



“Taller de cierre de CIV. Diferentes técnicas”

Diferentes técnicas y dispositivos.

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Hospitales Privado Universitario y de Niños de Córdoba, Argentina.

Título de la charla:

Diferentes técnicas y dispositivos.

Conflictos de interés en esta presentación:

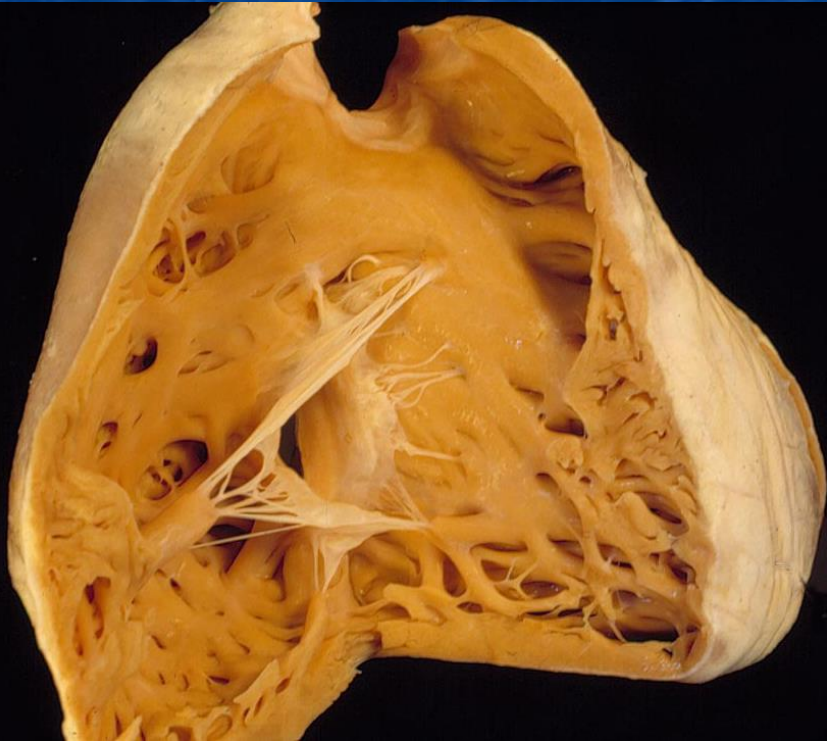
pfm Medical (consultor)

Lepu Memopart (participación en estudio CIV)

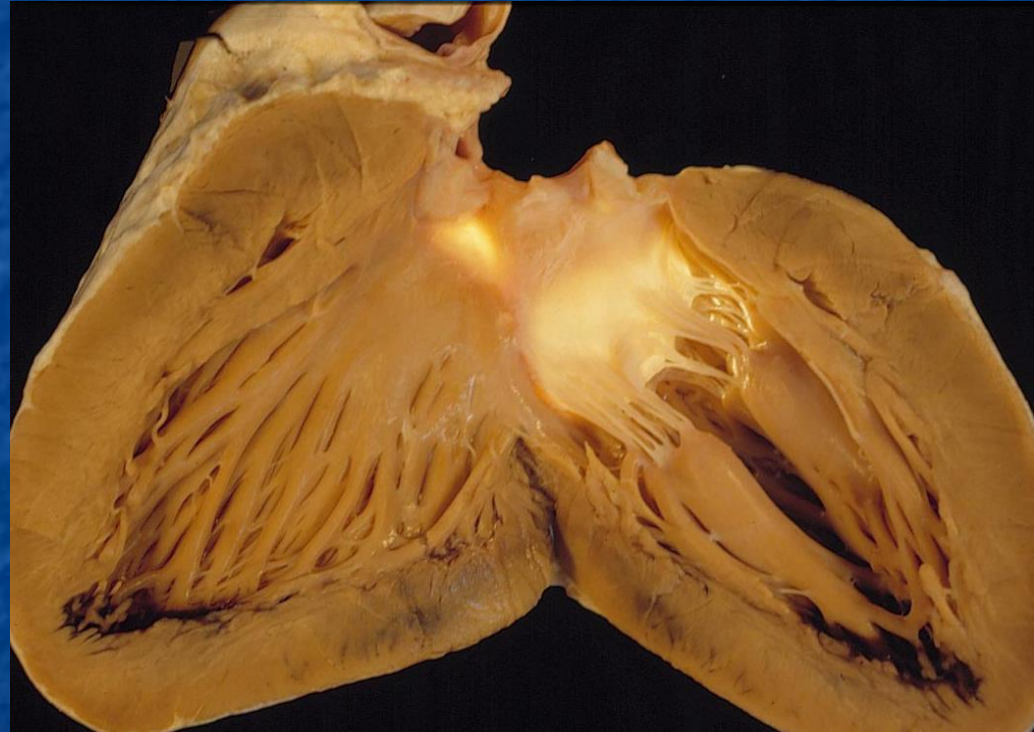
Background: VSD

- ***Most common CHD (after bicuspid aortic valve and MVP)***
- ***Incidence of 20 – 35% of pts with CHD***
- ***Most frequent associated to other heart lesions***
- ***Doubly-committed VSD (or JA) most common in Asian population (30% vs 5% in occidental pts)***
- ***Muscular defects 30% in western world and uncommon in Asians (less than 3%)***

Ventricular anatomy

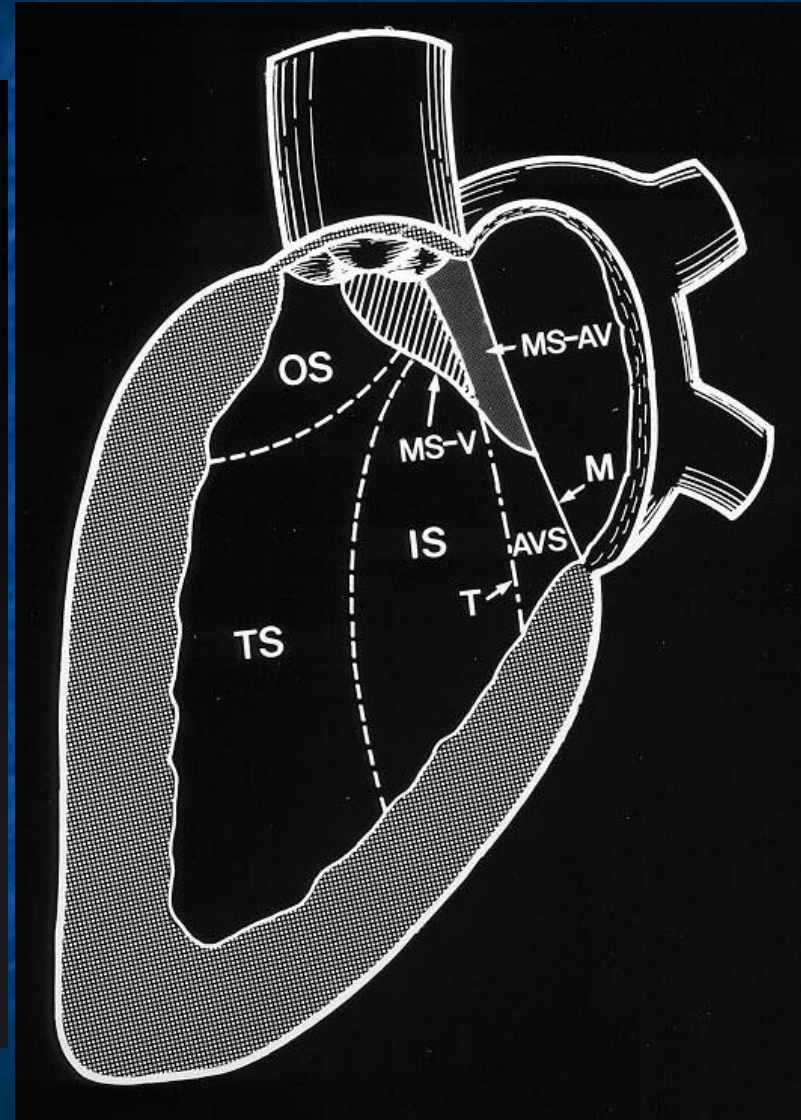
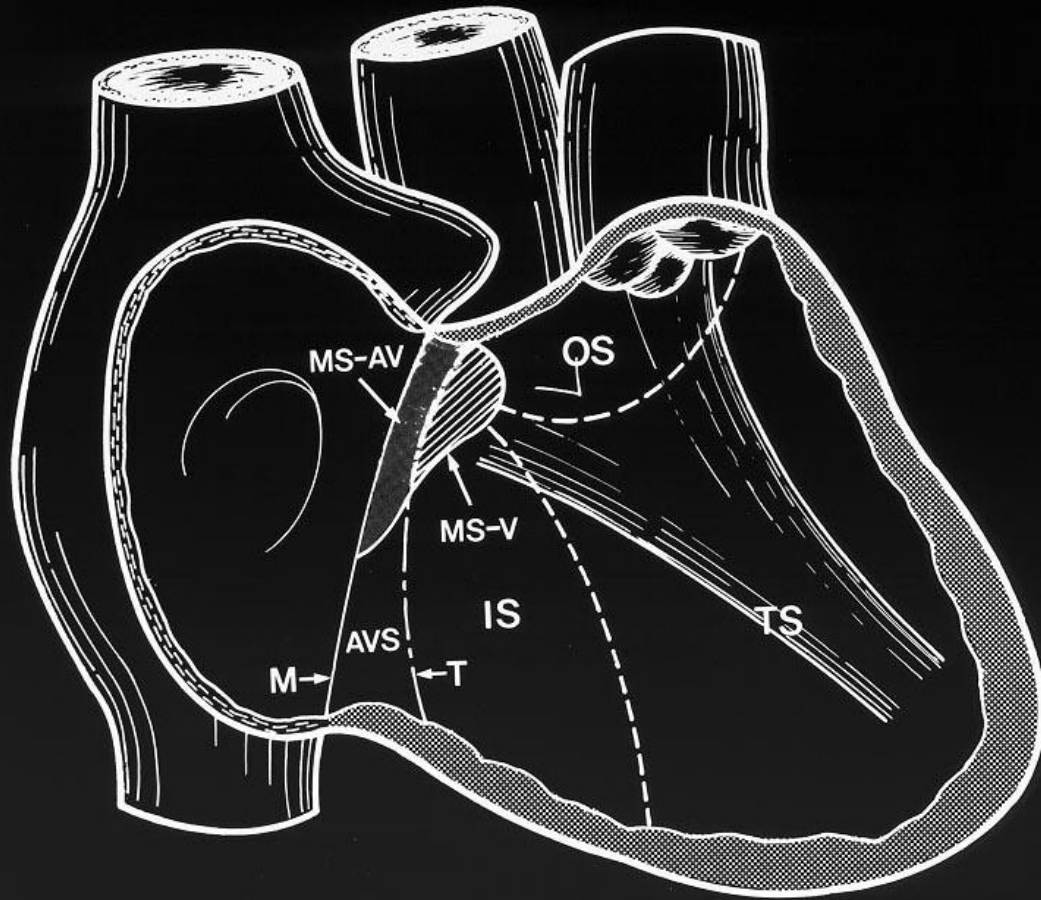


RV aspect

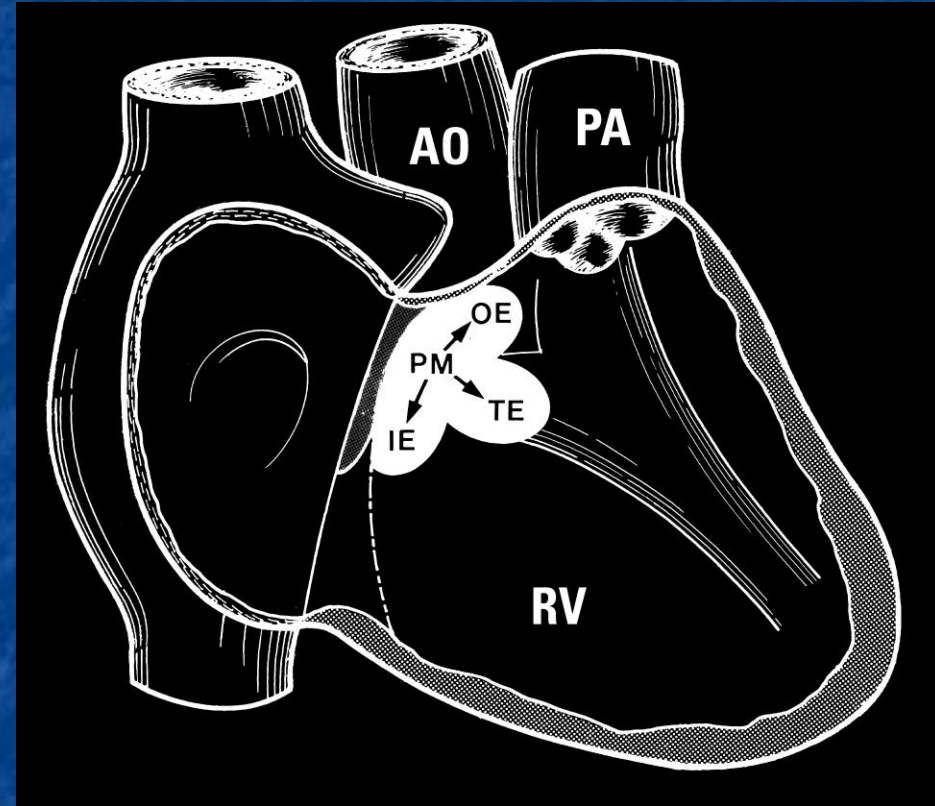
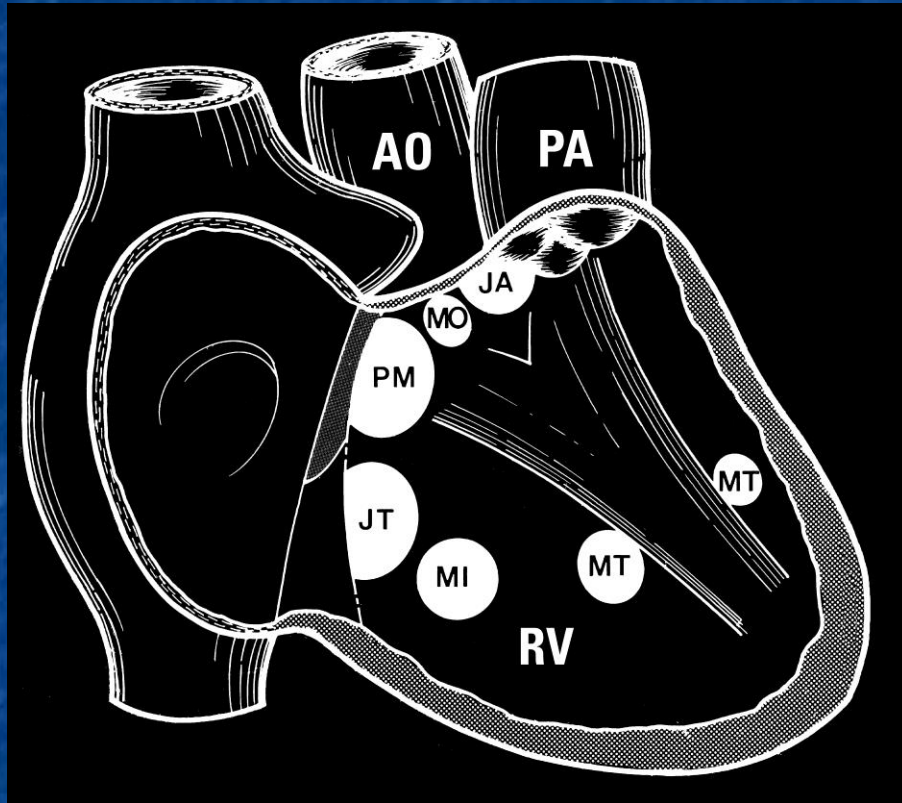


