

TRANSCATHETER VSD CLOSURE

HEART BLOCK ISSUES

DO NGUYENTIN MD.

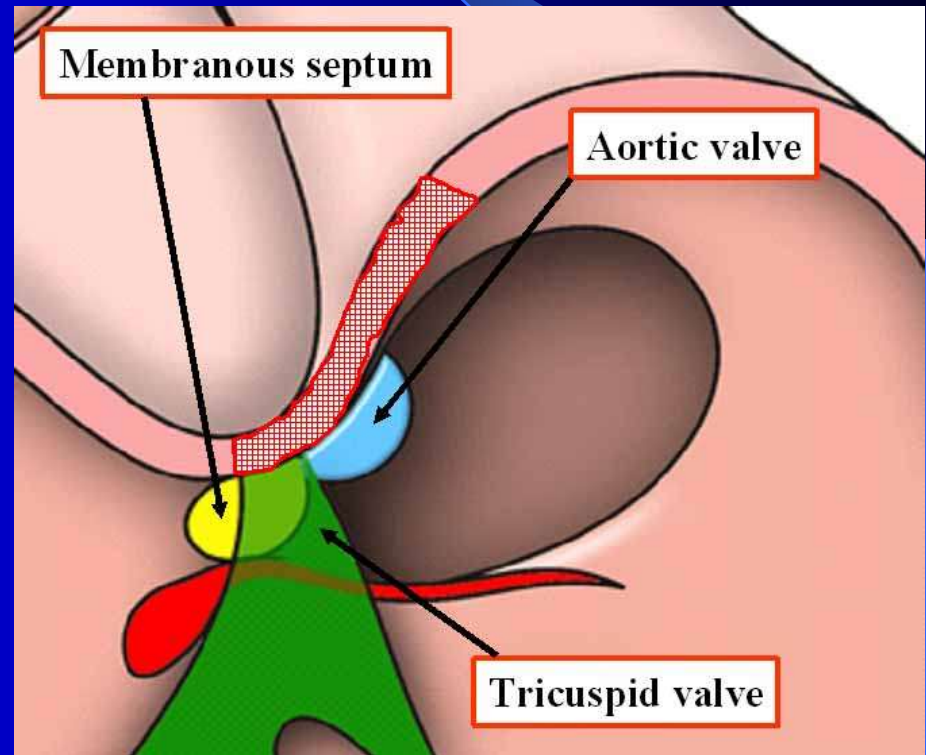
MEDICAL UNIVERSITY OF HCMC

CHILDREN HOSPITAL 1

Perimembranous defects - complications

- Complete atrioventricular block (cAVB)

- Early or late
- Transient or permanent
- Acute treatment options:
 - Abort procedure
 - Corticosteroids
 - Permanent pacemaker



How safe are VSD closures currently?

Different studies:

Author (year)	Number of patients	Major complications (%)	Need of pacemaker (%)
Knauth et al. (2004)	170	15%	8%
Holzer et al. (2004)	75	10,7%	0%
Arora et al. (2004)	137	1,9%	0%
Masura et al. (2005)	186	1,07%	0%

Adverse events after device closure of perimembranous VSDs (n = 100 procedures)

Procedure related complications	29/100 (29) ^a
■ Mortality	0/100 (0)
■ Arrhythmia/conduction anomalies	13/100 (13)
○ CHB requiring pacemaker	2/100 (2)
○ Transient CHB	1/100 (1)
○ Transient 1st DG HB	1/100 (1)
○ Transient 2nd DG HB	2/100 (2)
○ Transient LBBB	2/100 (2)
○ Transient junctional rhythm	3/100 (3)
○ RBBB	5/100 (5)
■ New/Increased AR	9/97 (9.2)
○ AR at last F/U > mild	1 Patient
■ New/Increased TR	9/97 (9.2)
○ TR at last F/U > mild	1 Patient
■ Tricuspid stenosis	1/100 (1)
■ Device embolization	2/100 (2)
■ Bradycardia/hypotension	3/100 (3)
■ Hemolysis	2/100 (2)
■ Mitral regurgitation	2/100 (2)
■ Other complications	2/100 (2)

^aValues in parentheses are in percentages.

PREVIOUS EVIDENCE

Source	Incidence	Outcome
Xunmim et al, Int J Cardiol 2007 (China)	1/72 (1.4%)	Transient
Butera G et al, JACC 2007 (Milan)	3/87 (3.4%)	SX or PPM
Pedra CAC et al, J Invasive Cardiol 2008 (Brasil)	1/39 (2.6%)	PPM
Zhou J et al, Clin Cardiol 2008 (China)	4/168 (2.4%)	Transient
Oses P et al, Ann Thorac Surg 2010 (Montreal)	2/35 (5.7%)	PPM
Zuo J et al, Am J Cardiol 2010 (China)	6/294 (2.0%)	SX or PPM
Yang R et al, Cath Cardiovasc Intervent 2011 (China)	1/60 (1.6%) [transient]	PPM
US Phase I Trial	2/35 (5.7%)	PPM
Survey – JLB 2007	12/486 (2.5%) [6 transient]	PPM
Tucker E et al, JACC 2007 <u>Surgical</u> >8kg Multicenter, PCCC	13/1739 (0.8%) [3 late]	PPM



DUE TO AVB!!!

