

CLOSURE OF LARGE PATENT DUCTUS ARTERIOSUS BY POST INFARCT VSD CLOSURE DEVICE: A CASE REPORT

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Contribution

All the authors contributed significantly to the research that resulted in the submitted manuscript.

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ABSTRACT

Patent ductus arteriosus (PDA) constitutes 6 to 11% of all congenital heart defects. While surgical ligation and video-assisted, thoracoscopic interruption of PDA are still available, transcatheter occlusion of PDAs has recently assumed a major role in closure of PDA. Most of the centre use Amplatzer duct occluder device for PDA closure. Here we report a large PDA that was not amenable to close by largest Amplatzer duct occluder, so we used successfully 24mm Amplatzer post infarct VSD occluder. Patient discharged home with stable hemodynamics and without complication as assessed by echocardiography 24 hours after procedure.

Key Words: Patent Ductus arteriosus, Amplatzer Duct Occluder Device, Amplatzer Post Infarct VSD Closure Device

INTRODUCTION

PDA is the fifth or sixth most common congenital cardiac defect observed in most surveys carried out in different centres of the world.¹ The incidence of isolated PDA has been estimated at 1:2000 to 1:5000 births which is about 10 to 12 percent of all varieties of congenital heart disease.^{1,2} Surgical closure of PDA though long been established, but number reducing gradually as device closure has achieved popularity amongst patient and paediatric cardiologist as a safe and effective procedure. A variety of techniques have been used since 1967 to achieve non surgical closure of PDA, at present all the paediatric cardiac centers prefer use of Amplatzer Ductus Occluder (ADO) as the safe and effective one.³⁻⁸ Catheter Intervention of PDA has now become routine in many centers and can be offered to most of the children and with an isolated ductus as "First choice therapy". Amplatzer Ductus Occluder is similar in principal to atrial septal defect (ASD) and ventricular septal defect (VSD) devices.⁹ In this case a huge PDA was closed with a nontraditional device (post infarct VS Doccluder) for the first time without any complications which lead to writing this report.

CASE HISTORY

ABC 15 year's old female presented to hospital with complaints of easy fatiguability, shortness of breath on exertion and palpitations. On examination

she was pink with bounding pulses, BP of 155/60 mm of Hg and Pansystolic murmur at left mid sternal border with loud P2. O2 saturation was 99% at room air. X ray chest shows cardiomegaly, while ECG shows normal sinus rhythm and biventricular hypertrophy. Transthoracic Echocardiography shows levocardia, situs solitus with normal systemic and pulmonary venous connection, large PDA shunting from left to right. There was severe pulmonary hypertension. Tricuspid regurgitation gradient was 80 mm of Hg while pulmonary regurgitation gradient was 70 mm of Hg. There was good biventricular function. It was decided to go for cardiac catheterization followed by PDA occlusion by device method. Informed consent was taken.

PROCEDURE

The procedure was carried out under local anesthesia. Right femoral vein and artery were cannulated with 7F and 6F sheaths respectively. PA pressure taken with MPA 2 catheter. Aortogram taken with help of pigtail catheter which showed PDA size measuring 13 mm, as shown in Figure 1. Cardiac catheterization showed Aortic pressure of 152/58 (89) mm of Hg, RV pressure of 100/5 mm of Hg while PA pressure of 90/58 (75). It was decided to do balloon occlusion of PDA for 30 minutes and take hemodynamics again. So PDA was occluded with 18 size tyshak balloon and after 30 minutes the Aortic pressure was 142/65 (93) while PA pressure dropped to 80/45 (66) mm of Hg. As the largest size Amplatzer duct occluder device available was 8/12, so it was decided to occlude the PDA with Amplatzer muscular VSD occluder (AMVO) of largest size i.e. 18 mm but the device was pulled through into the main pulmonary artery after multiple attempts, indicating undersized device. At last we decided to use the biggest available Amplatzer post

infarct VSD occluder of size 24 mm, which successfully well positioned with mild Residual shunt. There was no obstruction to pulmonary and aortic flow. Post closure angiogram was taken as shown in Figure 2. The patient was kept in CCU for 24 hours. She was started on dual antiplatelets and low molecular weight heparin. She remained asymptomatic. The Echo examination after 24 hours which showed mild residual flow in the PDA, no pulmonary artery stenosis and no coarctation. Patient was discharge on dual antiplatelets.

DISCUSSION

The post infarct ventricular septal defect closure device is a percutaneous, transcatheter, ventricular septal defect closure device intended for the occlusion of ventricular Septal Defects (VSD) after myocardial infarction. It is a self expandable double disc device made from a nitinol-wire mesh. The Two disc are linked together by a connecting waist corresponding to size of VSD. Such devices have longer waists i.e 10mm & longer retention discs than the routine AMVO. In this case it was decided that the longer waist will be well positioned in the PDA while it's right and left disc will give more stability in the aortic and pulmonary end of the PDA respectively. For the transcatheter closing of PDA many options have been tried for last few decades. The earlier devices have been replaced by a range of newer and technically superior ones.