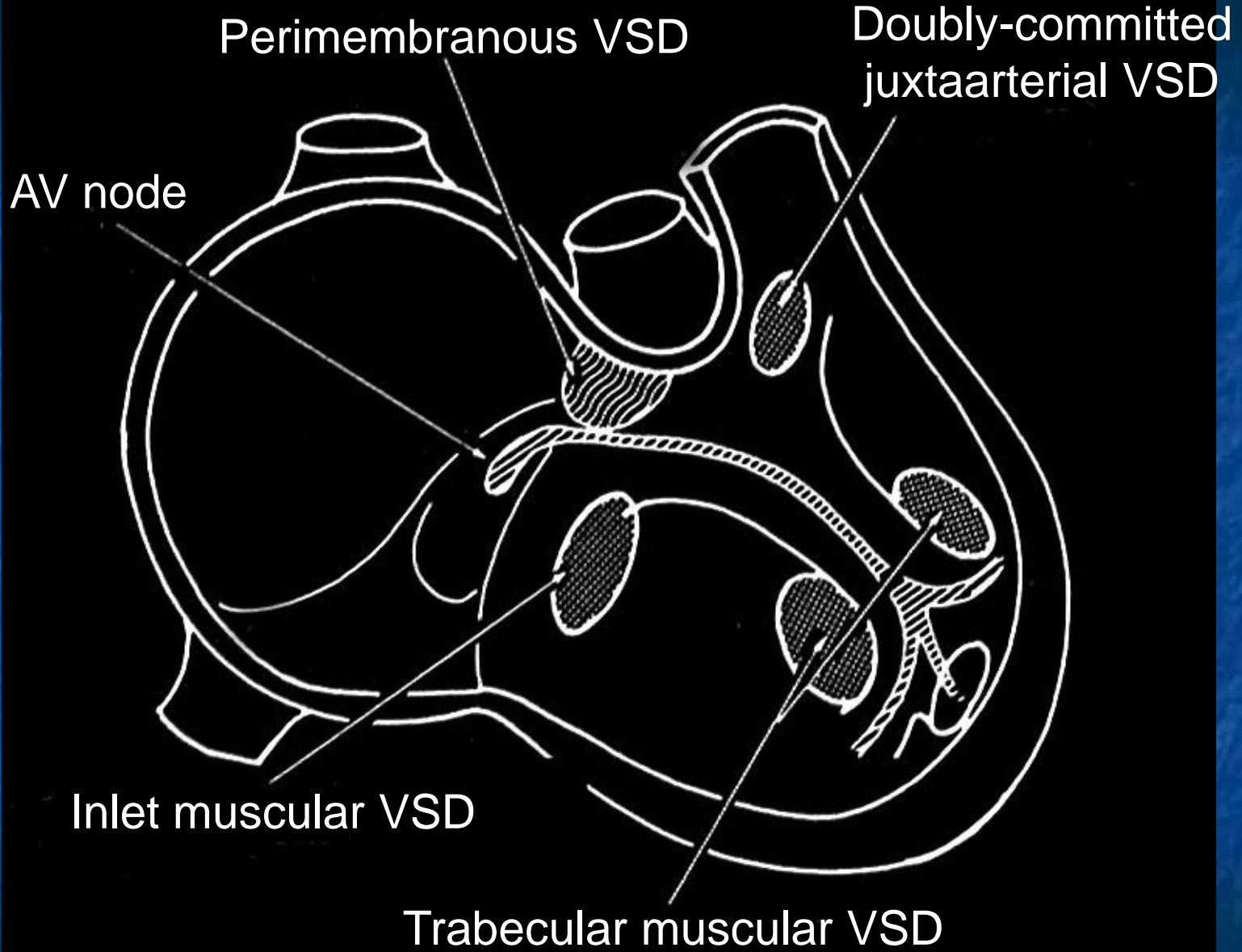
LV aspect

Ventricular anatomy



VSD classification and morphology



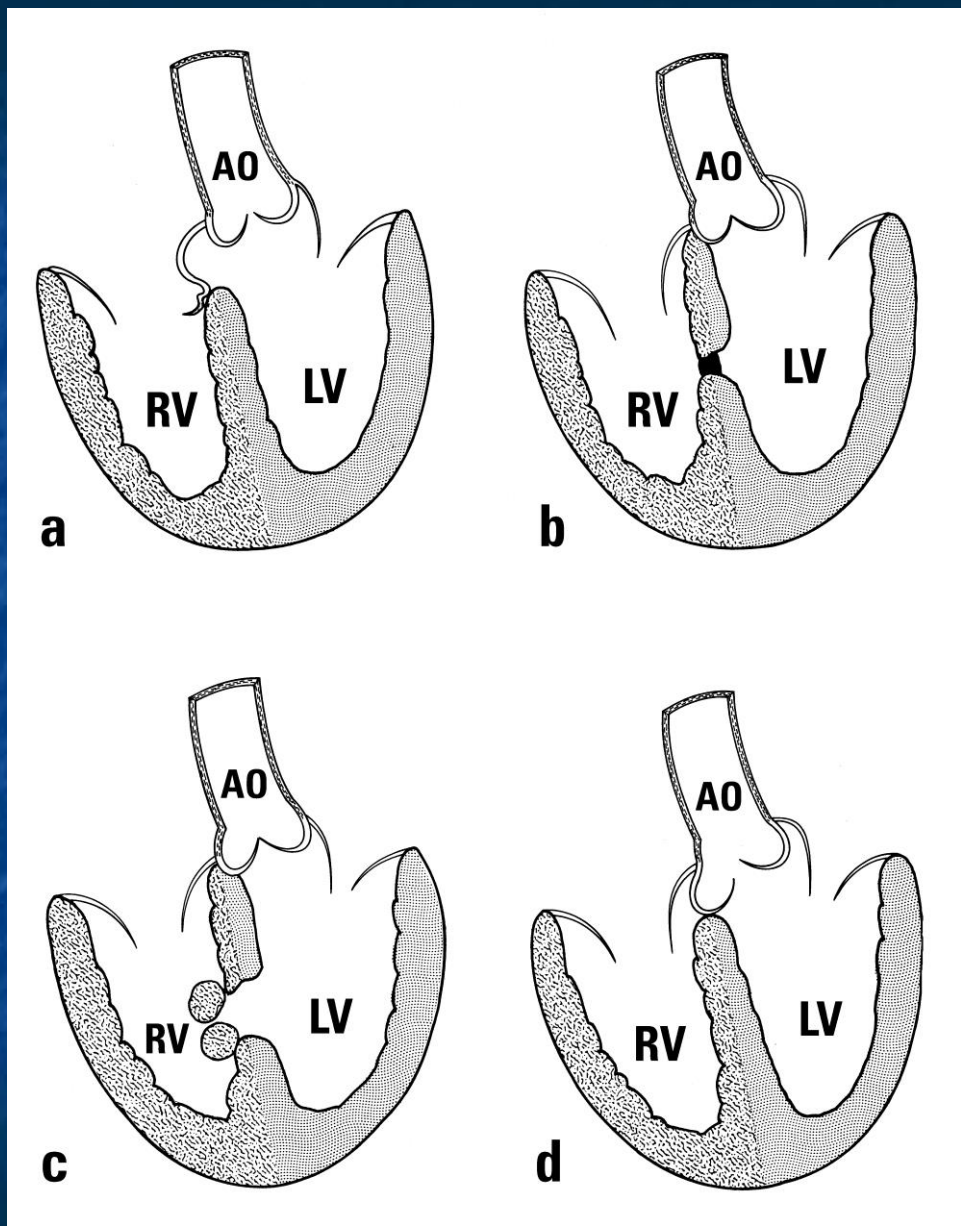


NATURAL HISTORY OF VSD's

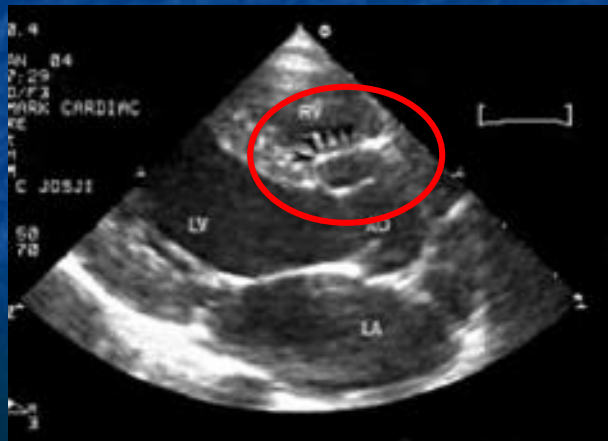
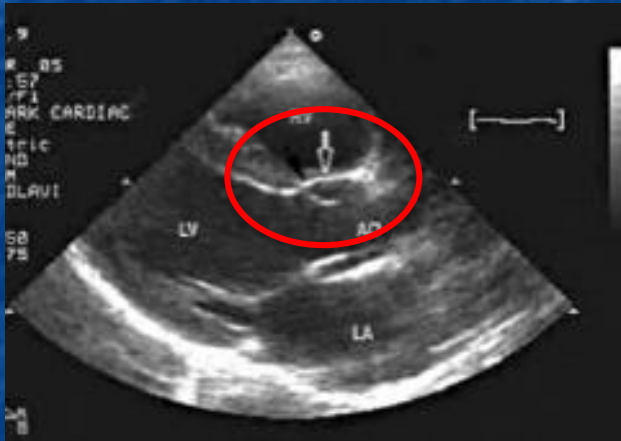
- 1. Spontaneous closure***
- 2. LV-RA shunt***
- 3. Aortic valve prolapse***
- 4. Aortic valve incompetence***
- 5. Pulmonary vascular disease***
- 6. RVOT obstruction***
- 7. LVOT obstruction***
- 8. Infective endocarditis***

SPONTANEOUS CLOSURE

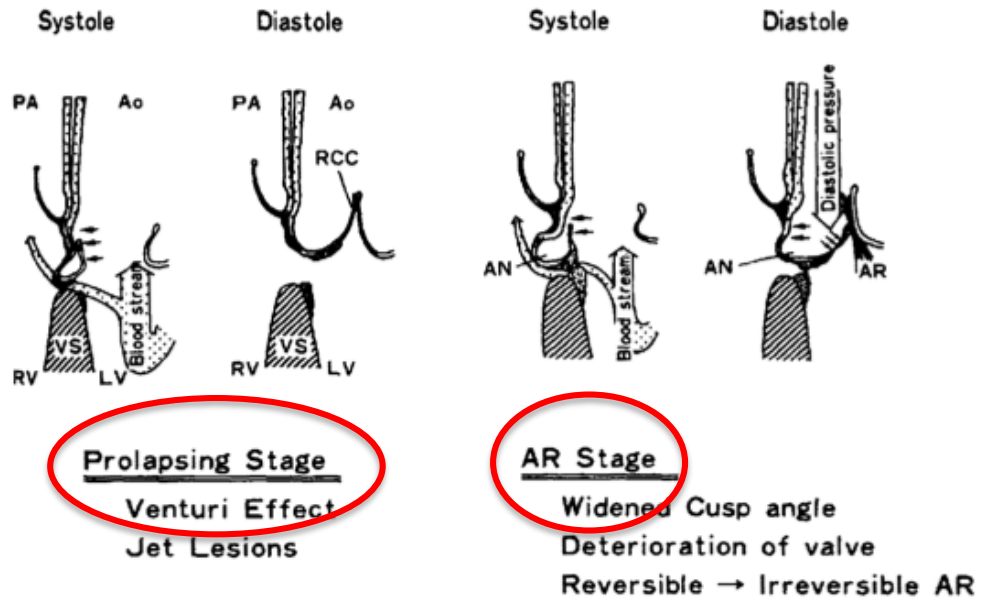
- a. Adhesion TV leaflets
- b. Fibrous tissue plug
- c. Hypertrophied muscle bundles
- d. Prolapsed aortic valve cusp



¿Porqué cerrar una CIV con prolapso del seno coronario derecho?



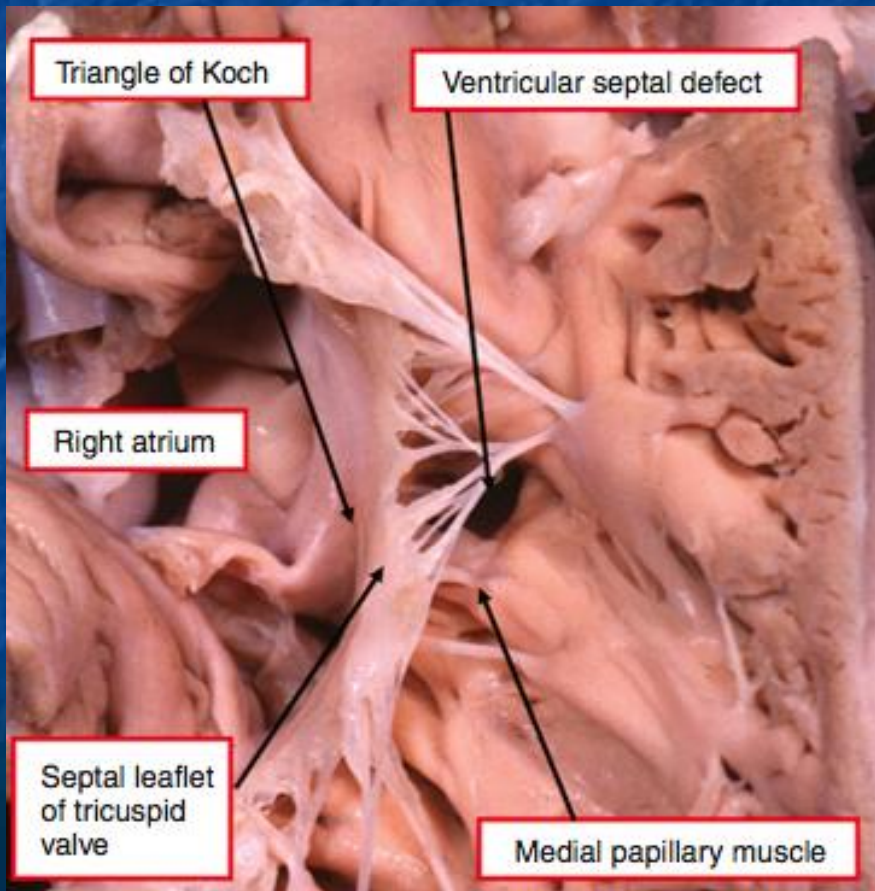
M. Ando and A. Takao: Pathological anatomy of VSD



Heart and Vessels (1986) 2: 117-126

Cierre de CIV PM con mecanismo de cierre parcial

ANATOMIA



Técnicas

- Percutánea anterógrada: asa arterio-venosa femoral
asa arterio-venosa yugular
sin asa arterio-venosa (Dr. RA)
- Percutánea retrógrada: sin asa arterio-venosa (Dr. FB)
vía FOP o CIA (Dr. JDB)
- Híbrida perventricular: (Dr. ZA)
- Mixta: percutánea retrógrada + híbrida (Dr. ZH)

