

Different devices in different places

By

Hala Hamza

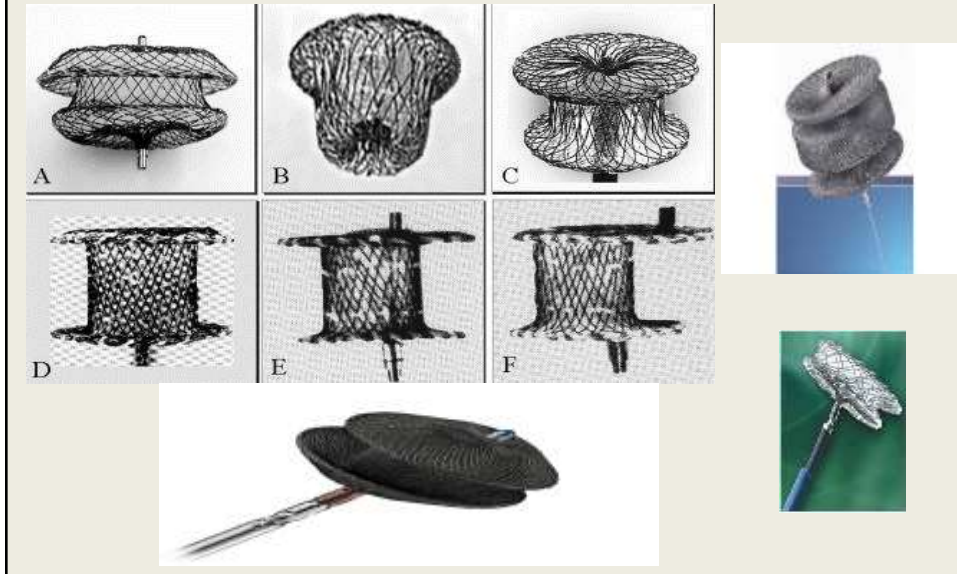
Pediatric Cardiology Unit

Cairo University

Introduction

- The interventional trans-catheter closure of cardiac defects has become an established technique over the past 15 years.
- Different devices have been developed to suit the anatomic characteristics of certain lesions.

Closure Devices



Aim

- This talk is concerned with the off label use of certain devices , designed originally and having license for certain defects , throwing the light on the possible use of these closure devices in defects in other locations.

Transcatheter Closure of VSDs

- 1988 was the first reported closure of muscular defects
- Muscular defects are more amenable to transcatheter or hybrid closure as they are usually at a sufficient distance to important structures, including valves and conduction tissue
- Perimembranous defects lie in proximity to the tricuspid valve and its subvalvular apparatus, the aortic valve and the conduction tissue.

* Anderson RH, Wilcox BR. The surgical anatomy of ventricular septal defect. *J Card Surg* 1992; 7: 17–35.

Complications of transcatheter closure of Perimembranous VSDs

- Arrhythmia especially complete heart block
- Embolization
- Haemolysis
- Aortic regurgitation
- Vascular complications
- Infection

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- Carminati M, Butera G, Chessa M, et al. Transcatheter closure of congenital ventricular septal defects: results of the European Registry. *Eur Heart J* 2007; 28: 2361–2368.
 - Fischer G, Apostolopoulou SC, Rammos S, Schneider MB, Bjornstad PG, Kramer HH. The Amplatzer Membranous VSD Occluder and the vulnerability of the atrioventricular conduction system. *Cardiol Young* 2007; 17: 499–504.
 - Predescu D, Chaturvedi RR, Friedberg MK, Benson LN, Ozawa A, Lee KJ. Complete heart block associated with device closure of perimembranous ventricular septal defects. *J Thorac Cardiovasc Surg* 2008; 136: 1223–1228.