	Qin et al (Am J Cardiol 2008; 101:1781-86) N = 412	Yang et al (Eur Heart J 2010; 31:2238-45) N = 848	
Device Embolization	3 (2 retrieved and redeployed)	2 (Surgical removal)	
NeoAR	3 (device removed)	1 (Requiring Sx)	
NeoTR	1 (Device removed)	1 (Requiring Sx)	} 7 not requiring Sx
Residual shunt	0	405	
LBBB	10	6	
RBBB	16	15	
Junctional rhythm		32	
CHB	6 (Recovered in 3 weeks, No PPI)	5 (2 requiring PPI)	

Devices Used

	Thakker et al N= 431	Nageshwar Rao et al N= 158	Jayrangnath et al N = 158	Dalvi et al N = 102
AAPMVSDO	1	19	12	61
Symmetric VSDO	113(SSM) + 159 (Starway)	11 (Lifetech)	0	0
MVSDO	32	20	8	15
ADO I	88	18	90	11
ADO II	0	87	46	14
ASO	1	0	2	0

Complications

	Thakker et al	Nageshwar Rao et al	Jayrangnath et al	Dalvi et al
Device Embolization	4	3	1	1
NeoAR	4 (1)	3	1	6
NeoTR	3	2	5	12 (1)
Acute MR	0	1 (1)	0	0
Hypotension	0	2	0	1
CHB	5	0	1	0

WHAT IS DEALING WITH AVB?

**DIFFERENT VSDs CAN BRING
DIFFERENT RESULTS?**

WHICH VSD IS HIGH RISK FOR AVB

Echocardiographic delineation of various VSDs

NO

SOME cases

Some cases

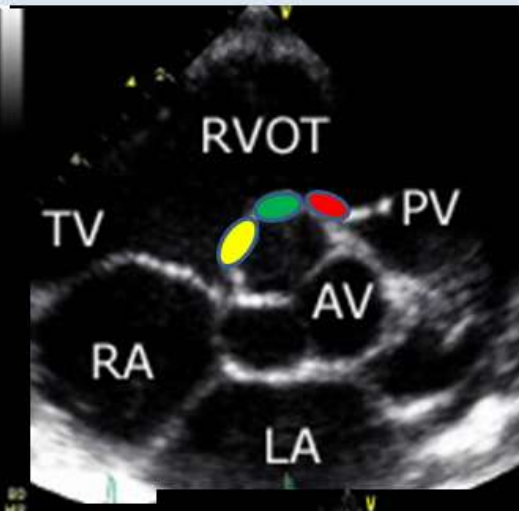
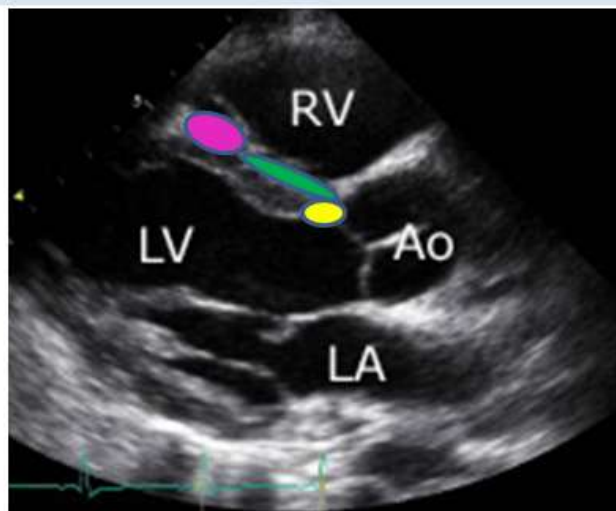
HIGH