Dispositivos

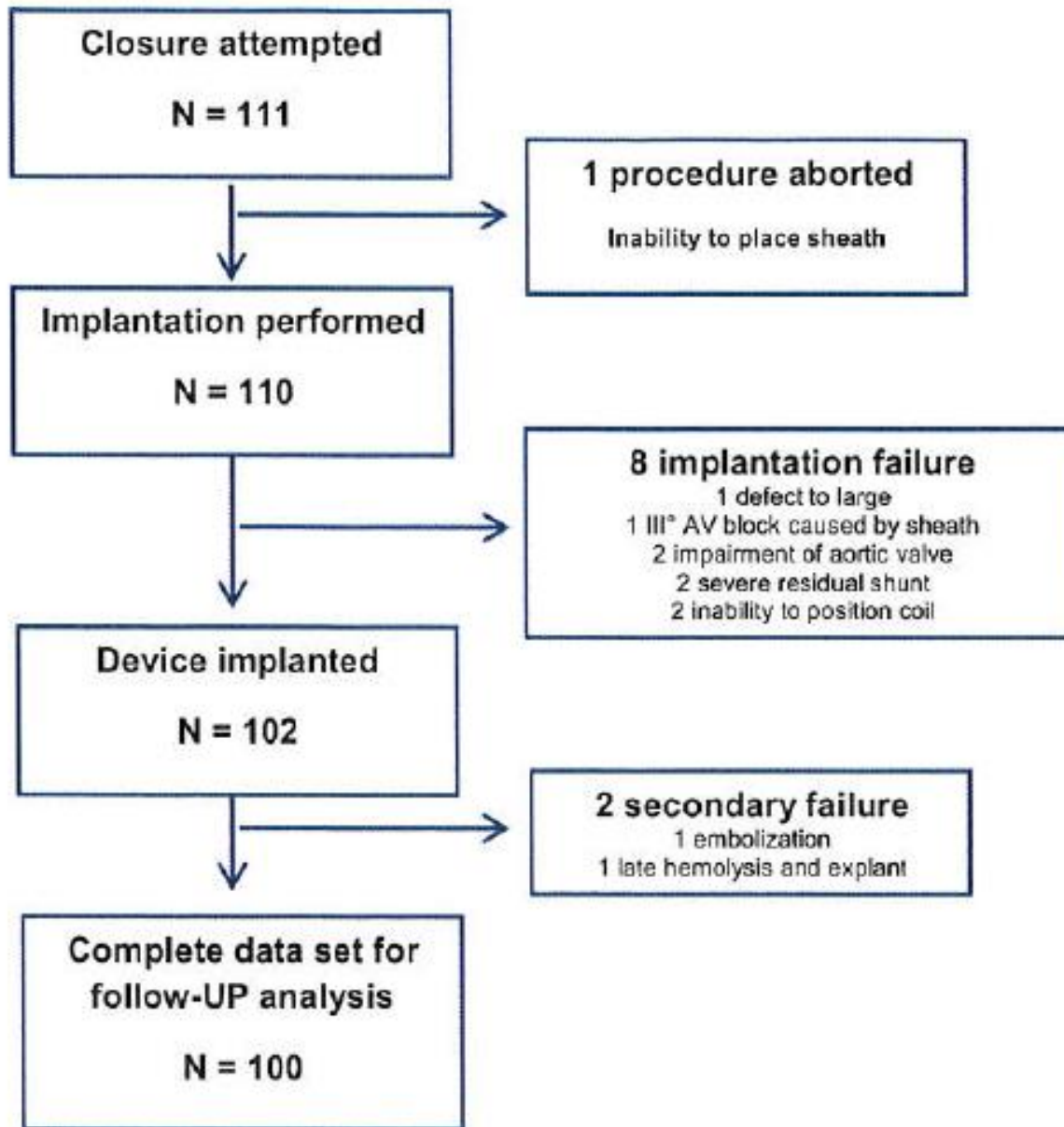
- *Nit Occlud VSD-Le coil* (pfm Medical, Alemania)
- *VSD devices MemoPart* (Lepu Medical Technology, China)

Interventional VSD-Closure with the Nit-Occlud® Lê VSD-Coil in 110 Patients: Early and Midterm Results of the EUREVECO-Registry

Nikolaus A. Haas^{1,10} · Laura Kock¹ · Harald Bertram² · Regina Boekenkamp³ · Daniel De Wolf⁴ · Igor Ditkivskyy⁵ · Matthias W. Freund⁶ · Marc Gewillig⁷ · Christoph M. Happel¹ · Ulrike Herberg⁸ · Edvard Karthasyan⁹ · Rainer Kozlik-Feldmann¹⁰ · Oliver Kretschmar¹¹ · Yulia Kuzmenko¹² · Ornella Milanesi¹³ · Goetz Mueller¹⁴ · Giacomo Pongiglione¹⁵ · Stephan Schubert¹⁶ · Gleb Tarusinov¹⁷ · Christoph Kampmann¹⁸

Pediatr Cardiol 2017. Published online Nov 2016.





Patient data

Number	n = 111
Sex	female: 66 (59.9 %) male: 45 (40.5 %)
Age (mean): (median)	8.38 ± 9.0 years (range:0.8 – 66.9 years) 5.1 years
	< 1 year n = 4 (3.6 %)
	1-6 years n = 55 (49.5 %)
	6-14 years n = 38 (34.2 %)
	> 14 years n = 14 (12.6 %)
Weight (mean): (median)	28.82 ± 20.1 kg (range:7.2-109 kg) 17.0 kg
	< 10 kg n = 9 (8.1 %)
	10-20 kg n = 44 (39.6 %)
	20-40 kg n = 31 (27.9 %)
	> 40 kg n = 27 (24.3 %)
Height(mean): (median)	122.2 ± 30.4 cm (range 61 – 194 cm) 113 cm

VSD data:

Perimembraneous VSD	n = 81	(76.5 %)
with aneurysm	n = 48	(43.2 %)
multiple exits	n = 20	(18.0 %)
muscular VSD	n = 30	(27.1 %)
midmuscular VSD	n = 24	(21.6 %)
apical VSD	n = 6	(5.4 %)

VSD

Mean size at right ventricle	4.46 mm	(SD ± 2.06, range 1.5 - 11 mm)
Mean size at left ventricle	8.69 mm	(SD ± 3.05, range 3 – 18 mm)
Minimal diameter (mean)	4.04 mm	(SD ± 2.02, range 1.5 –10 mm)
Multiple exits	20/111	(18 %)
Aneurysm	48/111	(43.2%)
Aortic rim if perimembraneous	3.98 mm	(SD 2.09, range 0 – 13 mm)

Implantation

Success with first placement	87/110	(79.1%)
Multiple attempts	23/110	(20.9 %)
Acceptable/good position	101/110	(91.8 %)
Device released	102/110	(92.7 %)
Embolization	1/110	(0.9 %)
Procedure aborted	9/111	(8.1 %)

Devices used

Size 8/6	6F sheath	26/110	(23.6 %)
Size 10/6	6F sheath	37/110	(33.6 %)
Size 12/6	6F sheath	30/110	(27.3 %)
Size 14/8	7F sheath	13/110	(11.8 %)
Size 16/8	7F sheath	4/110	(3.6 %)

Residual leak at implantation

Immediate complete closure	45/102	(44.1 %)
Trivial leak	46/102	(45.1 %)
Moderate leak	16/102	(15.6 %)
Severe leak	1/102	(0.9 %)

Procedure times

Fluoroscopy time	Mean	26.3 min	(SD 14.91, range 7.5 to 86.3)
	Median	21.7 min	
Procedure time	Mean	121.1 min	(SD 55.64, range 15 to 278)
	Median	110.0 min	

Total number of complications: 21/102 (20.5 %)

Severe complications: 2/102 (1.9%)

0 - death

1 - embolization (day 1) – surgical removal

1 - displacement/hemolysis– surgical removal at 2 years

***Hemolysis 4 pts (3,9%): 3 early with 2nd device or spontaneous remission
1 late with surgical removal***

Third degree AV block 1 pt (0,98%): early with resolution with steroids

2 - hemolysis, spontaneous remission

1 - III° AV block – 1 week after implantation – steroids
stable sinus rhythm

Mild complications: n = 15 (15/102 = 14.7%)

1 - device fracture, no impairment of cardiac function

6 - new onset right bundle branch block (RBBB)

3 - trivial aortic regurgitation

5 - trivial tricuspid regurgitation

Closure at implantation:

complete immediate closure	44/102	(43.1 %)
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discharge

n = 101 one device embolized

Complete	49/101	(48.0%)
trivial residual shunt	51/101	(50.0%)
overall success	100/101	(98.0%)

12 months

n = 97

Complete	94/97	(95.0%)
trivial residual shunt	2/97	(2.1 %)
overall success	96/97	(99.0%)

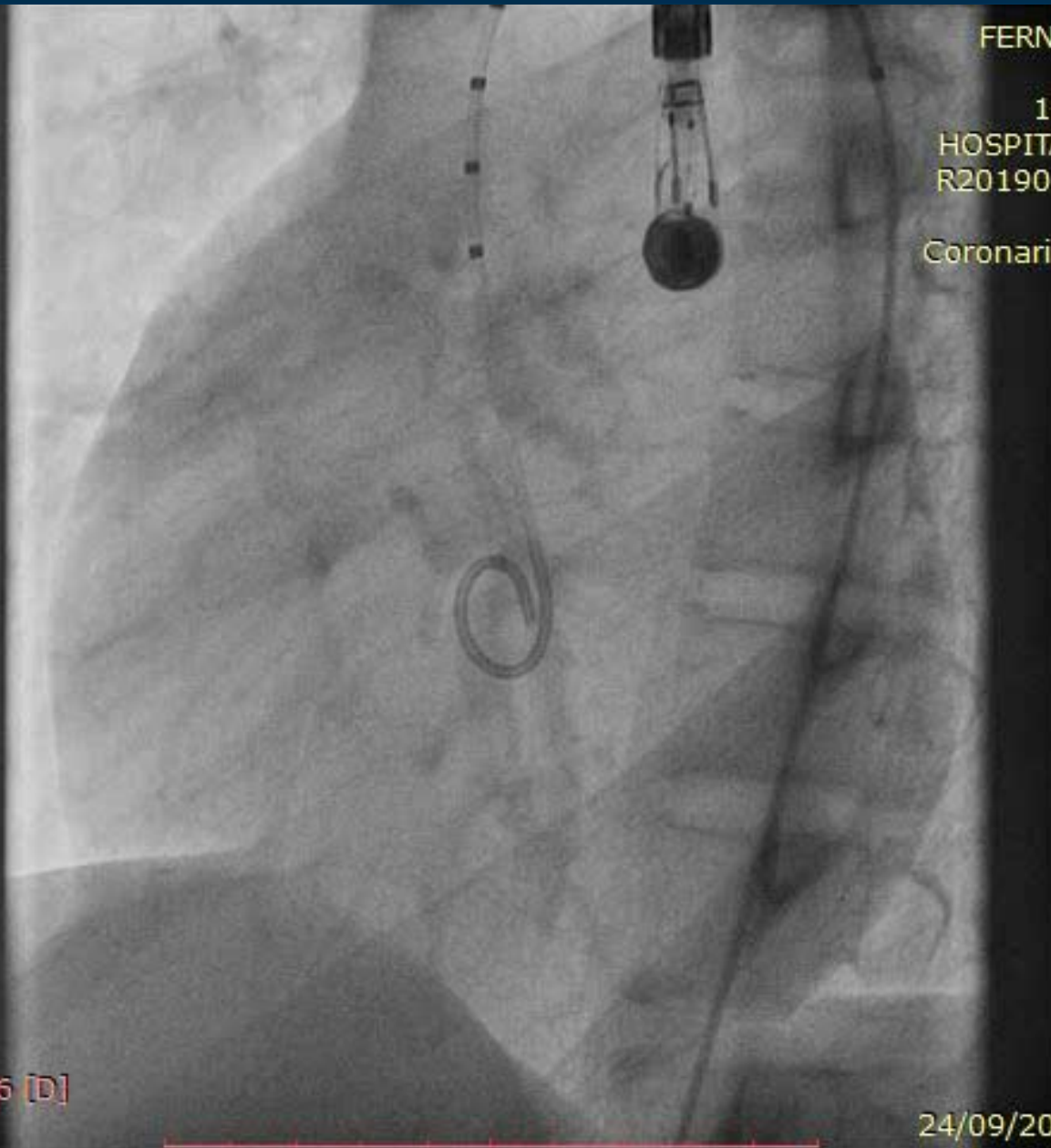
36 months

n = 31

complete	31/31	(100%)
trivial residual shunt	0/31	(0.0%)
overall success	31/31	(100%)

Im: 1/111
Se: 2

FERNANDEZ ALAN
4804
12/05/2004 M
HOSPITAL DE NIÑOS
R201909240820231
Cardíaca
Coronaria izda 15 ips



WL: 128 WW: 256 [D]
LAO: 53 CAU: 1

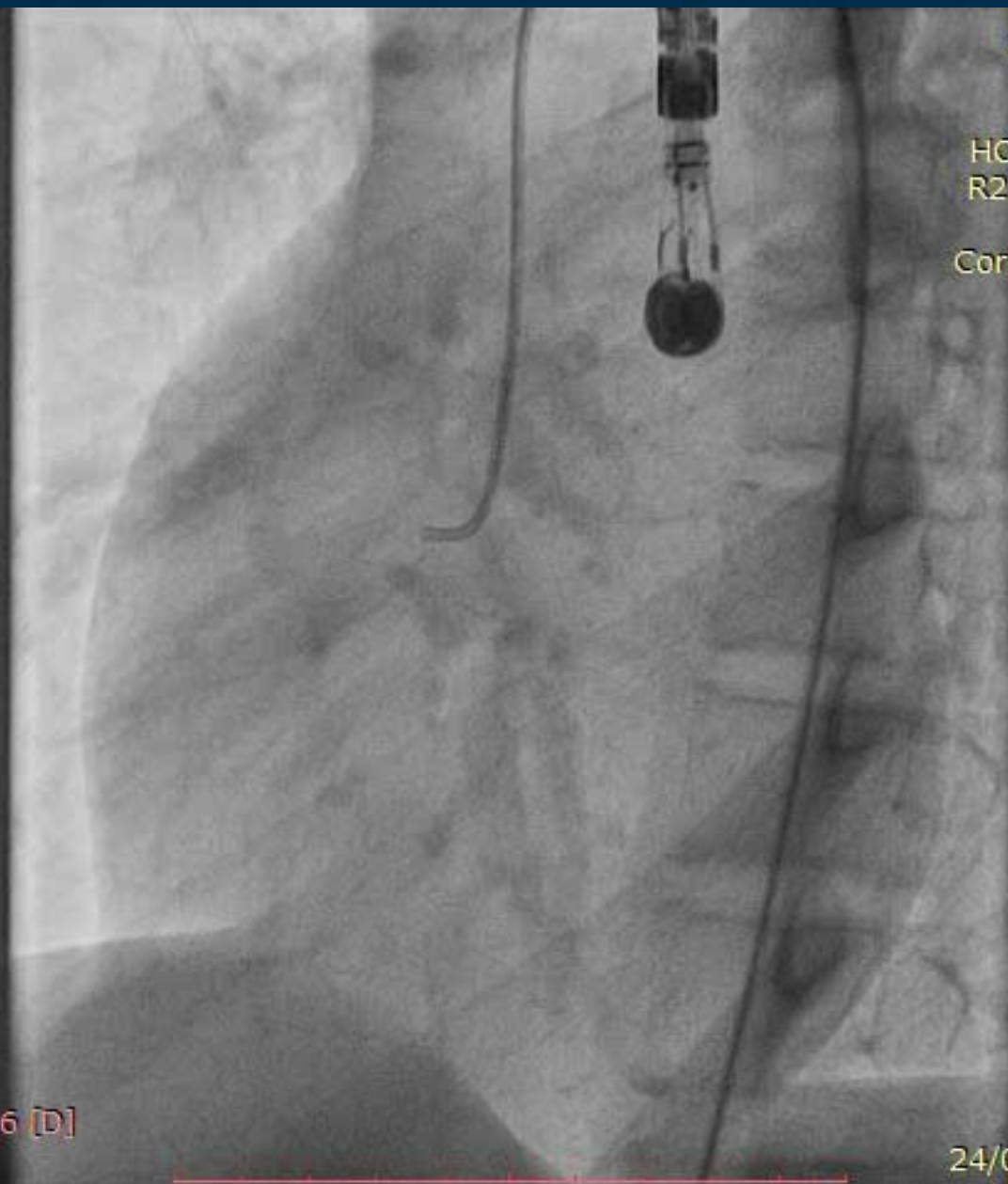
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Se: 4

