Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.elsevier.com/locate/ihj

Case report

Transcatheter closure of a residual aortopulmonary window through internal jugular vein access

R. Prem Sekar¹, P.R. Bhima Shankar*, Kotturathu Mamman Cherian¹

Frontier Lifeline & Dr K M Cherian Heart Foundation, R-30-C Ambattur Industrial Estate Road, Mogappair, Chennai 600 101, Tamilnadu, India

ARTICLE INFO

Article history:

Received 4 May 2012

Received in revised form

9 July 2012

Accepted 17 July 2012

Available online 27 July 2012

Keywords:

Percutaneous intervention

Congenital heart disease

AP window

ABSTRACT

The use of Amplatzer septal occluder for closing a residual aortopulmonary defect has been described. This is usually performed by femoral access. We report closure of a residual aortopulmonary defect using right internal jugular vein access in a patient who had no femoral access as a result of previous cannulation for surgical repair. The 1 cm defect was closed successfully using a 10 mm Amplatzer septal occluder.

Technical difficulty anticipated was unfounded although it was more cumbersome than femoral access. Left to right cardiac defects including PDA and AP window are amenable to transcatheter closure through internal jugular vein access.

Copyright © 2012, Cardiological Society of India. All rights reserved.

1. Introduction

Residual defects are a known complication of patch closure techniques for aortopulmonary window (APW). Use of an Amplatzer septal occluder to close a residual aortopulmonary defect has been reported albeit infrequently. Here we describe closure of a residual APW defect using internal jugular vein access in a patient in whom femoral venous approach was not possible.

2. Case history

An 18-year-old patient presented with a continuous murmur and NYHA class II symptoms. He had undergone surgical

repair of type 2 APW with a Gore-Tex patch at 8 months of age. The operative notes reported difficulty in cannulation of aorta due to large APW extending up to the great vessels. The presence of a residual defect was anticipated and documented postoperatively. The pulmonary pressure had reduced to half systemic pressure during the immediate postoperative period. Subsequently the child was lost to follow up.

At this presentation echocardiographic evaluation revealed a residual APW measuring 1 cm in diameter and placed well away from the coronary artery orifices. There was moderate pulmonary artery hypertension. The patient was taken up for transcatheter APW closure after obtaining informed consent. Femoral veins on either side could not be accessed possibly due to cannulation at the time of surgical repair. The right internal jugular vein was punctured and a 7 Fr sheath was

* Corresponding author. Tel.: +91 44 2656 7200; fax: +91 44 2656 5150.

E-mail address: bhimshankarraaj@yahoo.co.in (P.R. Bhima Shankar).¹ Tel.: +91 44 2656 7200/7242/5772; fax: +91 44 2656 5150.

0019-4832/\$ – see front matter Copyright © 2012, Cardiological Society of India. All rights reserved.

<http://dx.doi.org/10.1016/j.ihj.2012.07.018>

introduced using the Seldinger technique. The pulmonary artery pressure was 40/12 mmHg with mean of 25 mmHg. The Aortic pressure was 130/60 mmHg and a mean of 80 mmHg. The defect was crossed antegrade using a 6 Fr right judkins catheter and a 0.035" hydrophilic guide wire (Terumo Corporation). An Amplatzer 0.035" extra stiff 260 cm wire was passed upto the descending aorta. Balloon sizing of the APW showed a diameter of 10 mm. A 10 mm Amplatzer septal occluder (AGA Medical Corporation, Golden Valley, Minnesota) was deployed across the APW through a 7 Fr Amplatzer delivery sheath. An aortogram revealed stable position of the device (Figs. 1 and 2) with abolition of the shunt.

3. Discussion

Transcatheter closure of APW is not reported frequently in literature due to relative rarity of defects with adequate margins. Stamato et al¹ were the first to describe transcatheter closure of an APW in a 3-year-old child using a modified double umbrella occluder system. Tulloh and Rigby² described transcatheter umbrella closure of an APW in a 6-month-old child with a Rashkind double umbrella system. Richens and Wilson³ have described Amplatzer device closure of a residual APW in a 5-year-old child.

Subsequently there have been two other reports of transcatheter closure where Amplatzer septal and duct occluders have been used.^{4,5} In one of the reports they had to switch over to a septal occluder after initial failed attempts with the duct occluder. It appears that the septal occluder with a thinner profile and larger retention skirts would be appropriate in older children with reasonable margins.

Femoral vein access was used in all previously reported cases. Conventionally apical ventricular septal defects (VSD) and midmuscular VSD are closed through internal jugular vein access and atrial septal defect, patent ductus arteriosus and high muscular VSDs are closed using femoral vein access. We anticipated the transjugular procedure to be technically demanding due to the tortuous course. The tortuous course from the internal jugular to the APW did not cause any technical difficulty although the procedure was more cumbersome than a transfemoral procedure. The only previous report of

Fig. 2 – Device in situ.

a device closure of a left to right shunt through internal jugular venous access has been for a PFO.⁶

The PA pressure was subsystemic though the size of the residual defect was 1 cm. The QP/QS was 3.6. The residual defect was causing significant left to right shunt, although it did not cause severe pulmonary artery hypertension. It is known that a subset of patients do present late in the second decade with large left to right shunts. In Pinto et al series 71% presented with large left to right shunts after 15 years of age.⁷

In most reports of device closure of APW either duct occluders or septal occluders have been used. Intuitively an occluder with larger retention skirt on the aortic side should suffice. The margin needs to be safely away from the coronary ostia. A VSD device may be an option if pulmonary artery pressures are high.

4. Conclusion

This case report shows the usefulness of the internal jugular vein as an alternative approach to device closure of APW in patients with occluded femoral veins.

Conflicts of interest

All authors have none to declare.

REFERENCES

1. Stamato T, Benson LN, Smallhorn JF, Freedom RM. Transcatheter closure of an aortopulmonary window with a modified double umbrella occluder system. *Cathet Cardiovasc Diagn.* 1995;35:165–167.
2. Tulloh RM, Rigby ML. Transcatheter umbrella closure of aortopulmonary window. *Heart.* 1995;77:479–480.
3. Richens T, Wilson N. Amplatzer device closure of residual aortopulmonary window. *Catheter Cardiovasc Interv.* 2000;50:431–433.

Fig. 1 – Aortogram showing good positioning of the device.

4. Atiq M, Rashid N, Kazmi KA, Qureshi SA. Closure of aortopulmonary window with Amplatzer duct occluder. *Pediatr Cardiol.* 2003;24:298–299.
5. Naik GD, Chandra VS, Shenoy A, et al. Transcatheter closure of aortopulmonary window using Amplatzer device. *Catheter Cardiovasc Interv.* 2003;59:402–405.
6. Sader MA, De Moor M, Pomerantsev E, Palacios IF. Percutaneous transcatheter patent foramen ovale closure using the right jugular venous approach. *Cathet Cardiovasc Interv.* 2000;60:536–539.
7. Pinto RJ, Bhagwat AR, Loya YS, Sharma S. Profile of aortopulmonary window in India – a study of 20 cases. *Cardiol Young.* 1994;4:142–145.