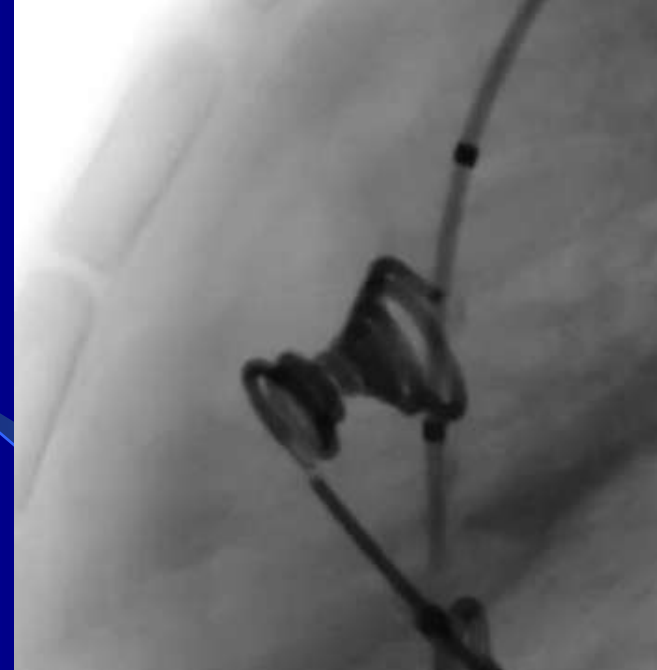
RARE

RARE

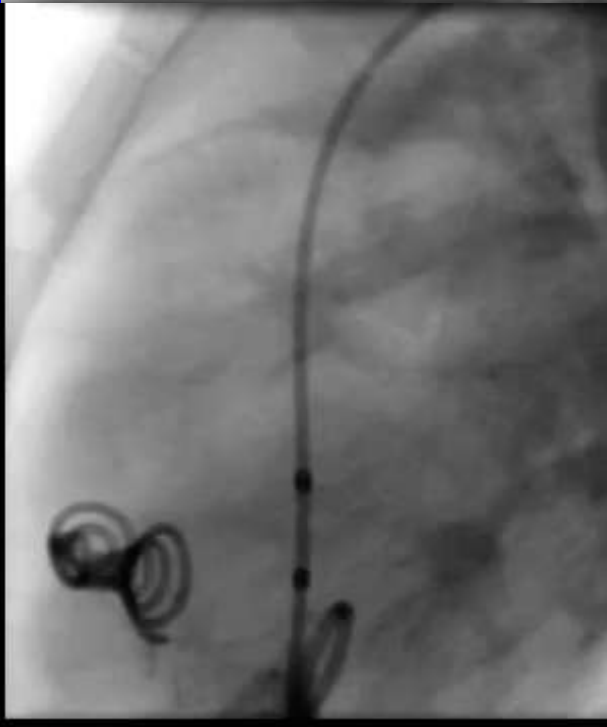
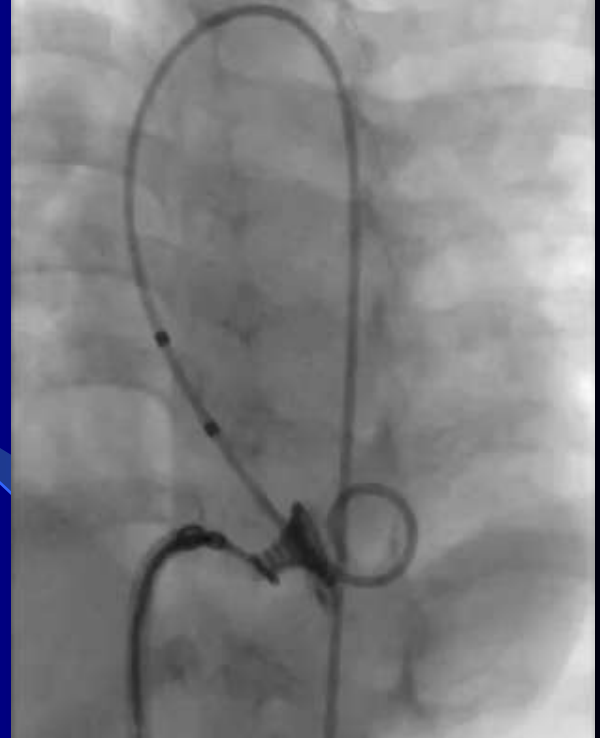
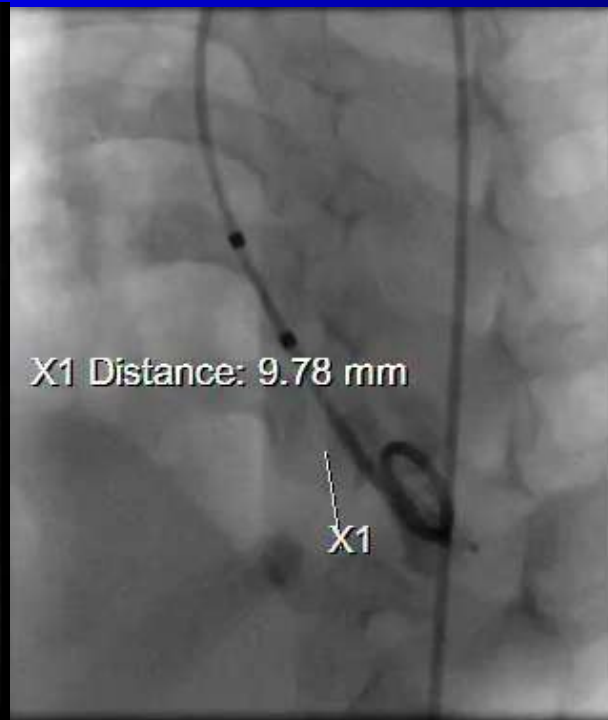
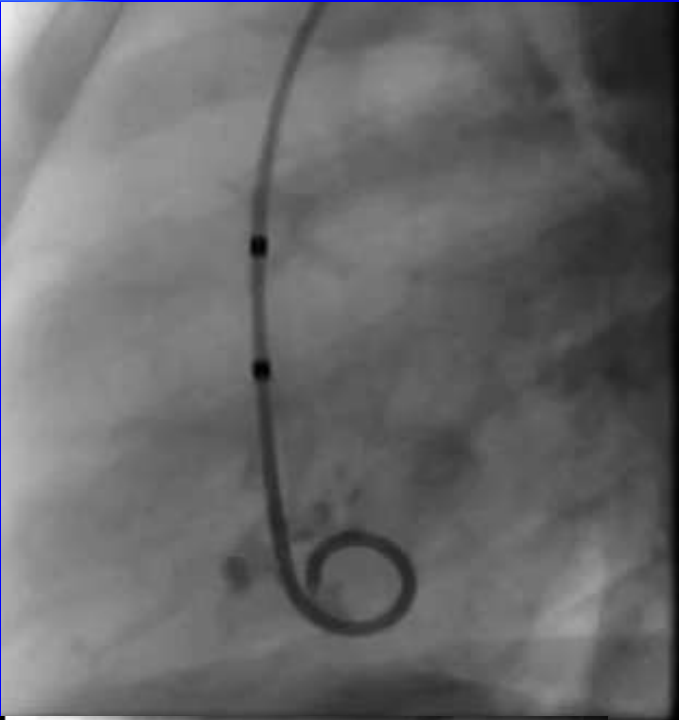
NO

