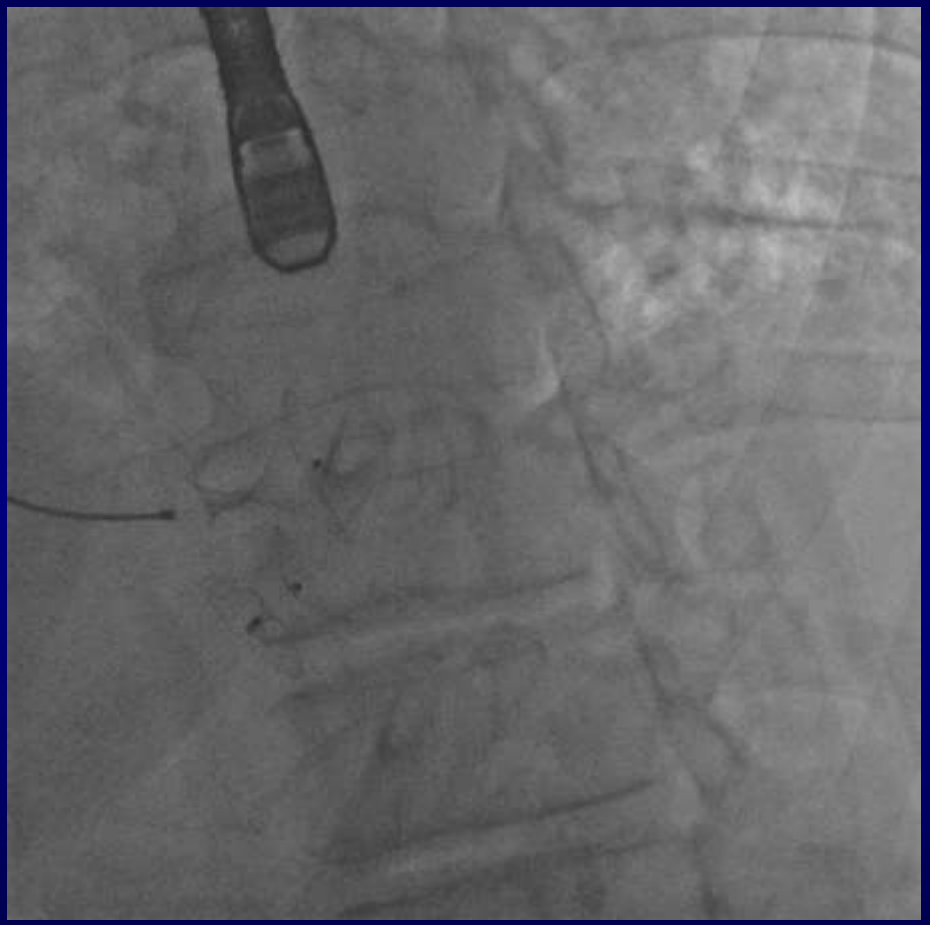
Crossing the defect with a balloon tipped catheter and creating Arteriovenous Loop