FERNANDEZ ALAN
4804
12/05/2004 M
HOSPITAL DE NIÑOS
R201909240820231
Cardíaca
Coronaria izda 15 ips

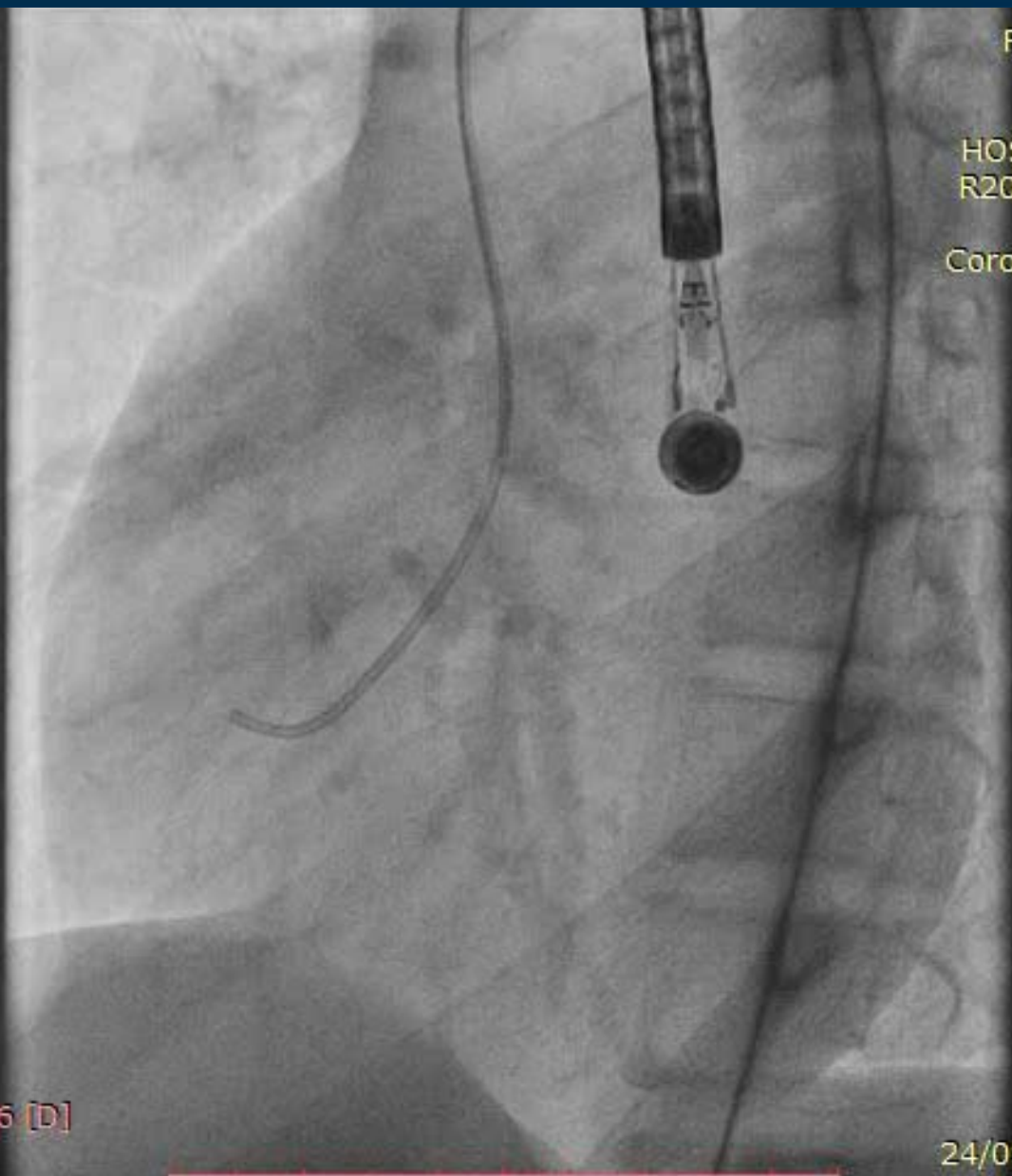
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LAO: 53 CAU: 1

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Im: 1/101
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FERNANDEZ ALAN
4804
12/05/2004 M
HOSPITAL DE NIÑOS
R201909240820231
Cardíaca
Coronaria izda 15 ips



WL: 128 WW: 256 [D]
LAO: 53 CAU: 1

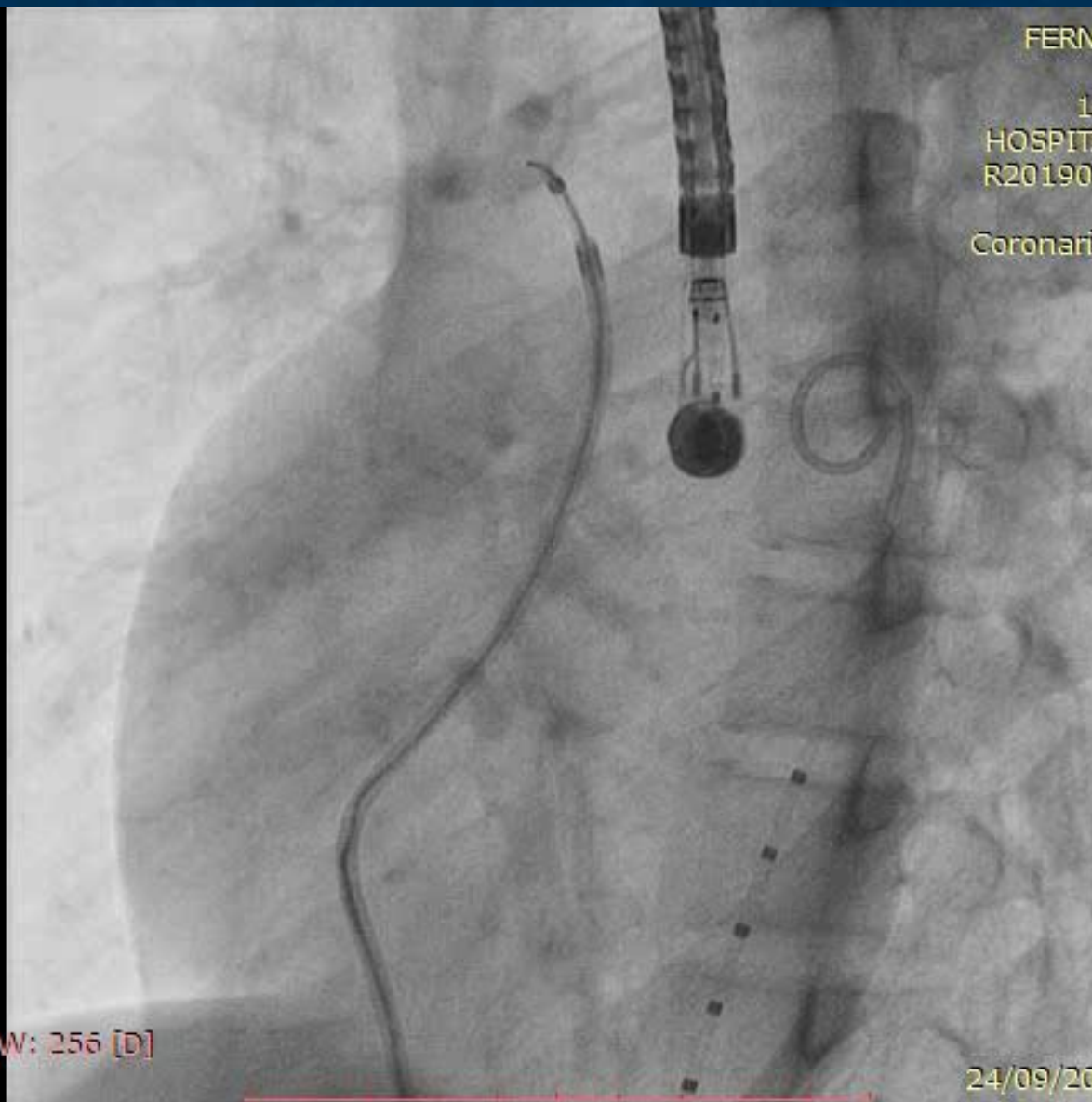
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Se: 8

FERNANDEZ ALAN
4804
12/05/2004 M
HOSPITAL DE NIÑOS
R201909240820231
Cardíaca
Coronaria izda 15 ips

WL: 128 WW: 256 [D]
LAO: 55

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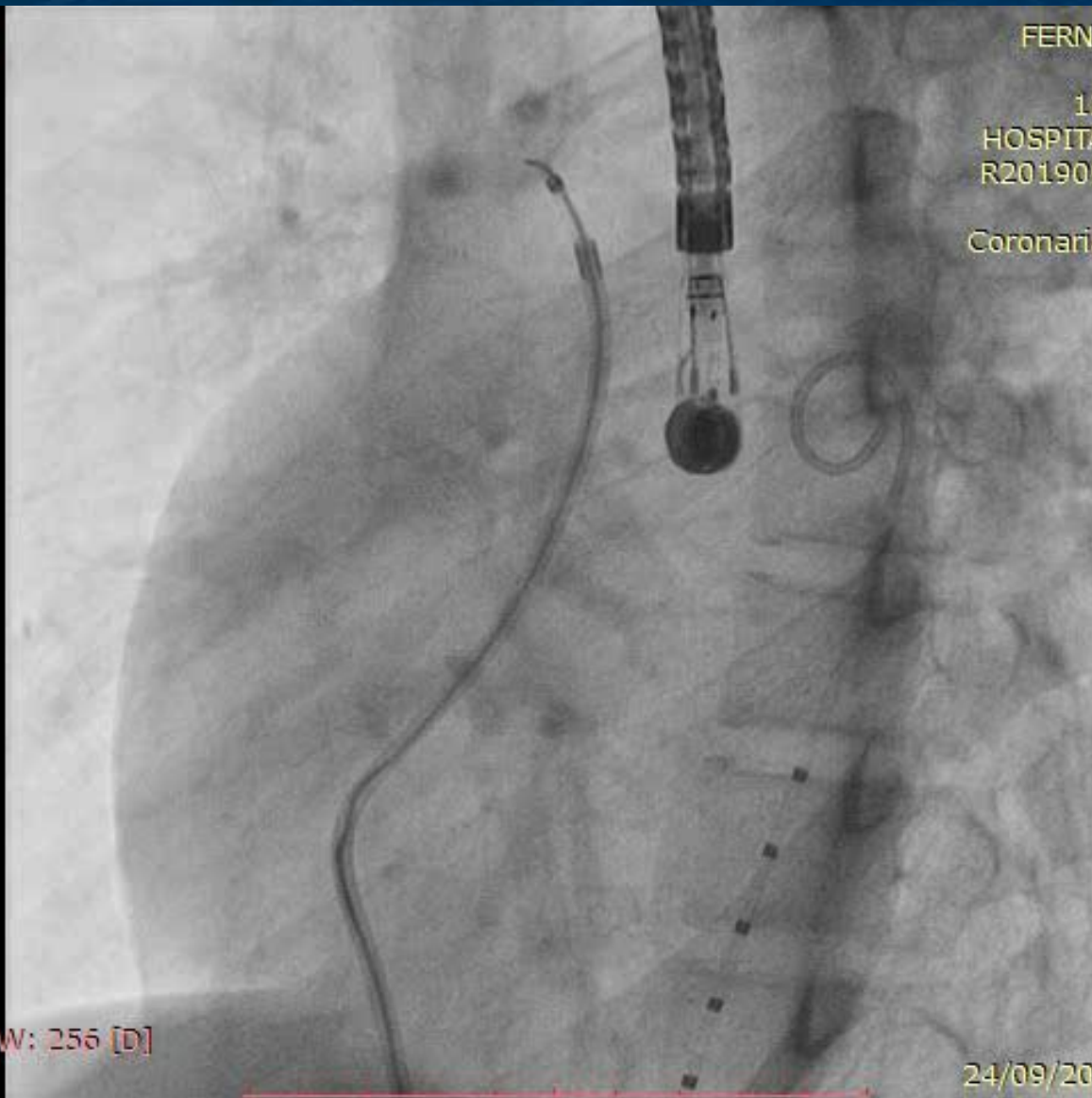


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FERNANDEZ ALAN
4804
12/05/2004 M
HOSPITAL DE NIÑOS
R201909240820231
Cardíaca
Coronaria izda 15 ips