Table 2. Details of 14 papers describing closure of perimembranous VSDs and the complication rates observed

Reference	Number of successful procedures	Number of patients	Device	Median age (years)	Median weight (kg)	Median Qr:Qs	Major complication	cAVB requiring PPM	Occluder size	VSD occluder ratio	Median follow-up (months)	Comments
Carreras et al. ¹⁴	n/a	258	n/a	n/a	n/a	n/a	15	9	n/a	n/a	n/a	*
Kirby et al. ¹⁷	23	25	5 A-ocVSD, 14 A-ocVSD	9.6	28	1.6	2	0	3	1.13	19.3	
Prelescu et al. ¹²	20	30	A-ocVSD	1.6	9.7	2	4	4	12	1.26	23.1	
Bun et al. ¹⁵	25	27	A-ocVSD	15.8	42.6	1.6	0	0	4	1.16	n/a	**
Burns et al. ³	100	104	14 A-ocVSD, 84 A-ocVSD	14	26.5	2	7	6	9.2	1.27	38.3	**
Fischer et al. ¹¹	35	35	3 A-ocVSD, 32 A-ocVSD	4.5	16	2	1	0	4.4	n/a	30	
Fu et al. ¹⁶	32	35	A-ocVSD	7.7	25	1.8	2	1	10	1.43	6	**
Hijazi et al. ¹⁸	6	6	A-ocVSD	10.3	29	1.6	0	0	7.6	1.02	n/a	
Höller et al. ²²	95	100	A-ocVSD	9	27.5	n/a	2	2	10	1.29	6	**
Masaru et al. ²¹	186	188	A-ocVSD	13.9	43.3	n/a	0	0	5.1	1.67	24	
Tan-Chang et al. ¹⁴	61	64	A-ocVSD	16.3	44.3	n/a	0	0	8.6	1.25	6.5	
Prata et al. ¹⁹	10	10	A-ocVSD	14	34.5	2.2	0	0	10	1.54	5	
Pinto et al. ²⁰	17	19	A-ocVSD	10	32	1.68	0	0	8	1.13	15.3	
Theopoulos et al. ¹¹	10	10	A-ocVSD	6	25.1	1.95	0	0	6	1.33	5	

cAVB = complete atrioventricular block; PPM = permanent pacemaker; VSD = ventricular septal defect

**Paper analyzes all VSD categories together with potential duplication of cases in **. This paper was therefore not included in the overall analysis

* James R. Bentham, Arjun Gujral, Satish Adwani, Nick Archer, Neil Wilson. Does the technique of interventional closure of perimembranous ventricular septal defect reduce the incidence of heart block? *Cardiology in the Young* (2011), 21, 271–280

Devices Used for Closure

- 1988 Rashkind double umbrella
- Cardioseal device
- Sideris buttoned devices
- Gianturco coils
- Amplatzer family markedly widened application with a special shaped for perimembranous ones
- PFM devices

Transcatheter Closure of VSD with ADO devices

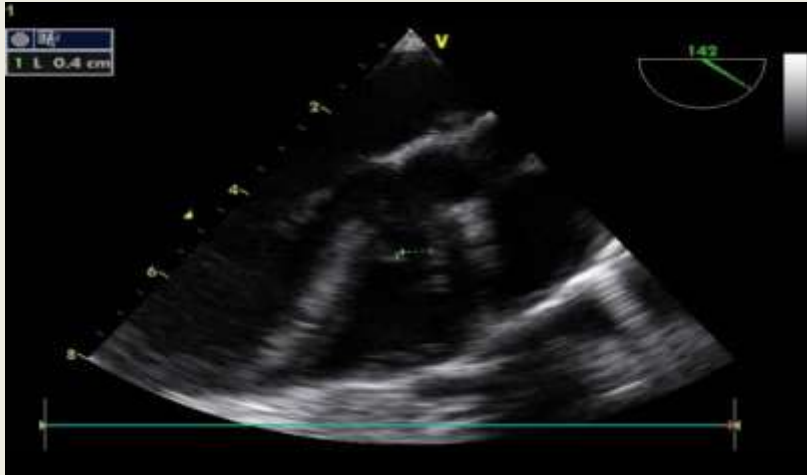
- Not sandwiching the septum, ?? less conduction abnormalities
- Softer as mentioned with ADOII devices
- Suitable in case of aneurysms
- Widely used
- Cheaper
- Technically less challenging
- In young children, no long sheath is needed in case of ADO II devices