- Subpulmonary
- Perimembraneous
- subaortic
- inlet
- mid-muscular
- marginal
- apical

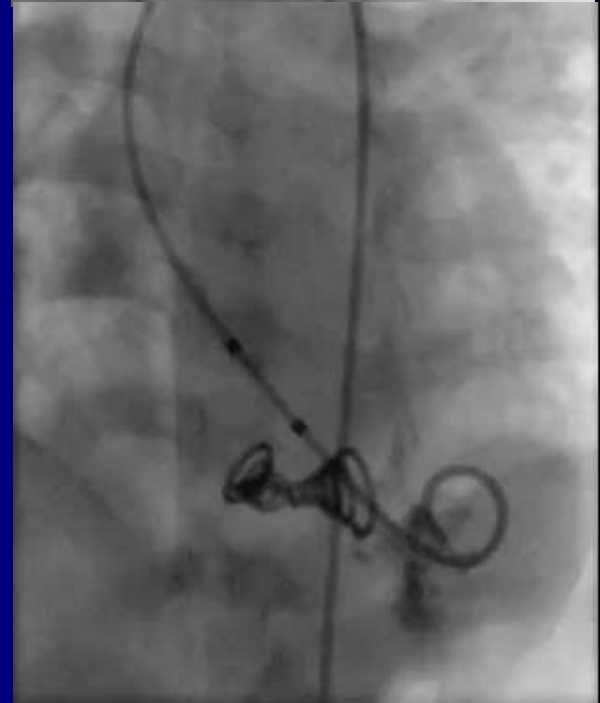


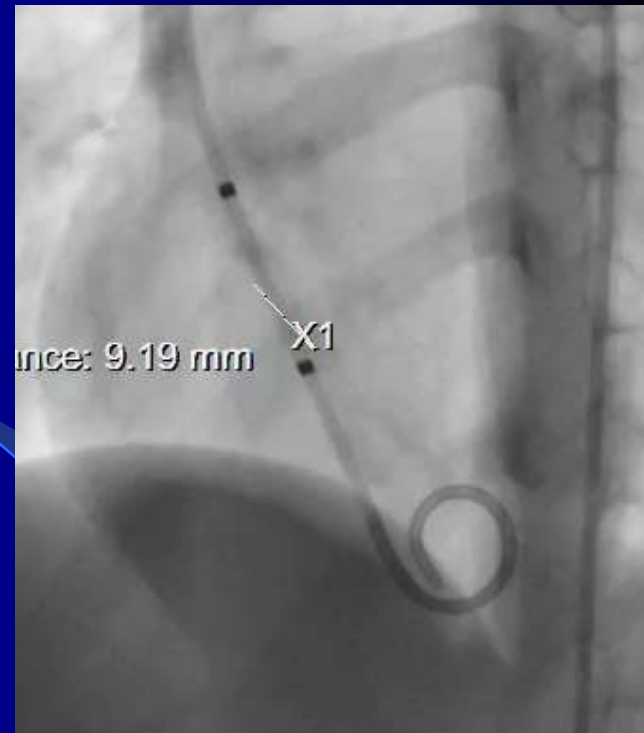


**OUTLET VSD
IS QUITE FAR
FROM AV NODE**



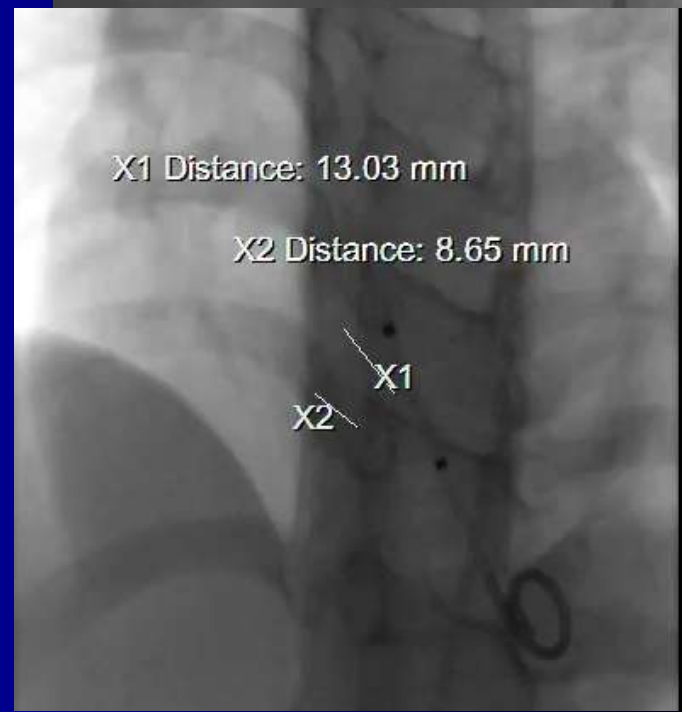
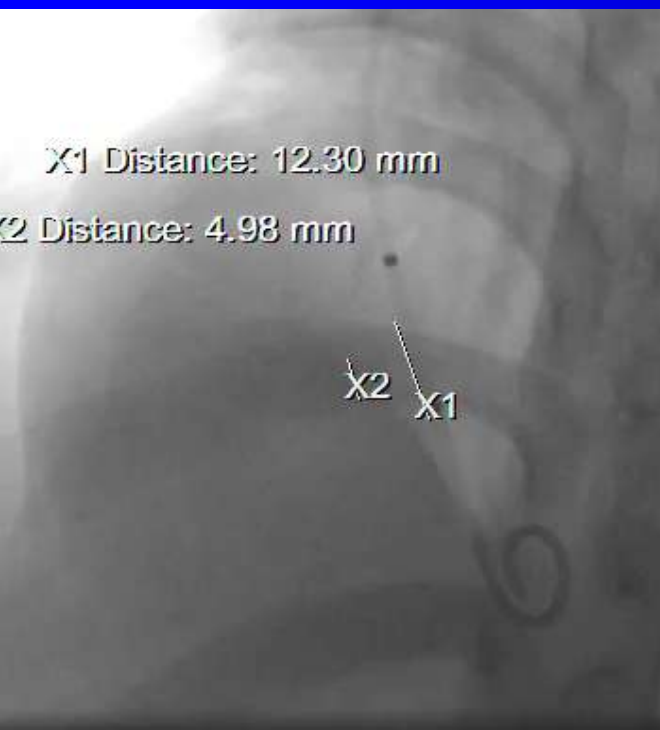
MUSCULAR VSD