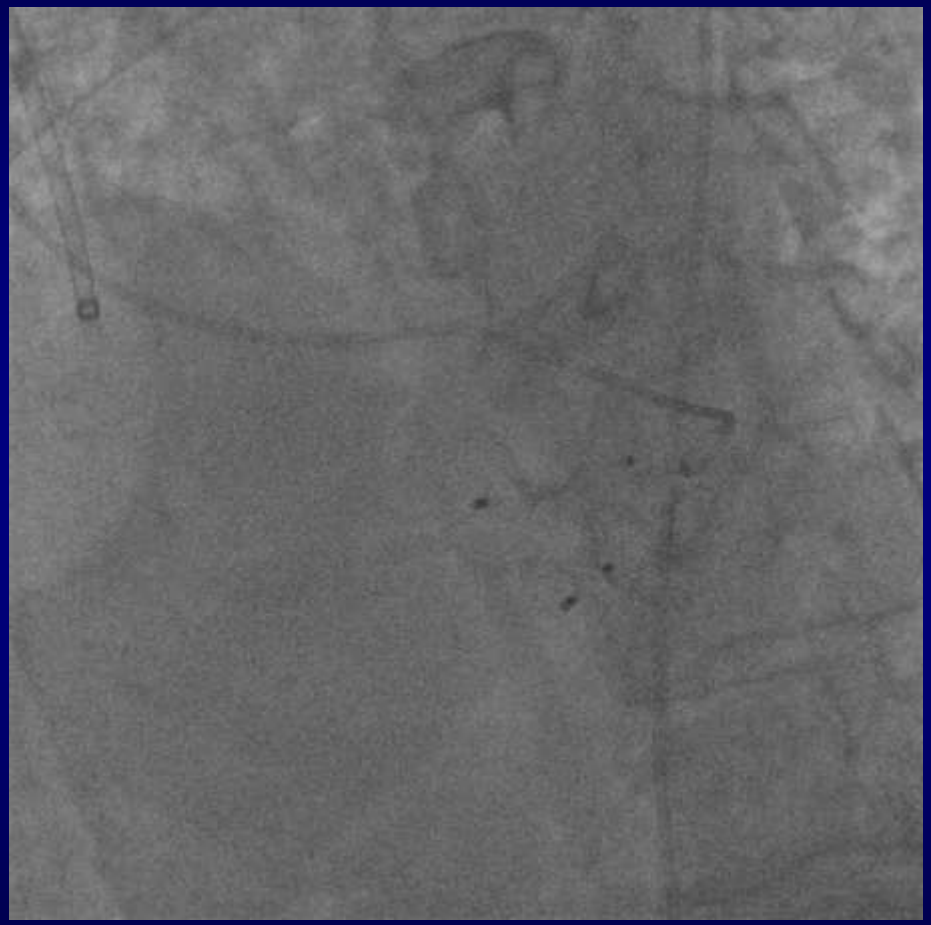


Deployment of a VSD occluder 16mm and Final LVG

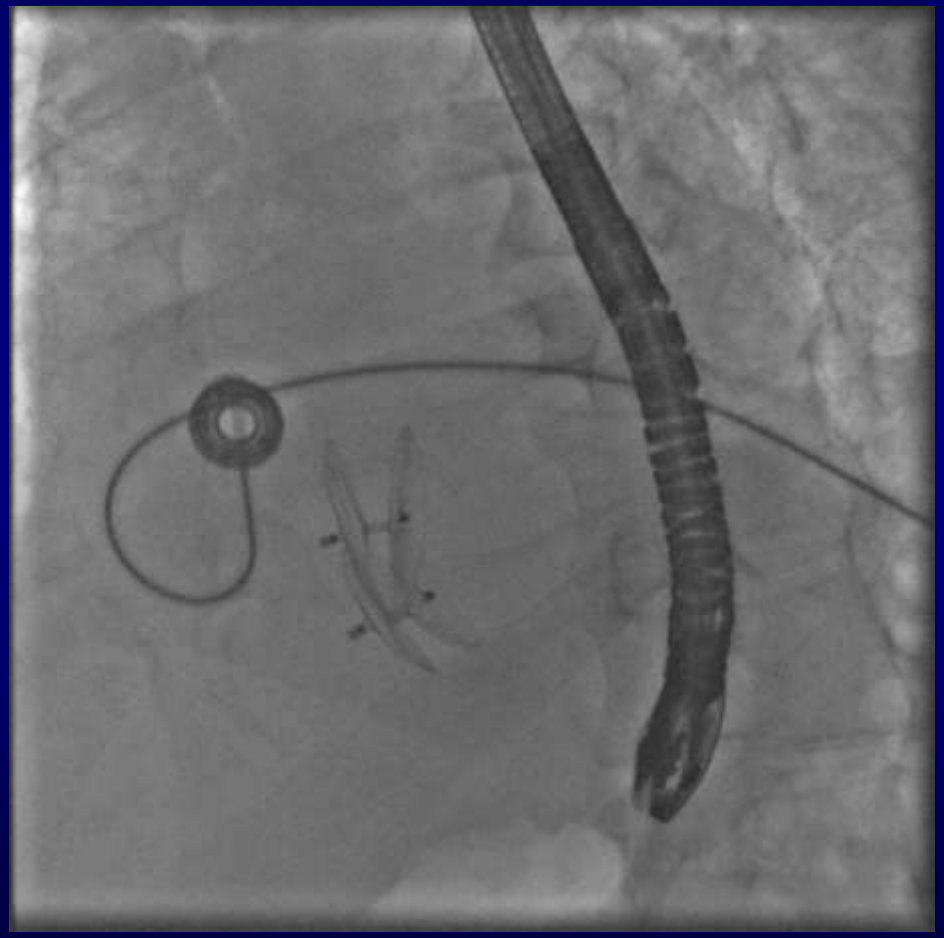


Residual shunt closure





Use of two Cribriform devices to close Post MI VSD



Residual shunt closure

Transcatheter Post-MI VSD Closure Experience at Cedars Sinai Medical Center

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Cedars Sinai Experience

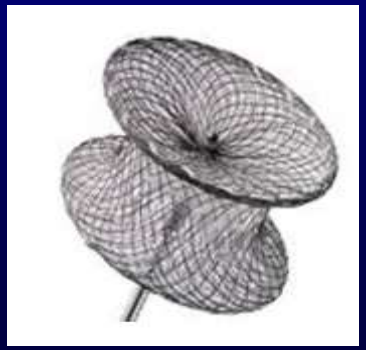
21 patients between 2005 to 2015.

On Presentation	N = 21
Age (SD)	72 ± 12
Male (%)	15 (71%)
Heart Failure (%)	15 (71%)
Average NYHA FC (SD)	3.7 ± 0.5
Cardiogenic Shock (%)	14 (67%)
IABP / Impella (%)	11 (52%)
Intubation (%)	9 (43%)
Transfer from outside hospital (%)	12 (57%)

Comorbidities	N = 21
HTN (%)	15 (71%)
HL (%)	10 (48%)
DM (%)	6 (29%)
CKD (%)	4 (19%)
Active tobacco use (%)	2 (10%)
Prior MI (%)	14 (67%)

Result

Closure Device	N = 26
Amplatzer Cribriform	10 (38%)
Amplatzer ASD	5 (19%)
Amplatzer VSD	10 (38%)
Amplatzer Ductal Occluder	1 (4%)
Average Size 1st Device (SD)	19 ± 8 mm
Average Size 2nd Device (SD)	22 ± 8 mm



- 26 closure devices were implanted in 18 patients.
- Failure to close 3 (14%)
- Three (14 %) patients underwent a second transcatheter closure
- Two (10%) patients had procedure-related death.
- The primary outcome of survival to discharge and 30 day survival occurred in 13 (62%) patients. The average length of hospitalization was 15±18 days and follow-up was 157±194 days.

Conclusions

- Ventricular septal defect(VSD) is a rare mechanical complication of MI.
- Prognosis is very poor
- Transcatheter closure is a feasible and effective alternative to surgery.
- Early and often multiple interventions and closure devices are required to salvage these critically sick patients.