Technique

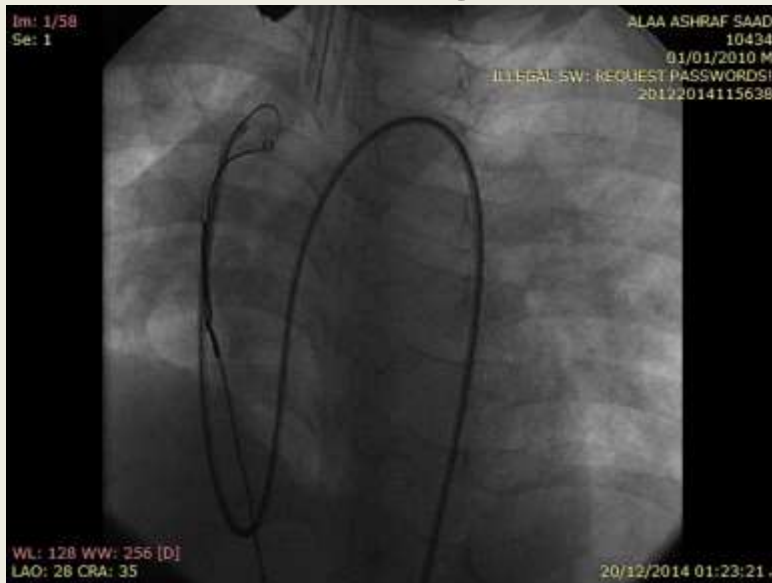


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Defect size



Snaring



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Technique



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Technique



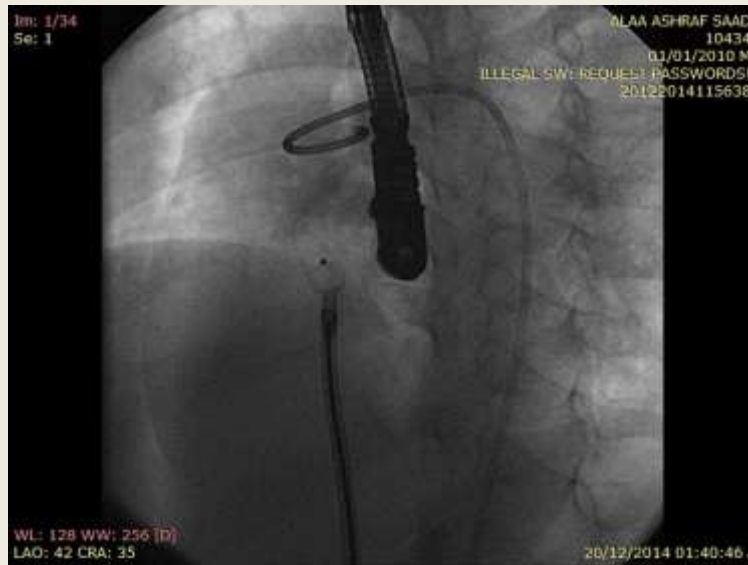
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Technique