**MAY ANEURYSM
HAVE SOME**

ADVANTAGES?

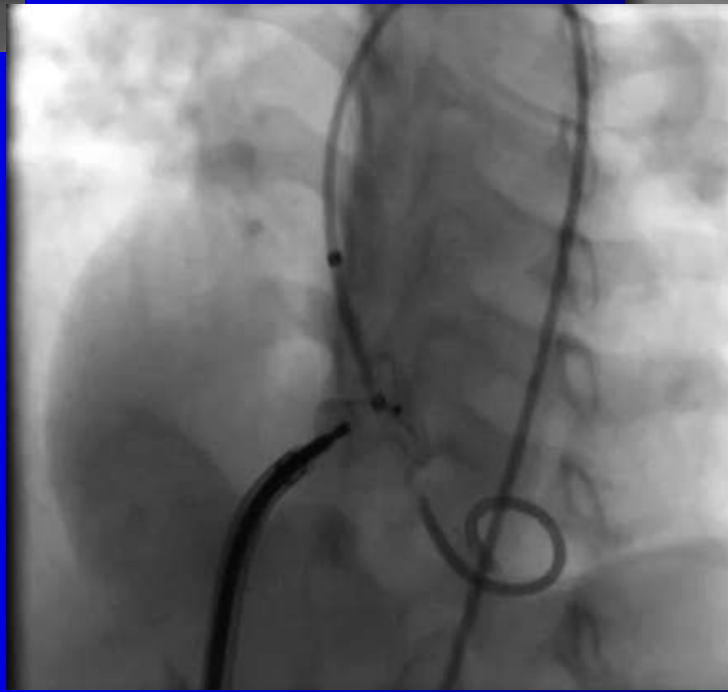


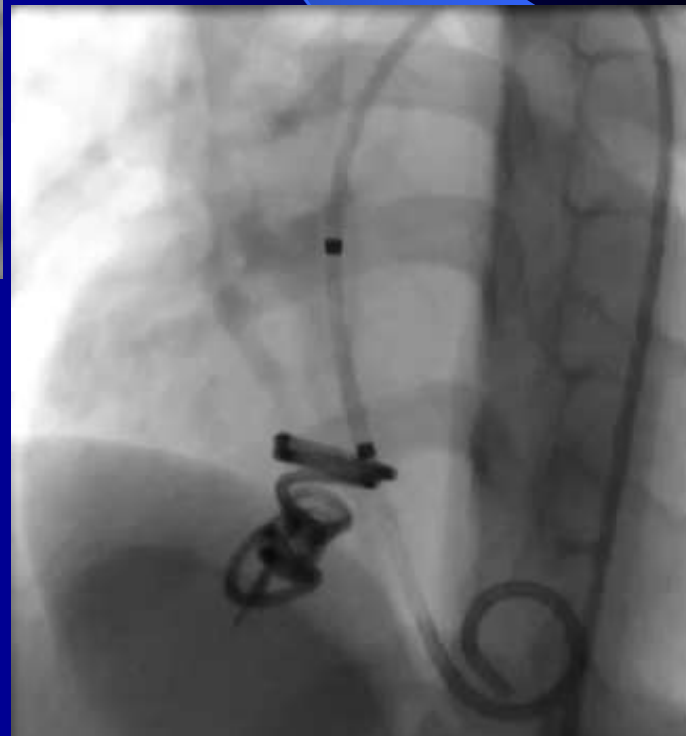
X1 Distance: 13.03 mm

X2 Distance: 8.65 mm

X1
X2

PM VSD

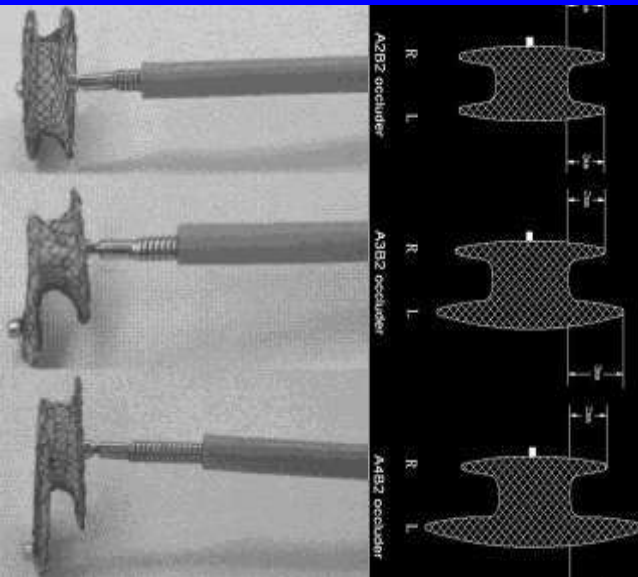