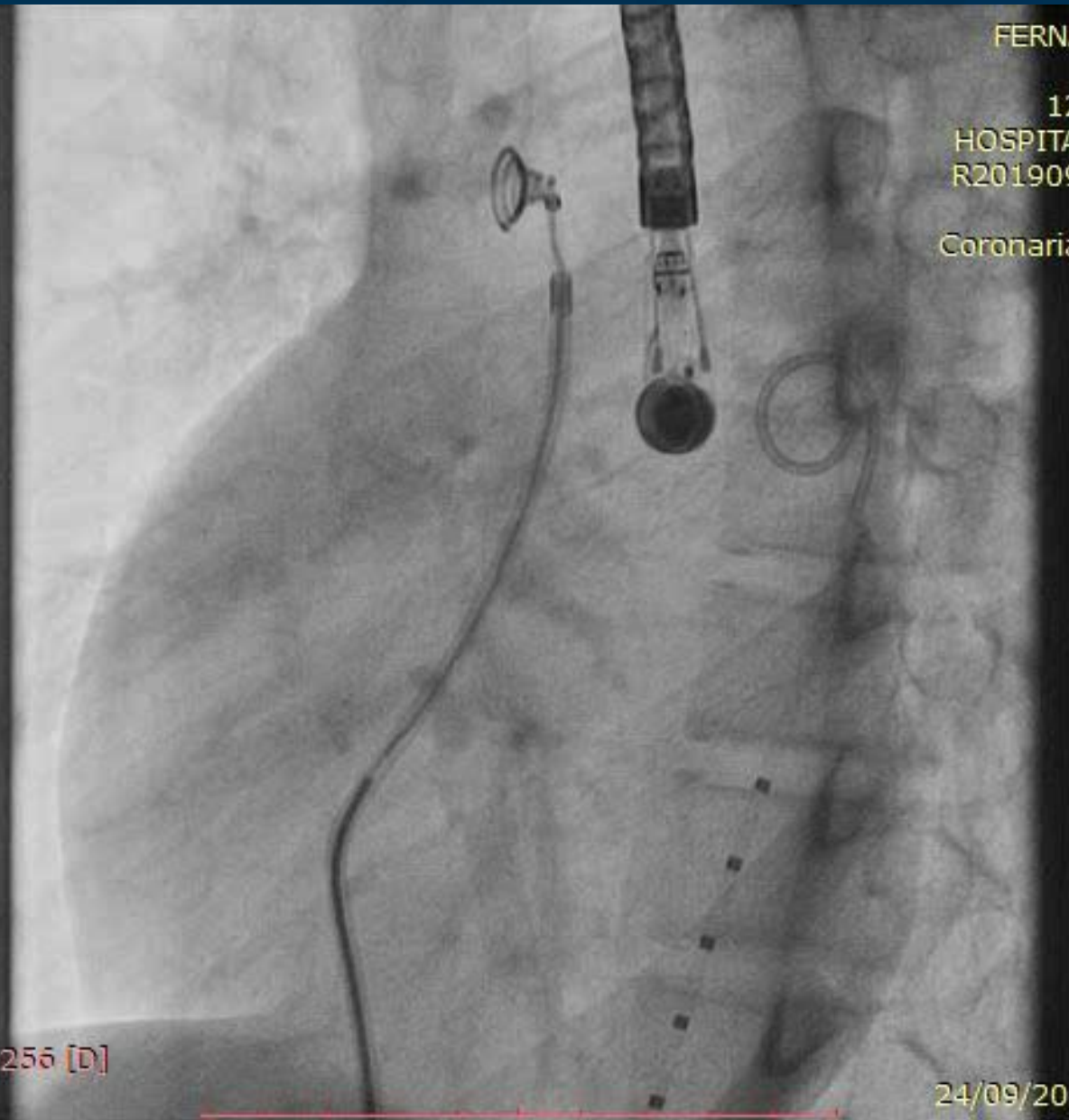
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FERNANDEZ ALAN
4804
12/05/2004 M
HOSPITAL DE NIÑOS
R201909240820231
Cardíaca
Coronaria izda 15 ips

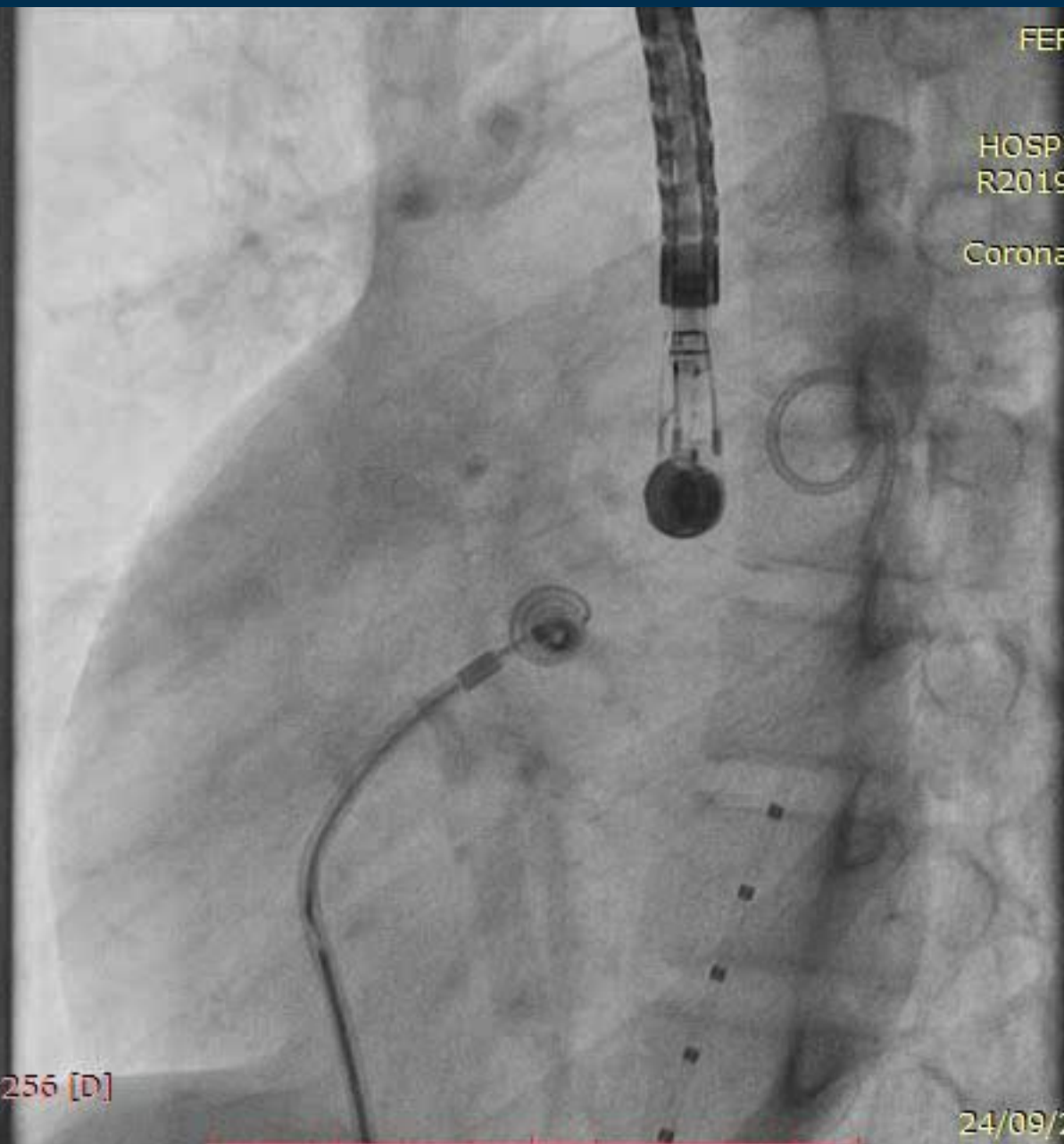


WL: 128 WW: 256 [D]
LAO: 55

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Im: 1/18
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FERNANDEZ ALAN
4804
12/05/2004 M
HOSPITAL DE NIÑOS
R201909240820231
Cardíaca
Coronaria izda 15 ips

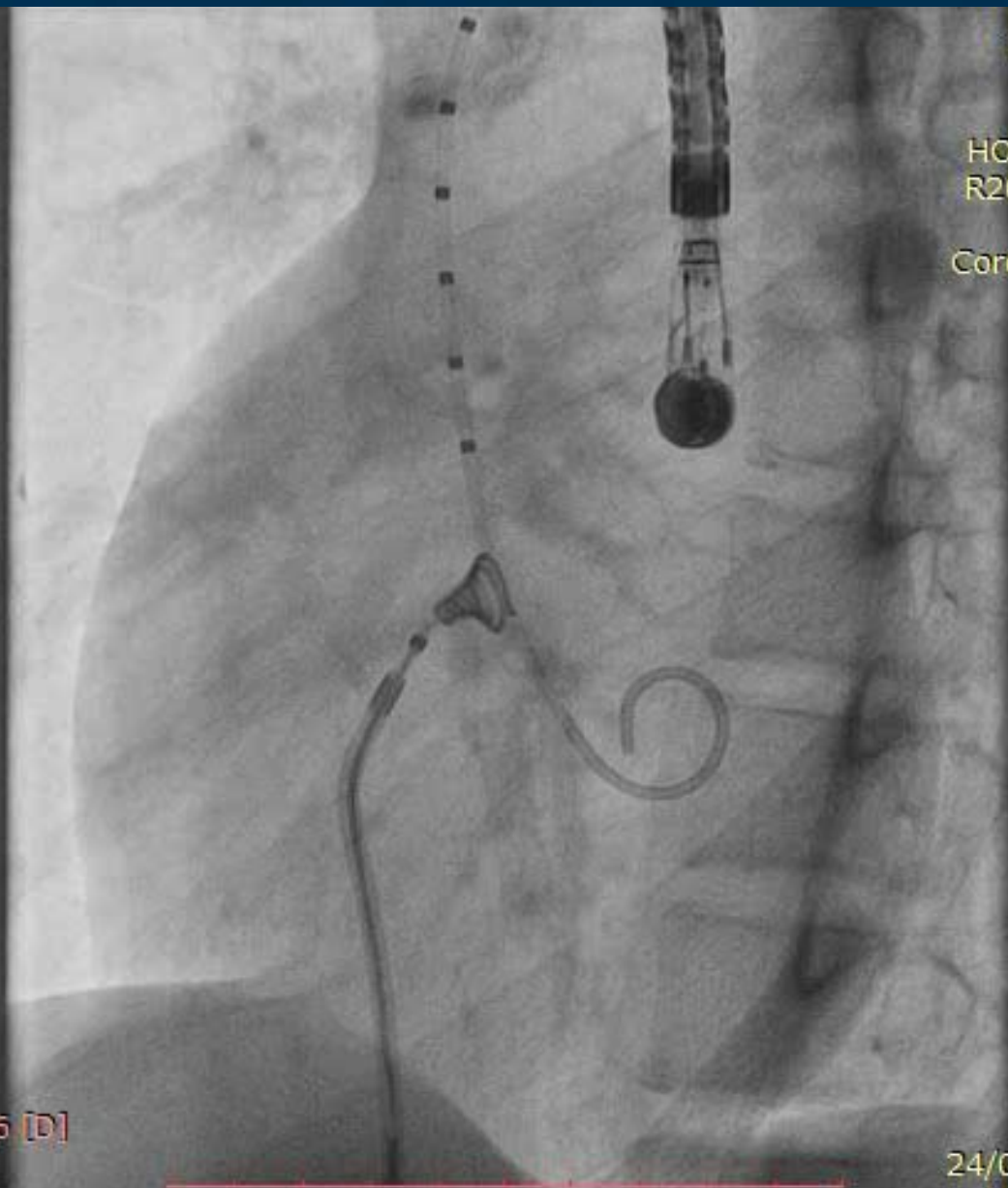


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LAO: 55

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Im: 1/62
Se: 15

FERNANDEZ ALAN
4804
12/05/2004 M
HOSPITAL DE NIÑOS
R201909240820231
Cardíaca
Coronaria izda 15 ips

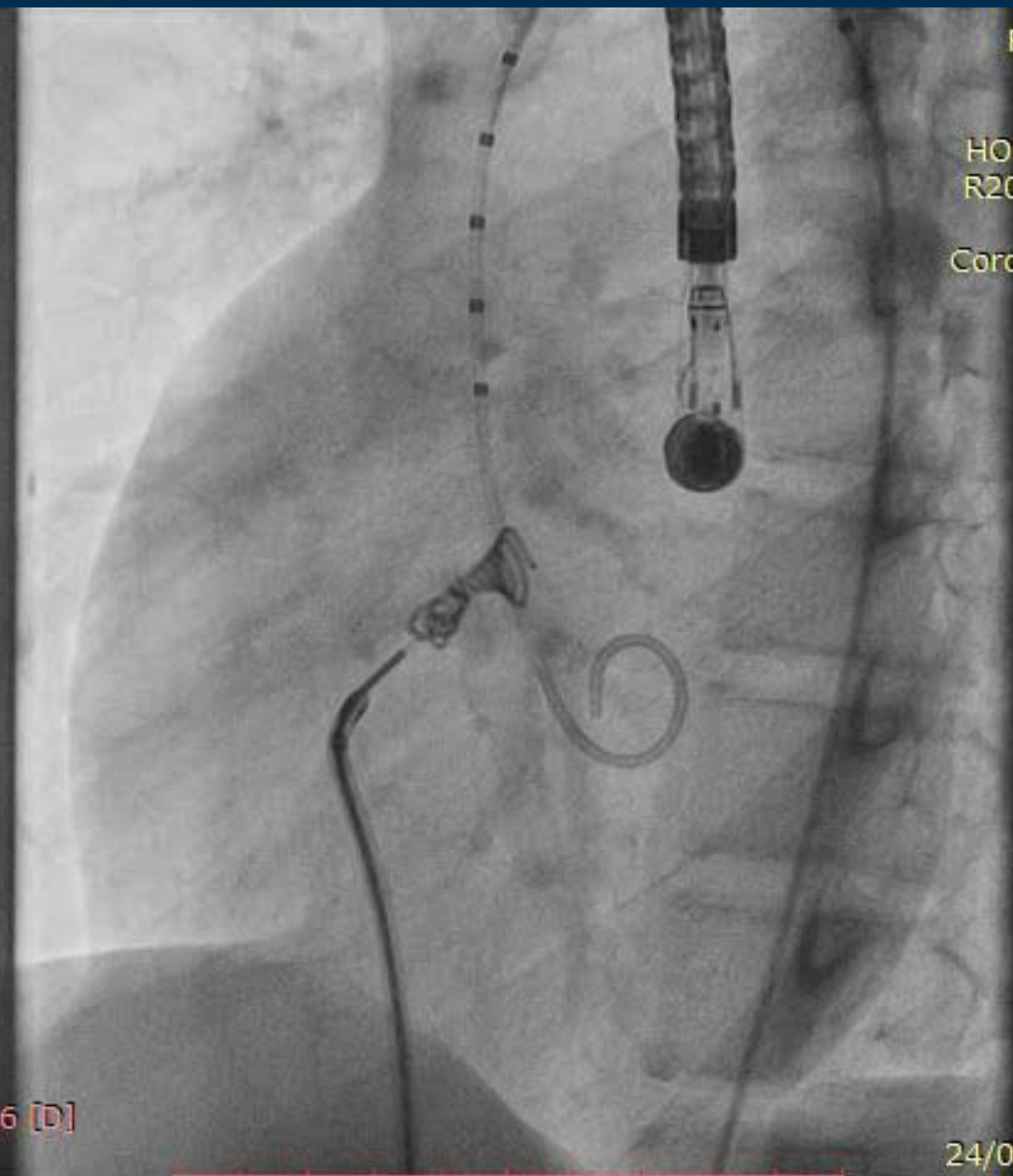


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LAO: 55

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FERNANDEZ ALAN
4804
12/05/2004 M
HOSPITAL DE NIÑOS
R201909240820231
Cardíaca
Coronaria izda 15 ips