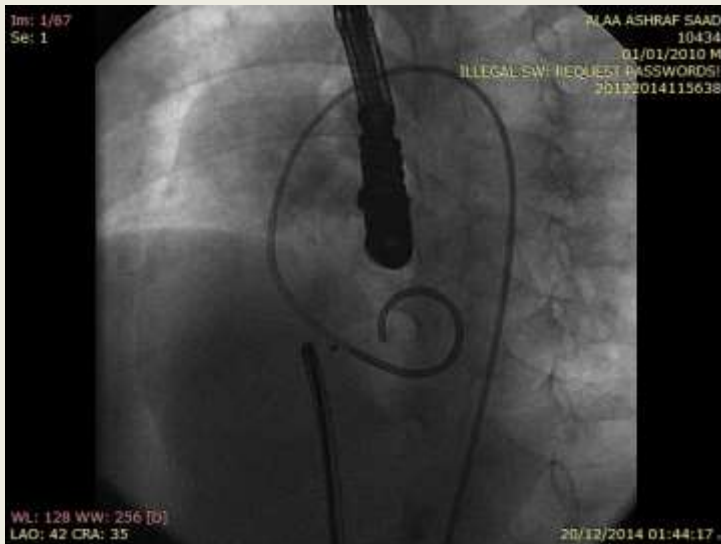
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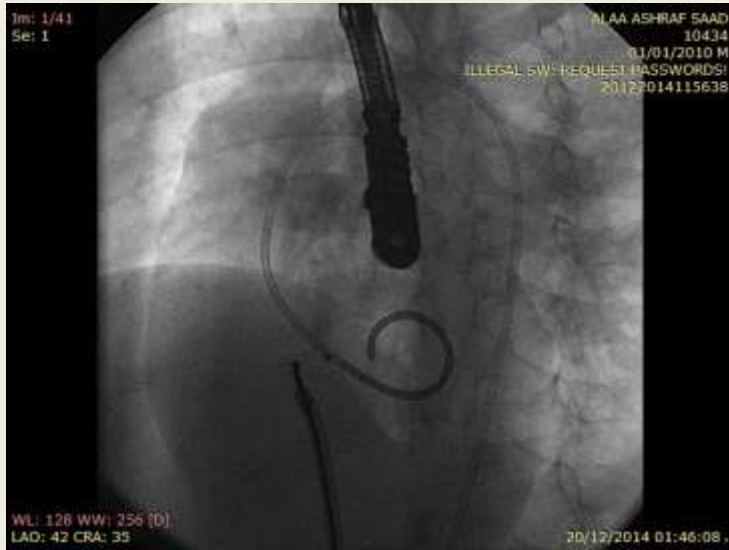
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Technique



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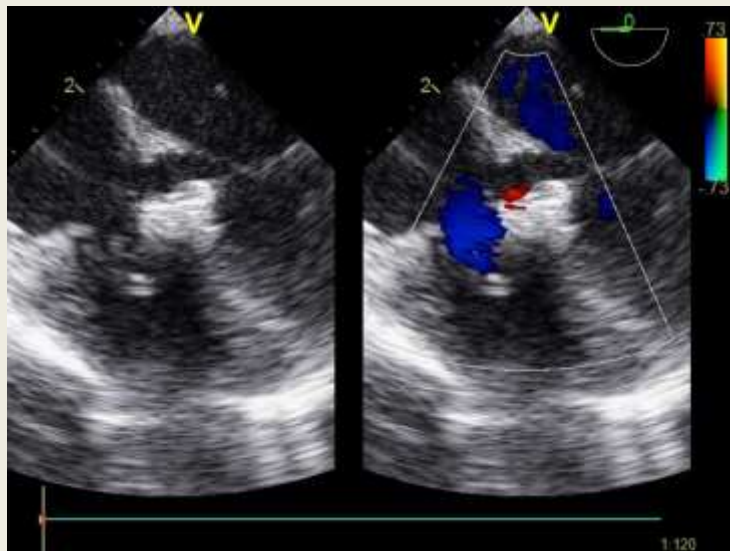