**DIFFERENT DEVICES CAN
BRING DIFFERENT RESULTS?**

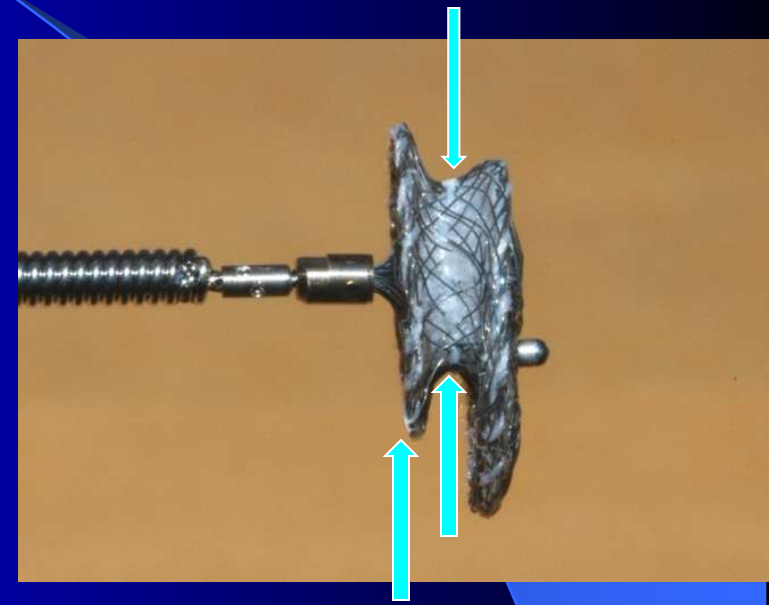
DEVICES



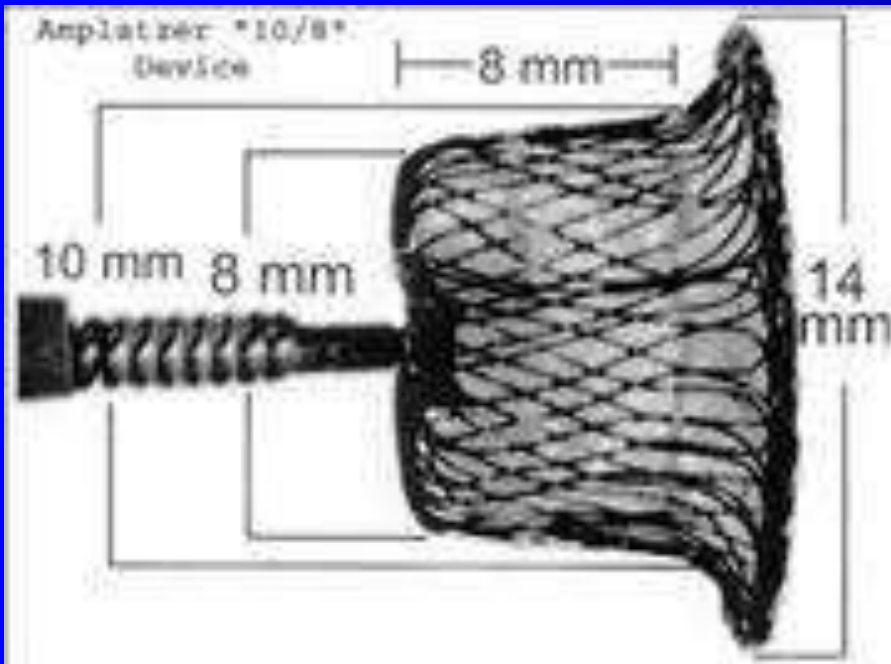
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AXIOM-Artis
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PLANE: SINGLE B