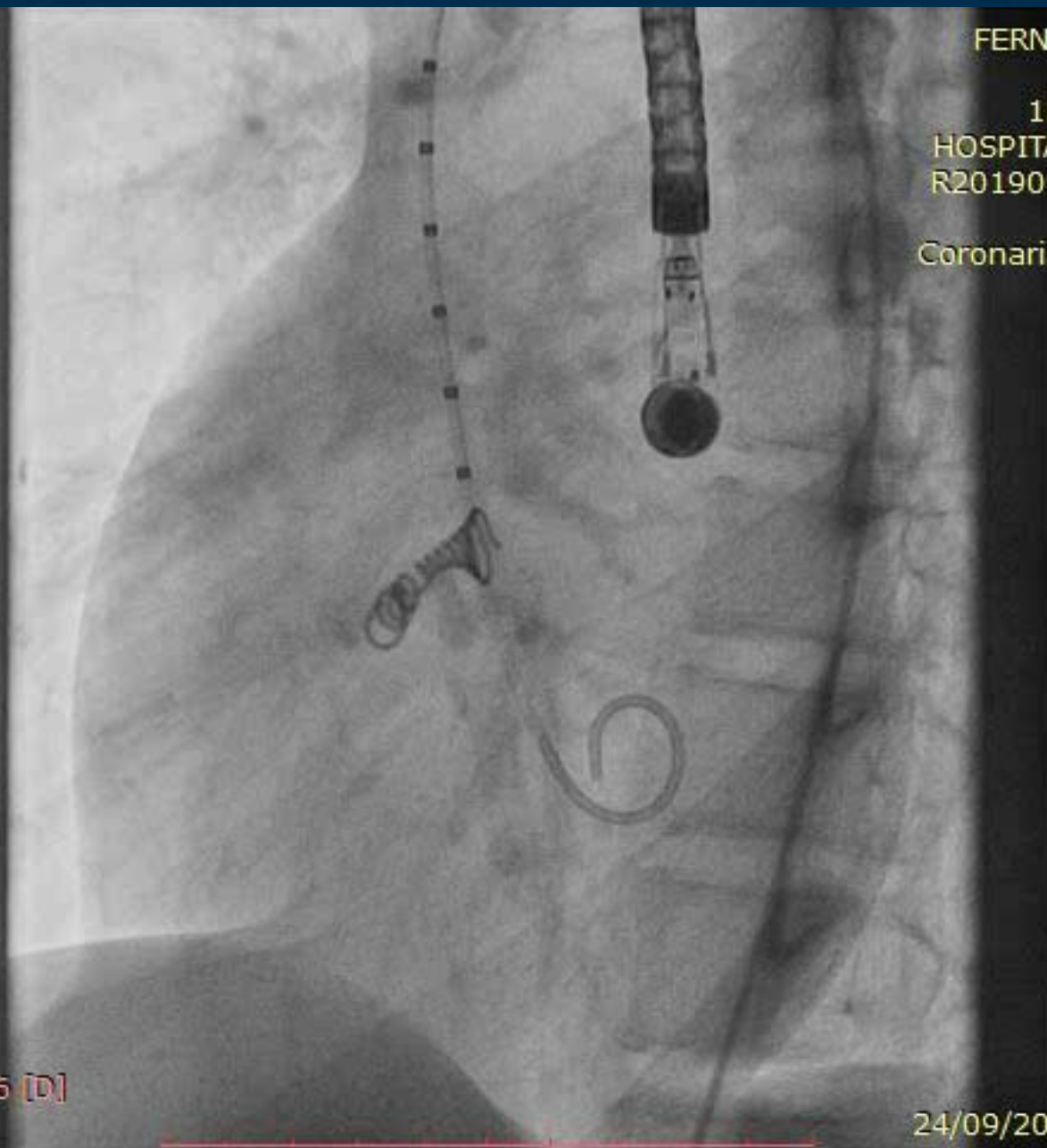


WL: 128 WW: 256 [D]
LAO: 55

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Im: 1/80
Se: 18

FERNANDEZ ALAN
4804
12/05/2004 M
HOSPITAL DE NIÑOS
R201909240820231
Cardíaca
Coronaria izda 15 ips




WL: 128 WW: 256 [D]
LAO: 55

24/09/2019 09:42:55

MemoPart™ Ventricular Septal Defect (VSD) Occluder

Congenital heart disease

Transcatheter Closure of Perimembranous Ventricular Septal Defect Using a Modified Double-Disk Occluder

Yongwen Qin MD ^a, Jinming Chen MD ^b  , Xianxian Zhao MD ^a, Dening Liao MD ^b, Ruibin Mu MD ^c, Shengqiang Wang MD ^d, Hong Wu MD ^a, Haoxue Guo MD ^e

Am J Cardiol. 2008; 15; 101: 1781-1786.

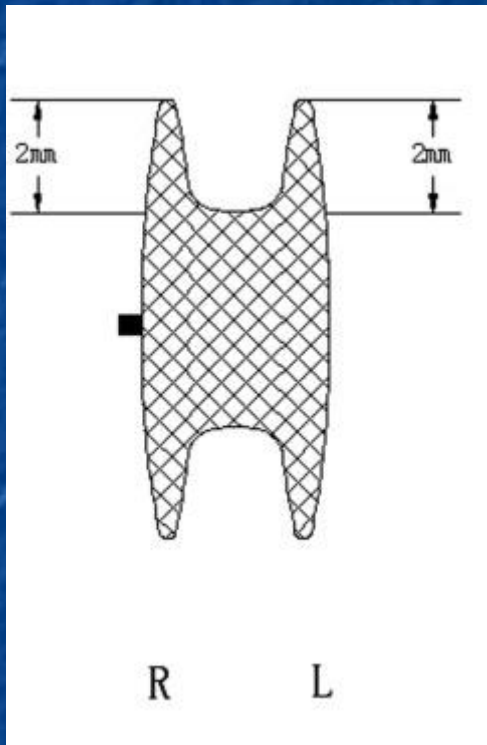
MemoPart™ Ventricular Septal Defect (VSD) Occluder

- ***Multicenter study***
- ***Objective: to assess efficacy and safety of transcatheter closure of perimembranous VSD using MemoPart™ VSD occluders.***
- ***5 different centers in China.***
- ***Enrolled pts: 412 (202 male & 210 female).***
- ***Immediate success rate*** ***96.6%.***
- ***Follow-up period of 2 years*** ***no evidence of residual shunt or device-related complications.***
- ***High degree AV block*** ***6 pts (1.5%). All recovered within 3 weeks***

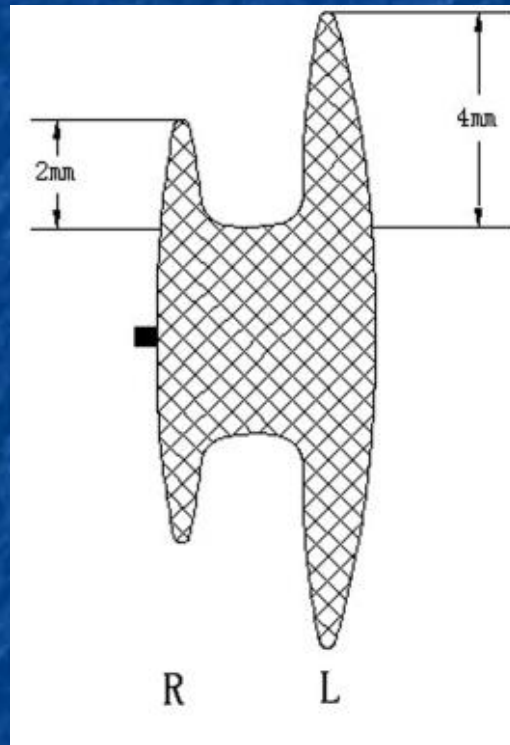
MemoPart™ Ventricular Septal Defect (VSD) Occluder

- ***Age: 3 to 65 years (mean 16.4+/-9.1).***
- ***Pulmonary to systemic flow varied from 1.6 to 2.3 (1.9+/-0.4).***
- ***Diameter of defect: 3 to 15 mm by TTE and 3 to 18 mm by angiography.***
- ***Device diameter: 4 to 20 mm (7.09+/-3.60).***
- ***Ventricular septal rim below the aortic valve: 0 to 5 mm.***
- ***None needed a permanent pacemaker.***
- ***Dislodgement of the device occurred in 3 pts but the device was recaptured and redeployed in 2 cases***

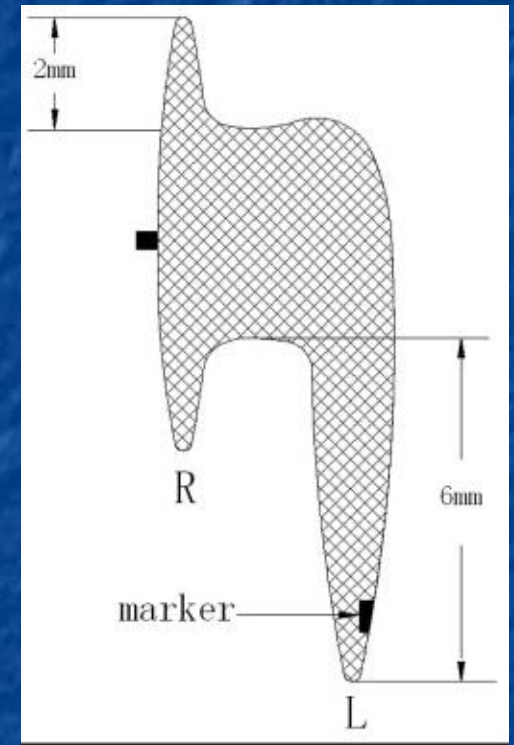
MemoPart™ Ventricular Septal Defect (VSD) Occluder



Simétrico

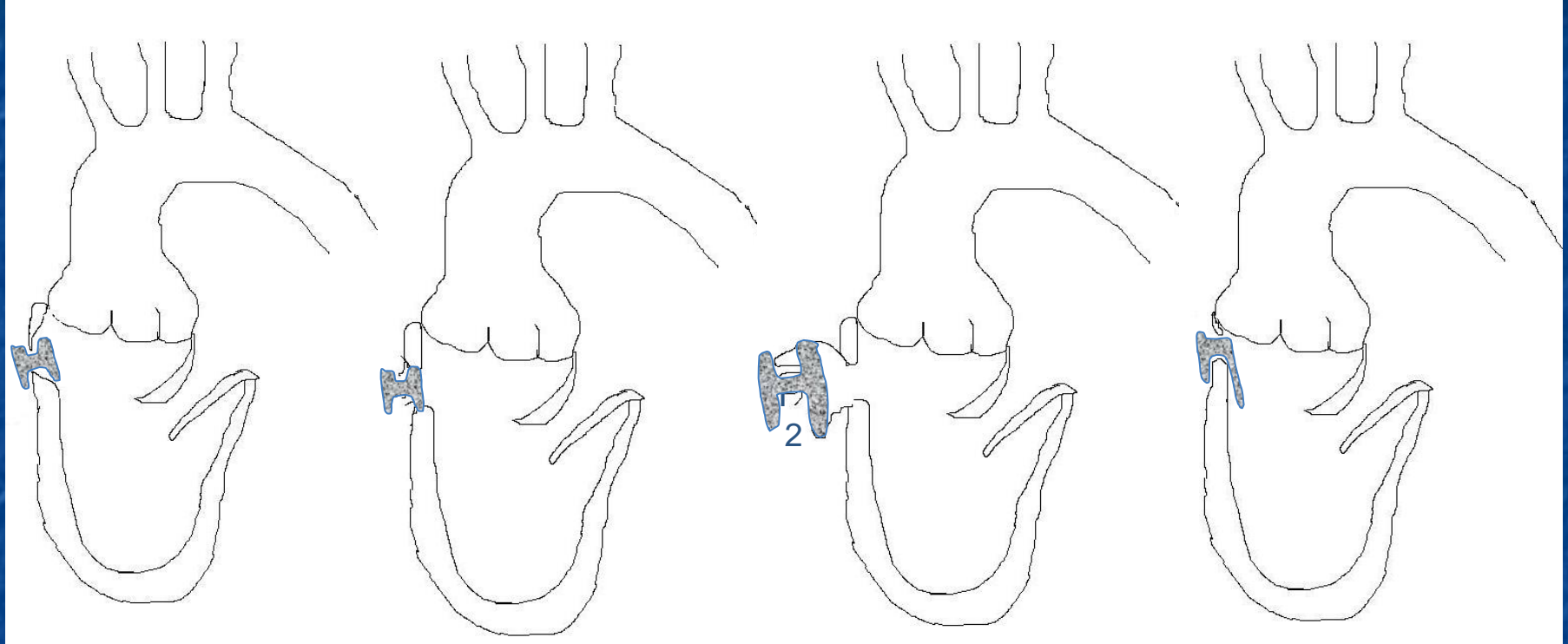


Asimétrico

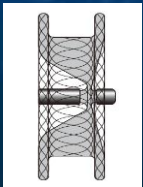


Excéntrico

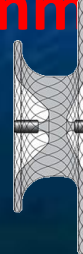
MemoPart™ Ventricular Septal Defect (VSD) Occluder



Symmetric



Asymmetric



Eccentric



Device sizes

- Muscular VSD: 4 to 18 mm
- PM VSD symmetric: 4 to 20 mm
- PM VSD asymmetric: 4 to 18 mm
- PM Zero rim eccentric: 4 to 16 mm

Estudio argentino de cierre de CIV con dispositivo MemoPart (Lepu Medical)

- **Investigador principal: Dr. Raúl Arrieta**
- **Centros involucrados:**
 - **Hospital de Niños de Córdoba** **18 casos**
 - **Hospital J. P. Garrahan CABA** **3 casos**

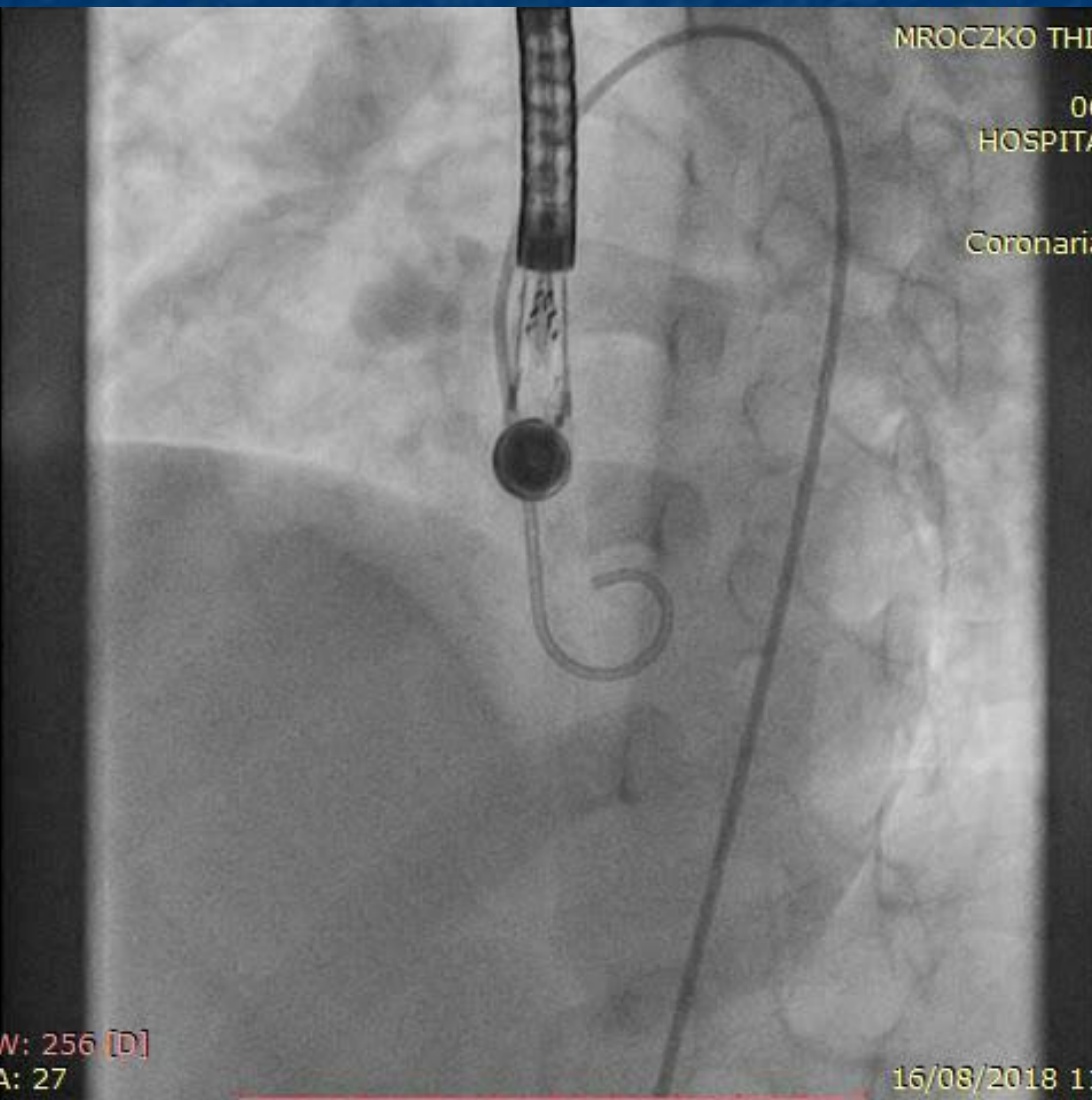
MemoPart™ Ventricular Septal Defect (VSD) Occluder Asymmetric

Im: 1/107
Se: 3

MROCZKO THIAGO LIONEL
4510
06/06/2010 M
HOSPITAL DE NIÑOS
3947010
Cardíaca
Coronaria izda 15 ips

WL: 128 WW: 256 [D]
LAO: 38 CRA: 27

16/08/2018 11:43:51 a.m.