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Technique



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Technique

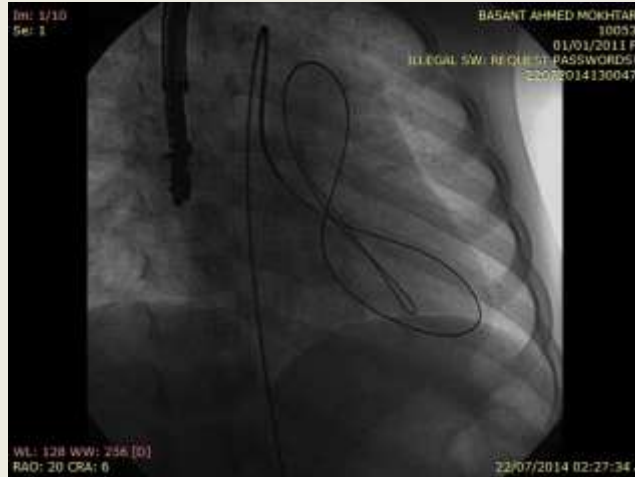


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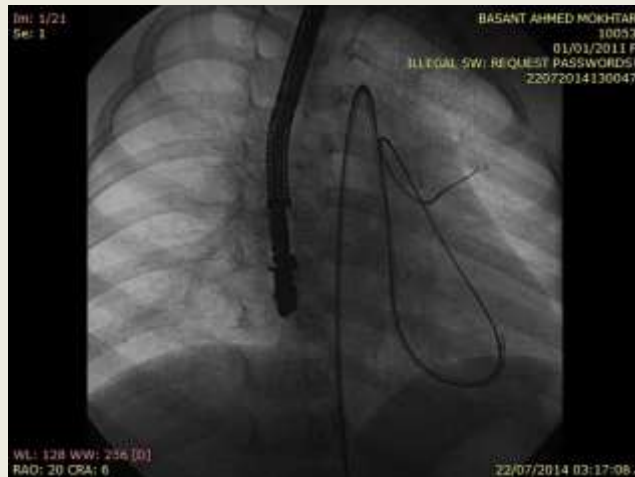
Closure of VSD with ADOII device