ADO I



SOFTER

SINGLE DISC

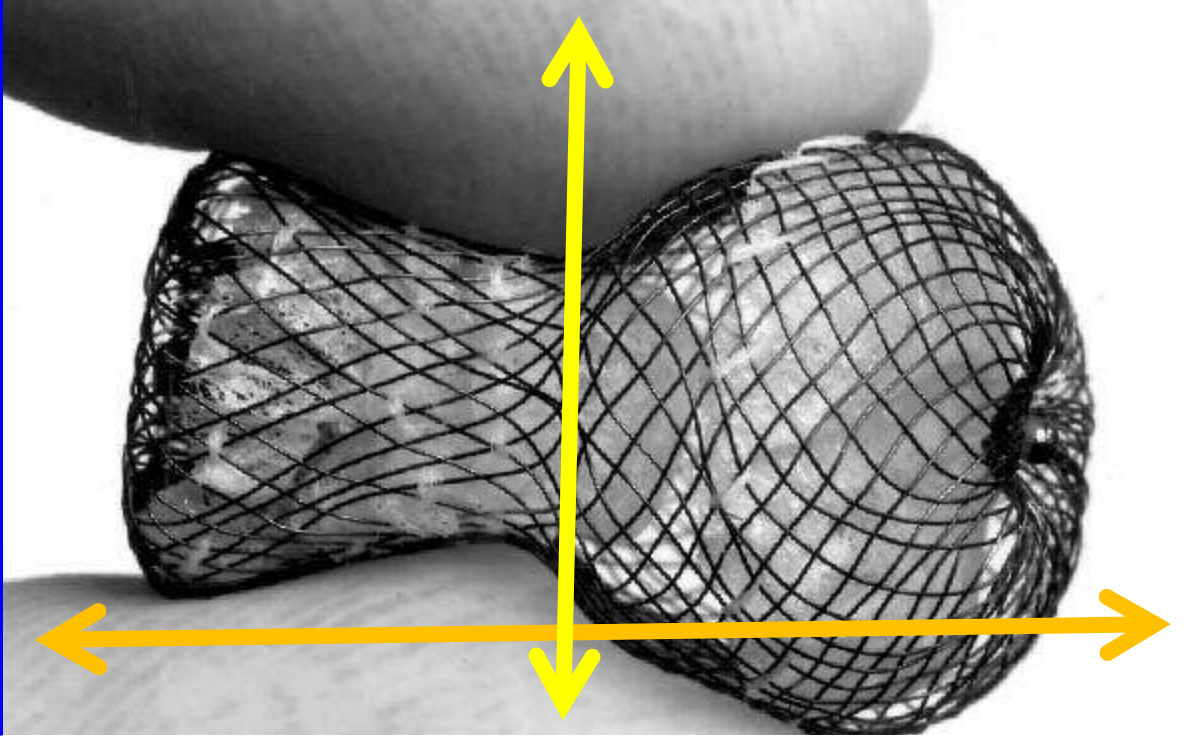
LONG LENGTH

STIFFER

DOUBLE DISC

SHORTER

WHEN COMPRESSED



INCREASES IN THIS DIRECTION

DECREASE IN THIS DIRECTION

FROM

OUR EXPERIENCES

ADO I

1. TOTAL: 113 CASES PM VSD CLOSURE WITH ADO I
2. TECHNICAL SUCCESS: 98%
3. CLINICAL SUCCESS: 97% (3 CASES FAILED)
 - 1 AV BLOCK: OVERSIZED DEVICE
 - 1 MILD RVOT STENOSIS: PROTRUSION INTO MSA
 - 1 SEVERE TRICUSPID REGURGITATION
4. LONGTERM F/U: NO LATE AVB

ADO II profile



SOFTER

DOUBLE DISC

FLEXIBLE



STIFFER

DOUBLE DISC

NON- FLEXIBLE



PM VSD WITH ADO II

FROM

OUR EXPERIENCES

ADO II

1. TOTAL: 128 CASES (PM VSD, MUSCULAR AND DC VSD)
2. TECHNICAL SUCESS: 98%
3. CLINICAL SUCESS: 3 YEARS F/U
 - AV BLOCK: NO
 - MILD AR: 2 CASES (DC VSD)
 - MILD TRICUSPID REGURGITATION: 10 CASES
 - SMALL PROFILE