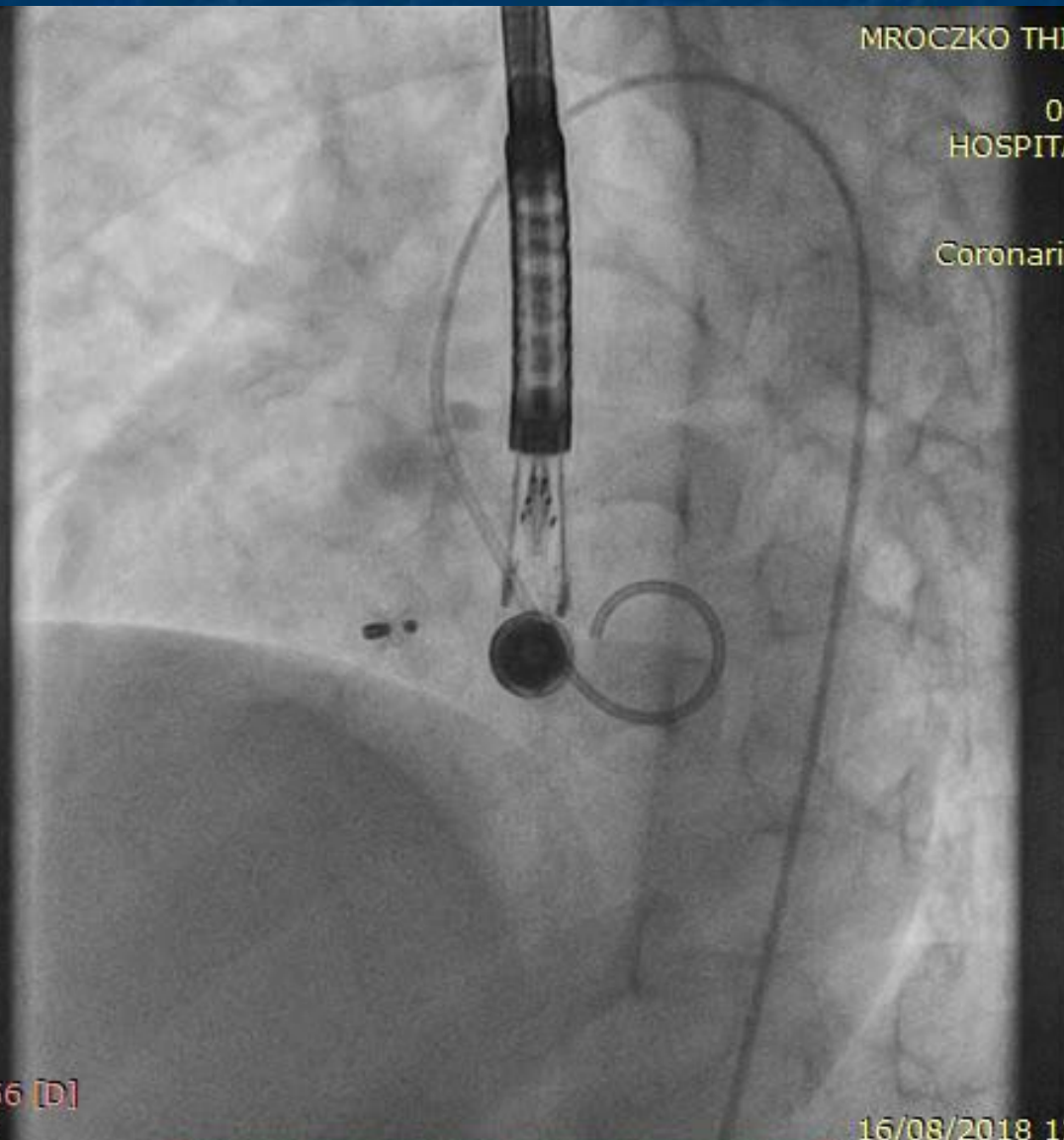
MemoPart™ Ventricular Septal Defect (VSD) Occluder Asymmetric

Im: 1/80
Se: 9

MROCZKO THIAGO LIONEL
4510
06/06/2010 M
HOSPITAL DE NIÑOS
3947010
Cardíaca
Coronaria izda 15 ips

WL: 128 WW: 256 [D]
LAO: 39 CRA: 27

16/08/2018 12:27:42 p.m.



Post Cx TOF. CIV muscular residual

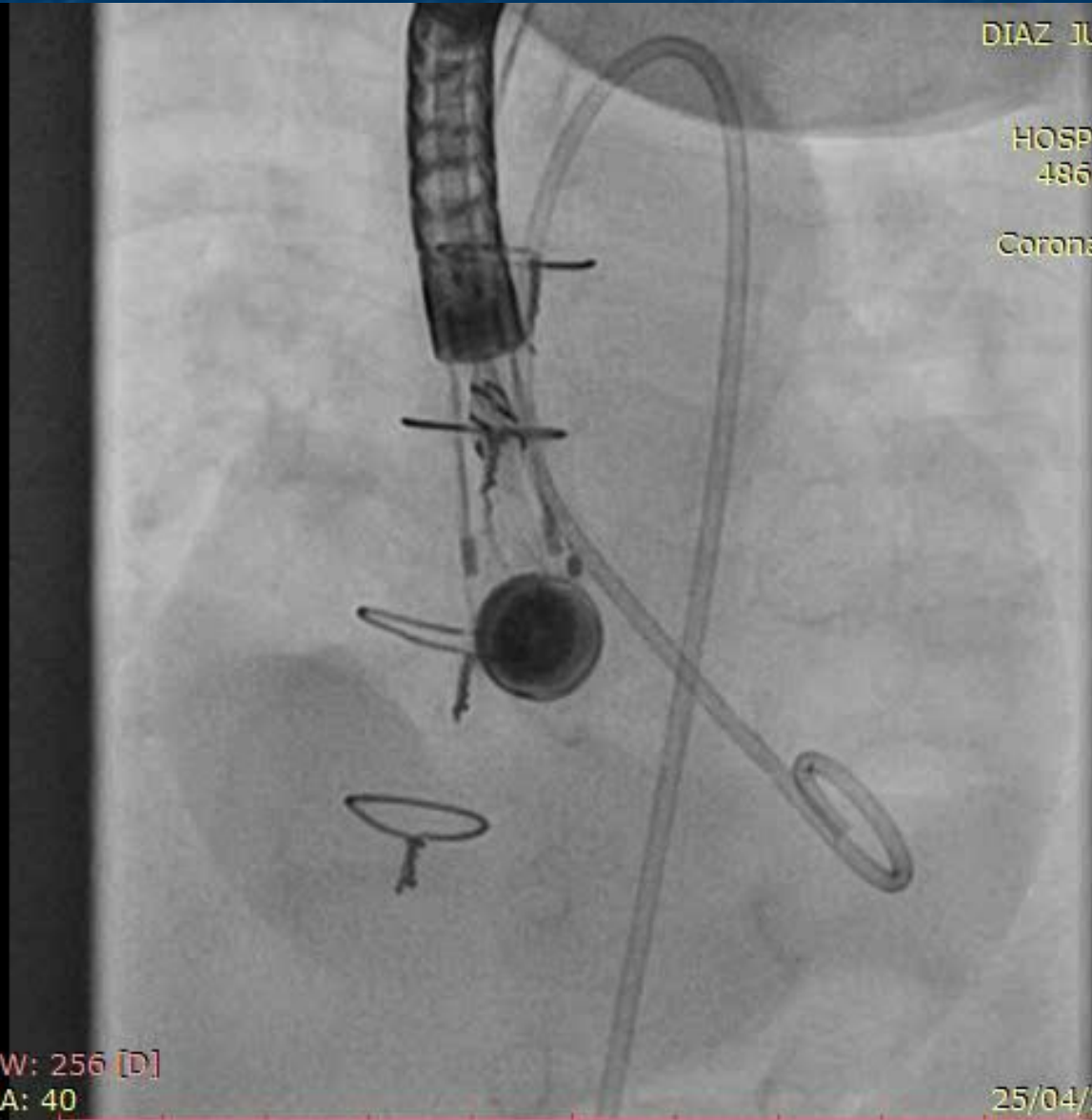
Im: 1/95

Se: 1

DIAZ JULIAN IGNACIO
4701
26/07/2018 M
HOSPITAL DE NIÑOS
486497/57009339
Cardíaca
Coronaria izda 15 ips

[WL: 128 WW: 256 [D]
LAO: 20 CRA: 40

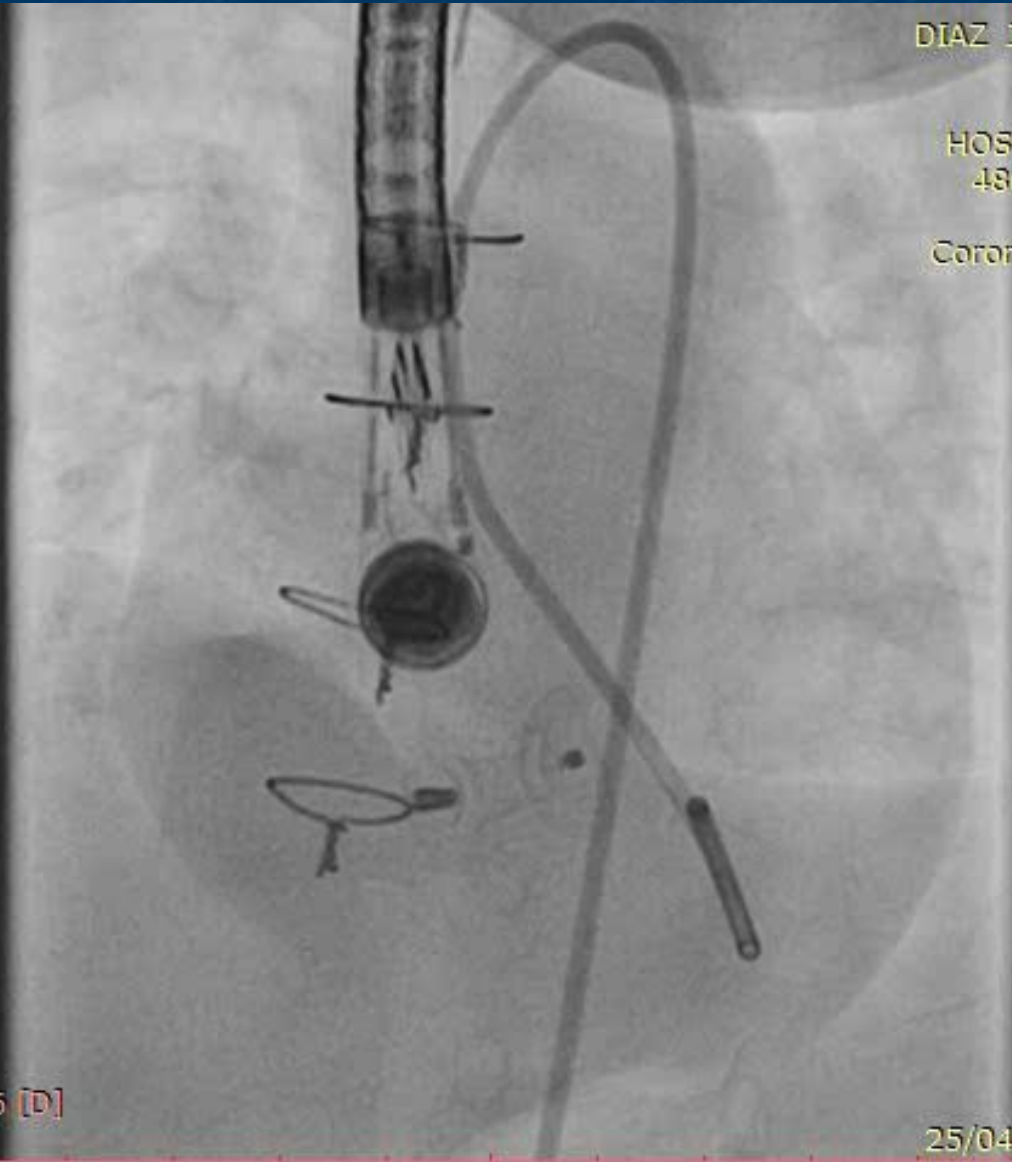
25/04/2019 09:35:34



Post Cx TOF. CIV muscular residual

Im: 1/115
Se: 12

DIAZ JULIAN IGNACIO
4701
26/07/2018 M
HOSPITAL DE NIÑOS
486497/57009339
Cardíaca
Coronaria izda 15 ips