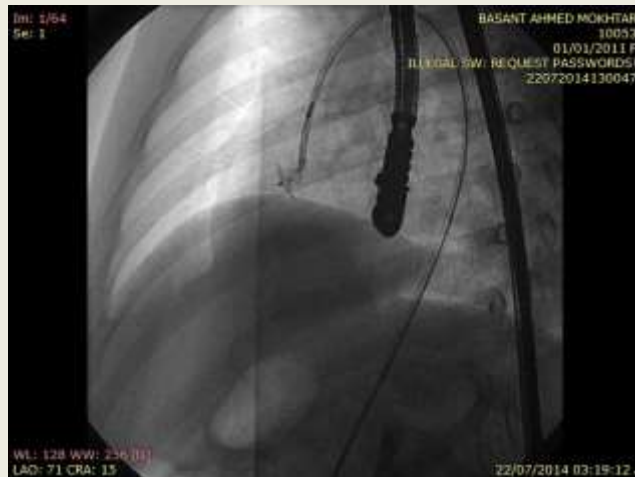
Closure of VSD with ADOII device

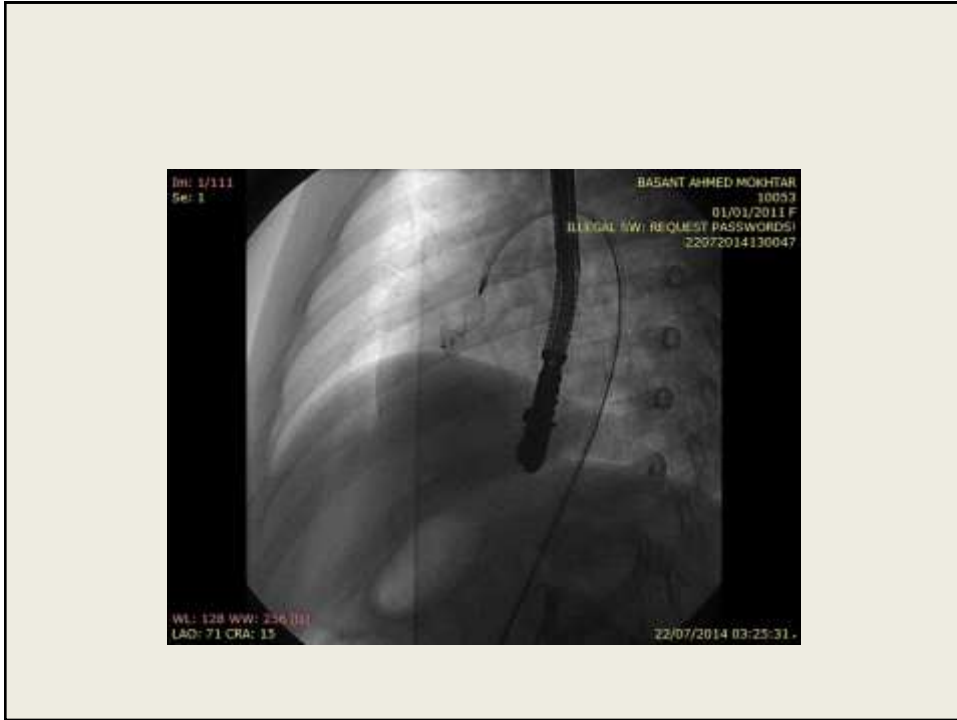


Closure of VSD with ADOII device



Closure of VSD with ADOII device





Closure of an aneurysm of the LPA



Probing the aneurysm



Probing the aneurysm



Lodging the catheter deep



Delivering the Device

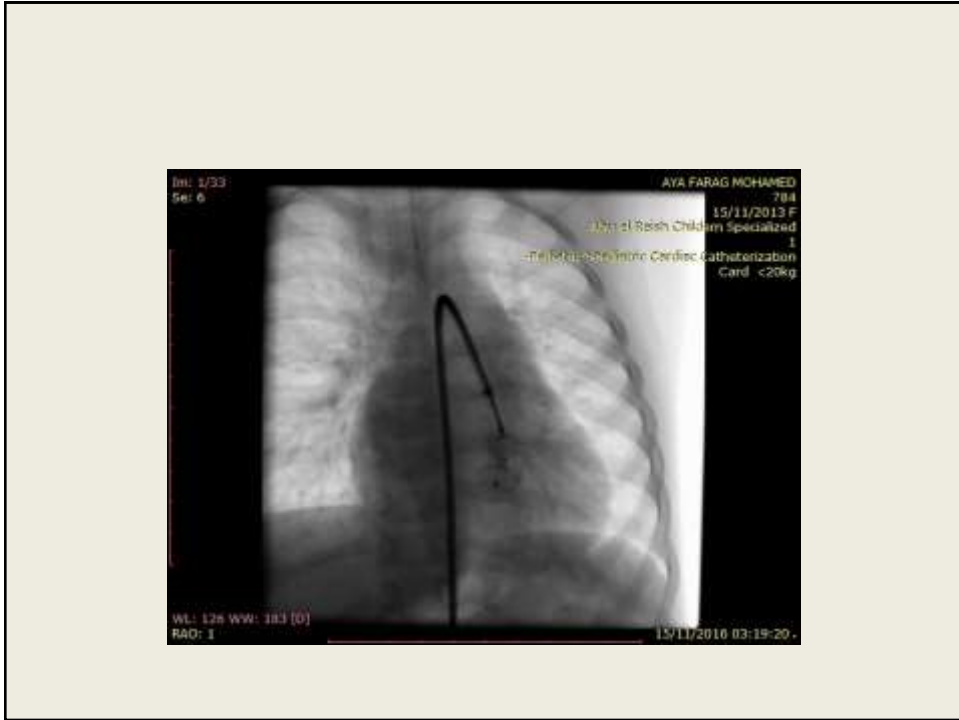


Aneurysm closed



Coronary Arterio-venous Fistula



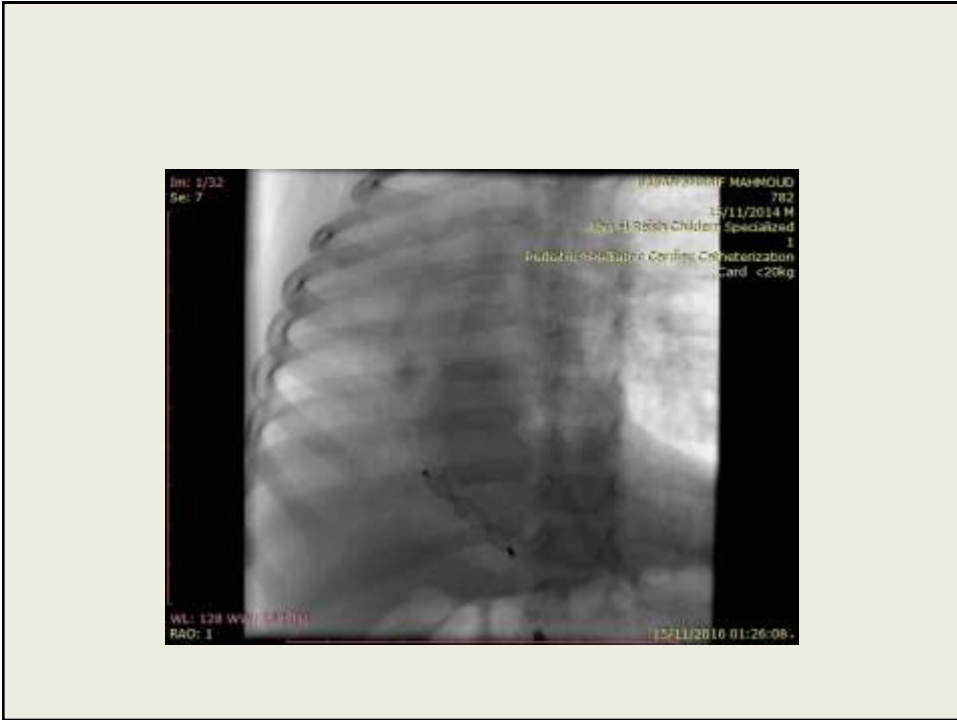


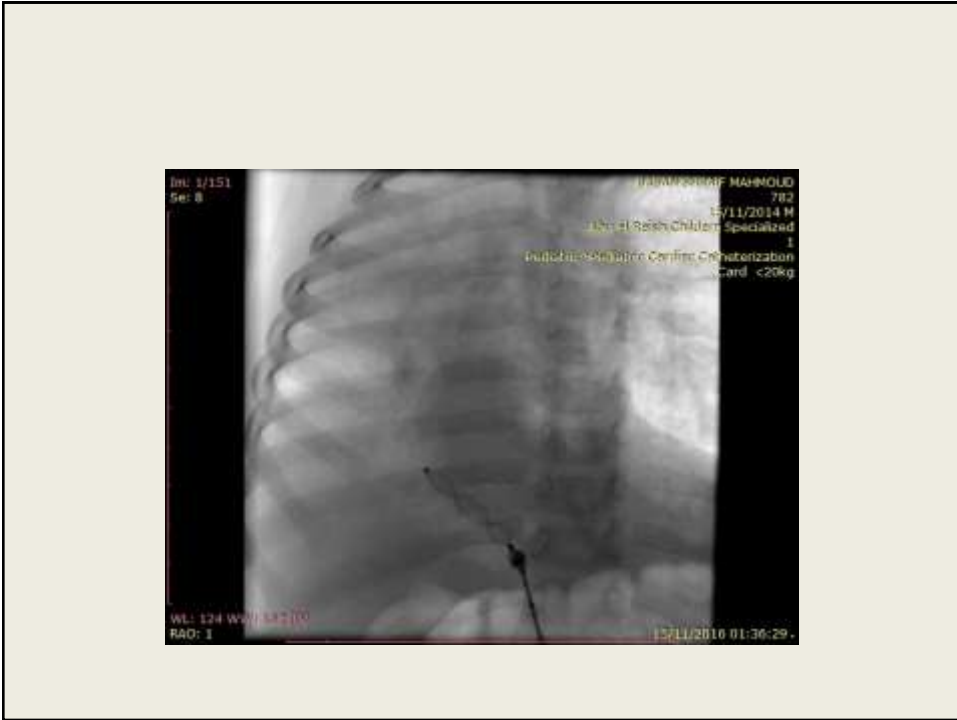


Sequestration artery occlusion





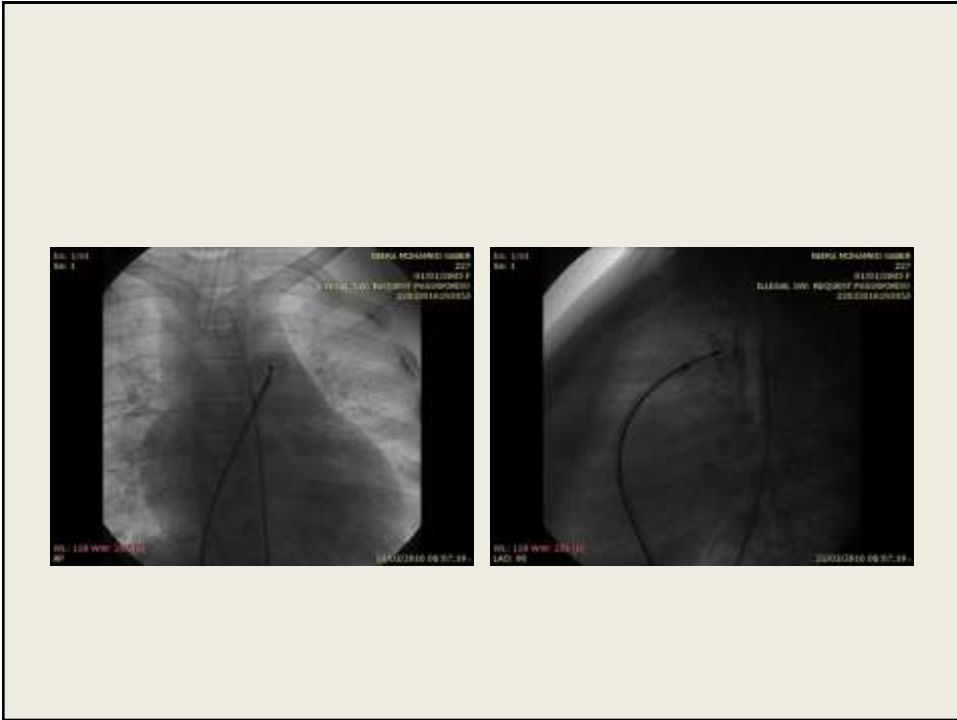






Closure of a huge PDA





Conclusion

- The availability of many devices for closure of cardiac or extra-cardiac defects gives an option for choosing the proper device according to anatomic as well as hemodynamic considerations.