PFM COIL profile



SOFTER

SINGLE DISC

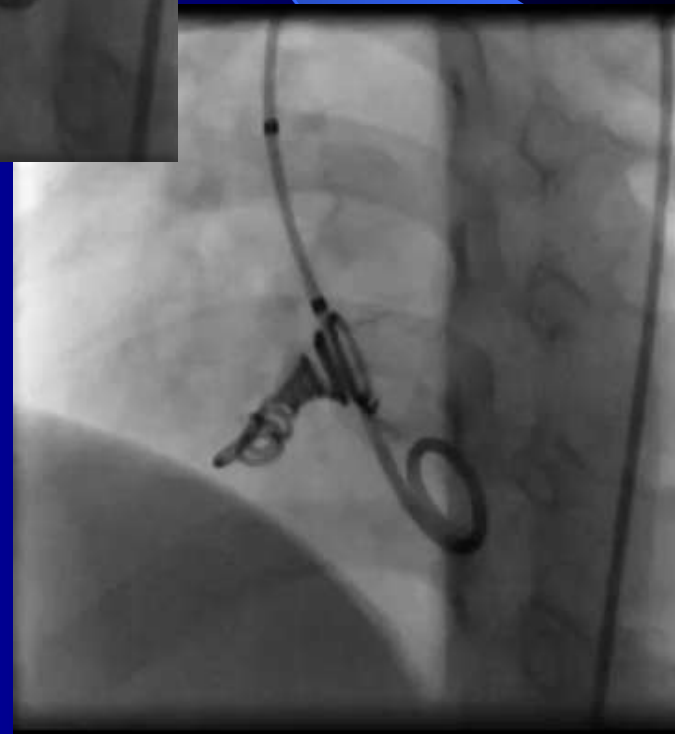
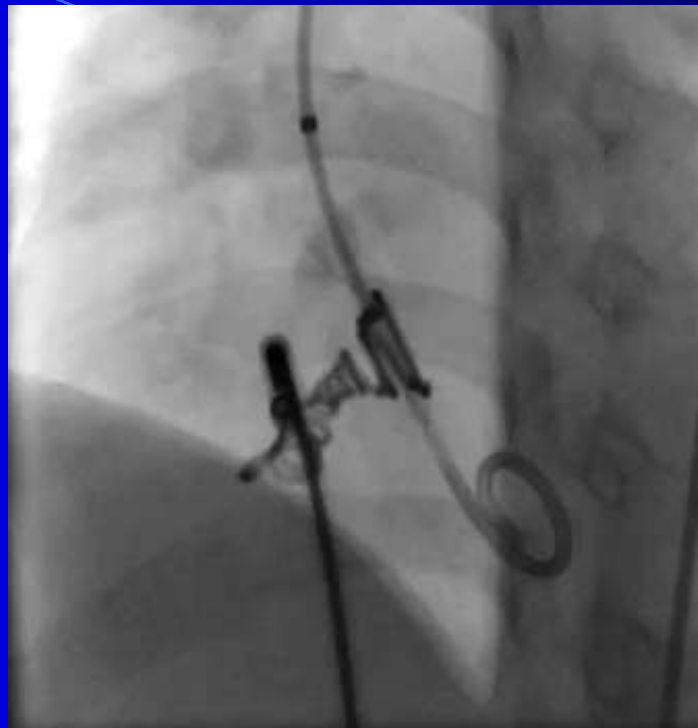
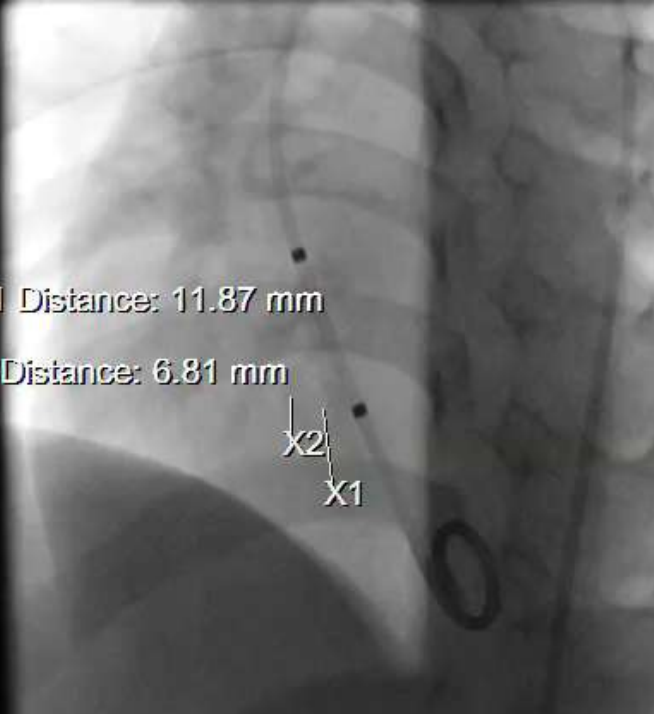
VERY FLEXIBLE



STIFFER

DOUBLE DISC

NON- FLEXIBLE



FROM

OUR EXPERIENCES

PFM COIL

TOTAL: 328 CASES

1. SUCCESSFUL: 317 CASES (96.6%)
2. TECHNICAL FAILURE: 6 CASES (doubly committed)
3. HEMOLYSIS: 4 CASE (1.2%): Bandung 1, CH: 3
4. AR: 1 CASES
5. NO AV BLOCK AFTER 8 YEARS F/U

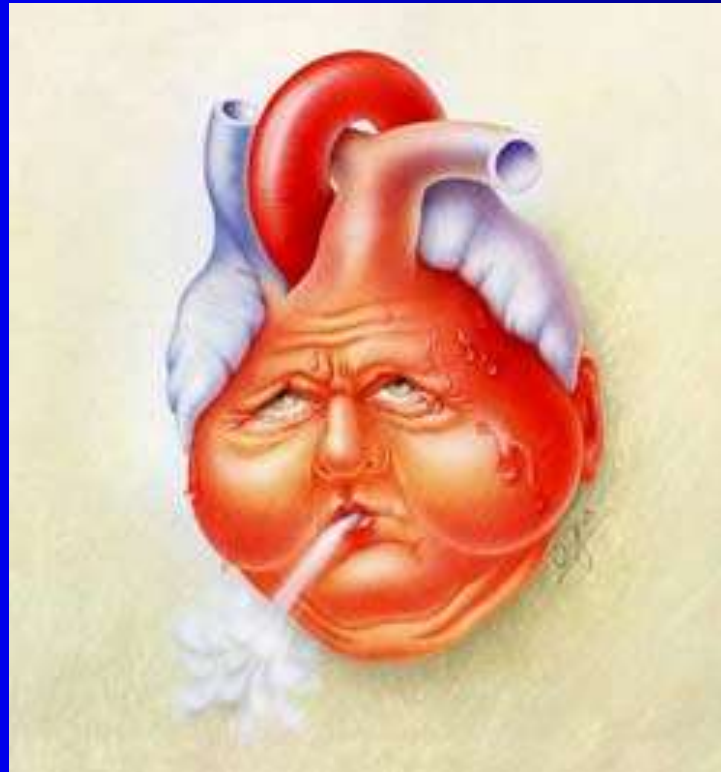


CONCLUSIONS

1. NO IDEAL DEVICE FOR VSD CLOSURE
2. WIDE VARIETY OF VSD MORPHOLOGY
3. MAIN KEY:

DEVICE SELECTION AND PATIENT SELECTION

GAME IS NOT OVER



THANKS FOR YOUR ATTENTION

SEE YOU IN HO CHI MINH CITY JAN 15 - 17, 2015