For ductus closure, most widely used options at present time are coils and Amplatzer devices. Since the concept of PDA coil occlusion 20 years ago, several studies have reported larger series using different techniques with variable results. Amplatzer ductus occluder is gaining

Figure 1: Aortogram Showing Large Size PDA, Before Device Closure

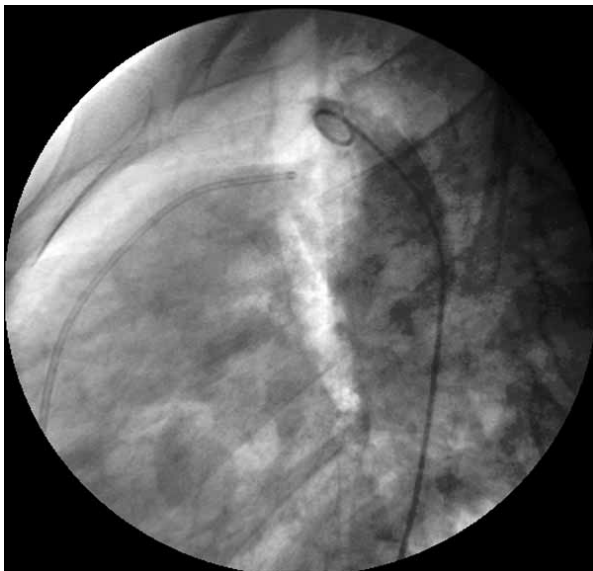
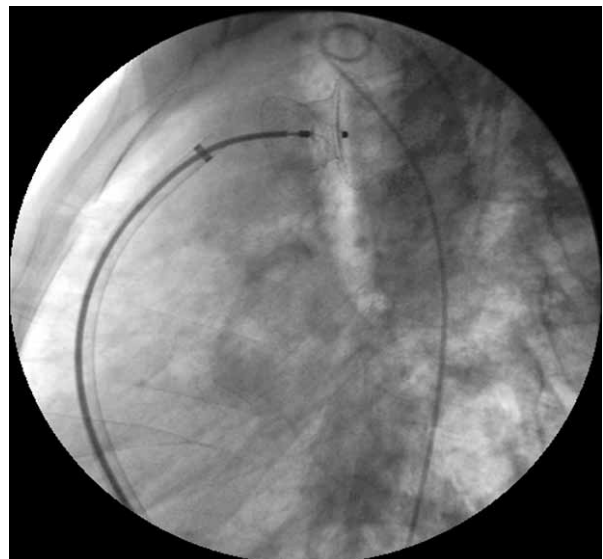


Figure 2: Aortogram Showing Successful Occlusion Of PDA With Post Infarct VSD Occlude.



popularity especially for larger ductus now a day.¹⁰⁻¹³ But there are some ductus which are large in size, tubular and cannot be closed by ductusoccluder. The present case was a challenging one because largest size VSD muscular occluder was small for the larger size PDA then we successfully closed with post infarct VSD occluder of size 24 mm.

According to our knowledge, post infarct VSD occluder has been used for the first time to occlude the large size PDA.

CONCLUSION

It is now standard practice in many centers to recommend non surgical closure as the first choice for most children with PDA. Present case was a challenging case with a huge PDA and severe pulmonary hypertension, where PDA was closed successfully with post infarct VSD closure device of size 24mm. More studies are required to prove the efficacy of postinfarct VSD occluder for occluding large ducts.

REFERENCES

1. Micheal M, Brook MD, Micheal M. Patent ductus arteriosus. In: Allen HD, Driscoll DJ, Shaddy RE, Feltes TF, editors. Moss & Adams heart disease in infants, children and adolescents including the fetus and young adults. 5th ed. Baltimore: William and Wilkins; 1995. p.746-64.
2. Fyler DC. Patent ductus arteriosus. In: Keane JE, Fyler DC, Lock JE. *Nada's paediatric cardiology*. St Louis: Hanley and Belfus; 1992. p. 525-34.
3. Wilkinson JL. Interventional pediatric cardiology: device closures. *Indian J Pediatr* 2000;67:507-13.
4. Rashkind WJ, Causo CC. Transcatheter closure of a patent ductus arteriosus: successful use in a 3 kg infant. *Pediatr Cardiol* 1979;1:3-7.
5. Rashkind WJ, Mulins CE, Hellenbrand WE, Tait MA. Nonsurgical closure of patent ductus arteriosus: clinical application of the Rashkind PDA Occluder System. *Circulation* 1987;75:583-92.
6. Hills LC. Closure of patent ductus arteriosus using the Rashkind PDA occluder system. *Radiogr Today* 1989;55:20-3.
7. Sievert H, Ensslen R, Fach A, Merle H, Scherer D, Schröder R, et al. Transcatheter closure of patent ductus arteriosus with the Rashkind occluder. Acute results and angiographic follow up in adults. *Eur Heart J* 1997;128:1014-8.
8. Bulbul ZR, Fhey JT, Doyle TP, Hijazi ZM, Hellenbrand WE. Transcatheter closure of the patent ductus arteriosus: a comparative study between the occluding coils and the Rashkind umbrella device. *Cathet Cardiovasc Diagn* 1996;39:355-63.
9. Masura J, Walsh KP, Thanopoulous B, Chan C, Bass J, Goussous Y, et al. Catheter closure of moderate to large sized patent ductus arteriosus using the new Amplatzer duct occluder: immediate and short term results. *J Am Coll Cardiol* 1998;31:878-82.
10. Lee CH, Leung YL, Chow WH. Transcatheter closure of the patent ductus arteriosus using an Amplatzer duct occluder in adults. *Jpn Heart J* 2001;42:533-7.
11. Saliba Z, Aggoum Y, Hqusse AO, Acar P, Bonnet D, Fraise A, et al. Percutaneous closure of patent ductus arteriosus with Amplatzer duct occluder. *Arch Mal Coeur Vaiss* 2000;93:533-8.
12. Marwah A, Radhakrishnan S, Shrivastavas S. Immediate and early results of closure of moderate to large patent ductus arteriosus using the new Amplatzer devices. *Cardiol Young* 2000;10:208-11.
13. Thanopoulos BD, Hakim FA, Hiari A, Goussous Y, Basta E, Zarayelyan AA, et al. Further experience with transcatheter closure of the ductus arteriosus using the Amplatzer duct occluder. *J Am Coll Cardiol* 2000;35:1016-21.