- Availability of all these devices with different sizes on shelf gives option to change plans and meet with different unexpected considerations.

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Transcatheter closure of perimembranous ventricular septal defects with ductal occluders.

Mahimarangaiah J1, Subramanian A¹, Kikkeri Hemannasetty S1, Chandra S2, Karur S1,, Mandikal Kodandaramasastry U1Cholenahally Nanjappa M1.

¹Department of Cardiology,Sri Jayadeva Institute of Cardiovascular Sciences and Research,Bengaluru,Karnataka,India.

²Department of Cardiology,Manipal Hospitals,Bengaluru,Karnataka,India.

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¹Department of Pediatric Cardiology, Beijing Anzhen Hospital, Capital Medical University, Beijing 100029, China.

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García-Montes JA1, Camacho-Castro A¹, Sandoval-Jones JP¹, Buendía-Hernández A², Patiño-Bahena E2, Zabal C¹. Calderón-Colmenero J2

¹Department of Interventional Cardiology,National Institute of Cardiology "Ignacio Chavez",Mexico City,Mexico.

²Department of Pediatric Cardiology,National Institute of Cardiology "Ignacio Chavez",Mexico City,Mexico.

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Treatment of severe hemolysis following Nit-Occlud L^e VSD coil implantation with Amplatzer Duct Occluder II

Mustafa Orhan Bulut, Mehmet Küçük, Şevket Ballı, Ahmet Çelebi
Siyami Ersek Education And Research Hospital, Pediatric Cardiology, Istanbul

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Follow-up of patients with interventional closure of ventricular septal defects with Amplatzer Duct Occluder II.

Kanaan M¹, Ewert P, Berger F, Assa S, Schubert S.

¹Department of Pediatric Cardiology and Congenital Heart Diseases,
Deutsches Herzzentrum Berlin, Augustenburger Platz 1, 13353, Berlin,
Germany.

Thank you