[WL: 128 WW: 256 [D]
LAO: 20 CRA: 40

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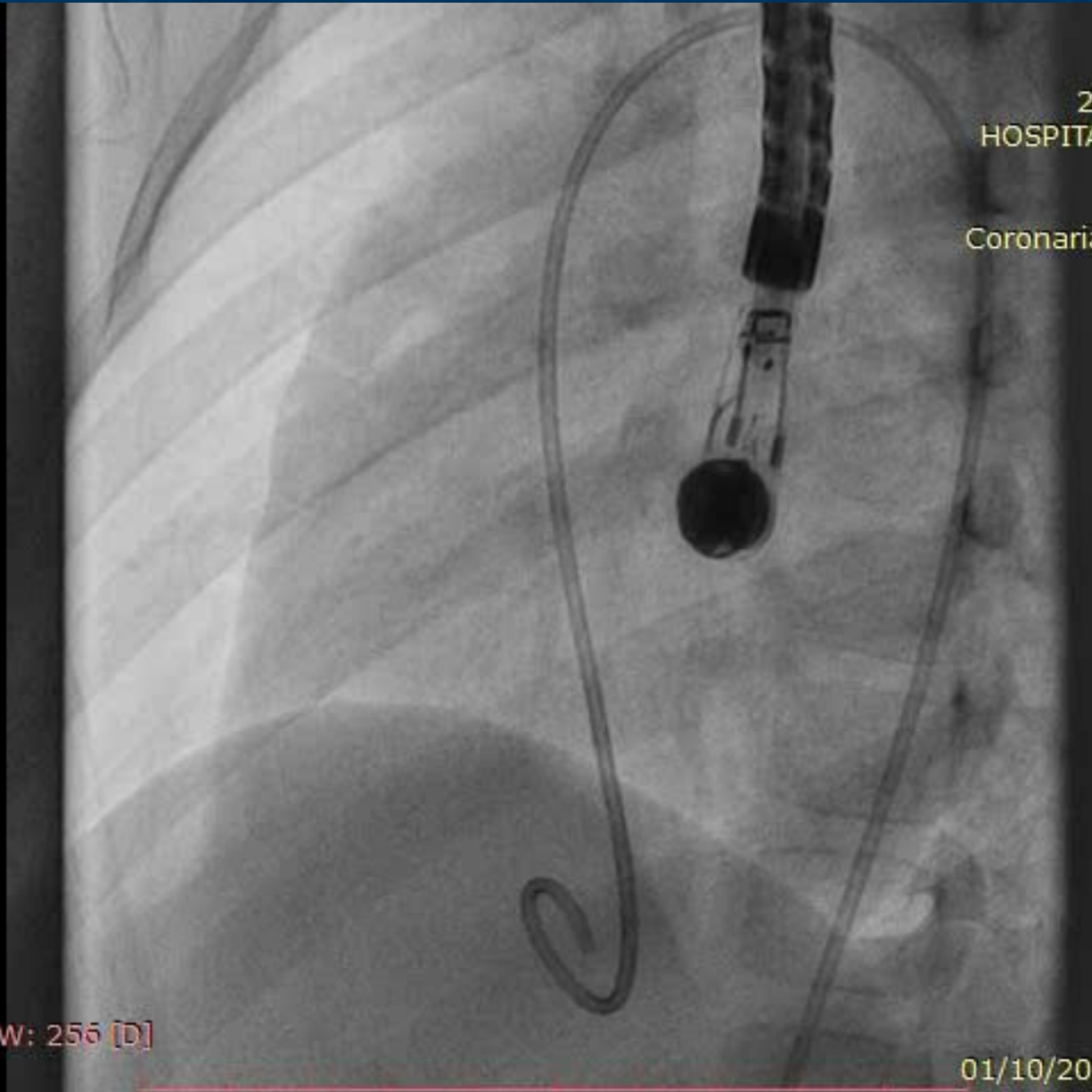
MemoPart™ Ventricular Septal Defect (VSD) Occluder Eccentric

Im: 1/136
Se: 1

SIRK MIA
4810
21/11/2014 F
HOSPITAL DE NIÑOS
173008669
Cardíaca
Coronaria izda 15 ips

WL: 128 WW: 256 [D]
LAO: 59

01/10/2019 08:58:54



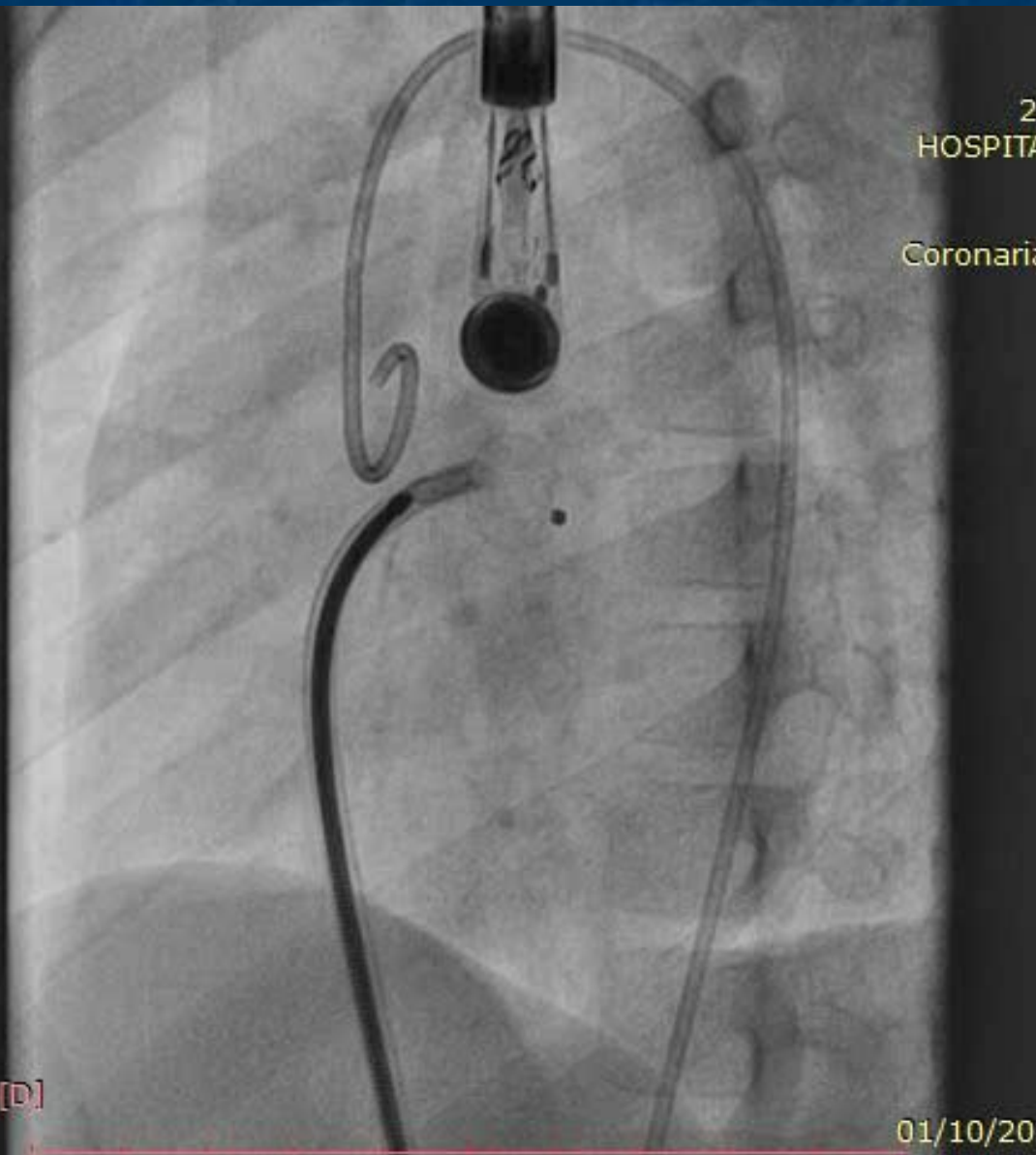
MemoPart™ Ventricular Septal Defect (VSD) Occluder Eccentric

Im: 1/15
Se: 3

SIRK MIA
4810
21/11/2014 F
HOSPITAL DE NIÑOS
173008669
Cardíaca
Coronaria izda 15 ips

WL: 128 WW: 256 [D]
LAO: 54

01/10/2019 09:38:47



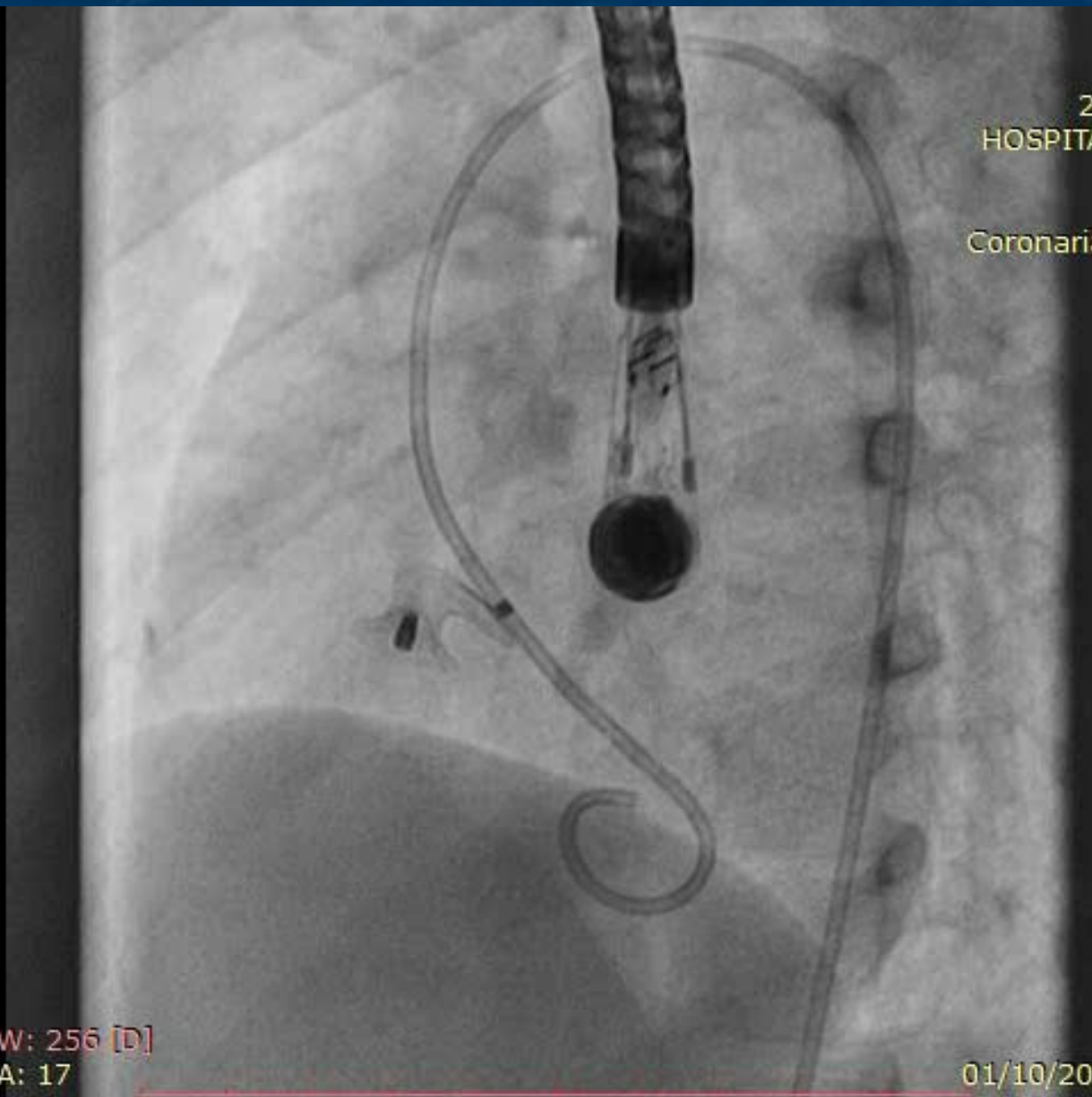
MemoPart™ Ventricular Septal Defect (VSD) Occluder Eccentric

Im: 1/99
Se: 9

SIRK MIA
4810
21/11/2014 F
HOSPITAL DE NIÑOS
173008669
Cardíaca
Coronaria izda 15 ips

WL: 128 WW: 256 [D]
LAO: 53 CRA: 17

01/10/2019 09:54:37



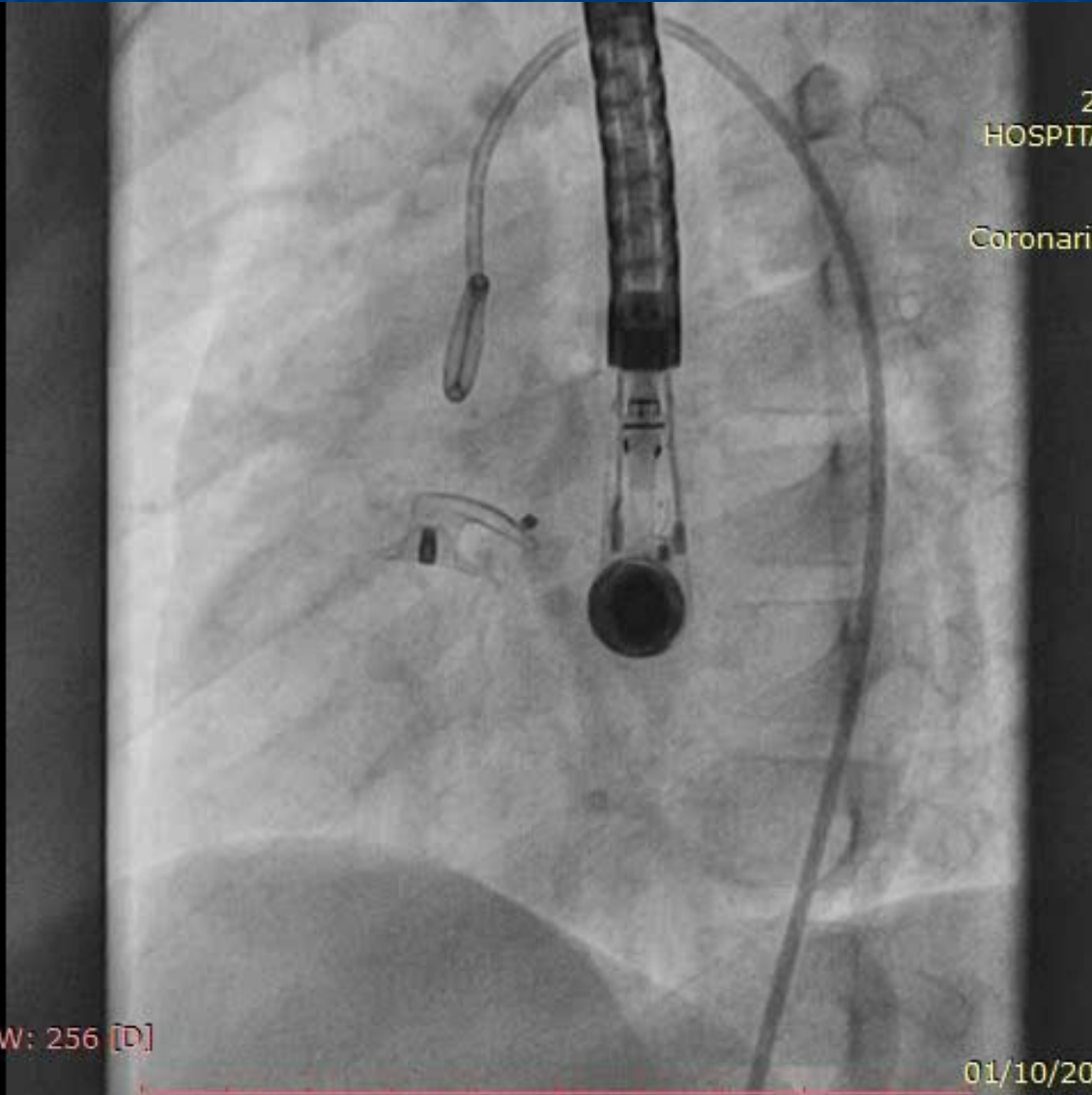
MemoPart™ Ventricular Septal Defect (VSD) Occluder Eccentric

Im: 1/79
Se: 10

SIRK MIA
4810
21/11/2014 F
HOSPITAL DE NIÑOS
173008669
Cardíaca
Coronaria izda 15 ips

WL: 128 WW: 256 [D]
LAO: 53

01/10/2019 09:55:53



Pensamientos finales...

- *Imperativo la necesidad del conocimiento detallado de las diferentes anatomías del defecto.*
- *Cierre percutáneo es un procedimiento demandante.*
- *Selección de los pts es crucial para obtener éxito.*
- *Aparición de nuevas tecnologías han sido el estímulo para reanudar con esta técnica intervencionista.*
- *Resultados **similares o superiores** al cierre quirúrgico (bloqueo AV, shunt residual, aparición de incompetencia aórtica) van a imponer la técnica pécutánea vs quirúrgica.*