Persistent atypical atrial flutter after device closure of the atrial septal defect in a young man

Keerthika Ravella, Shrikant Bhoskar, Neeta Bachani, Yash Lokhandwala, Bharat Dalvi

Department of Cardiology, Holy Family Hospital, Mumbai, Maharashtra, India

ABSTRACT

Atrial flutter is uncommon in young patients with uncorrected atrial septal defect (ASD). Although rare, it has been reported in the younger population following device closure of ASD/patent foramen ovale. We describe a case of persistent atypical atrial flutter following device closure of ASD in a young man and discuss the management strategy given the various underlying dilemmas.

Keywords: Arrhythmias, cardioversion, congenital heart disease

A 28-year-old asymptomatic man was found to have a right bundle branch block during a routine medical check-up. On further evaluation, he was found to have a large ostium secundum ASD with dilated right-sided chambers. His transesophageal echocardiographic examination revealed the defect to be 27 mm in diameter with adequate surrounding rims for device closure. He underwent successful closure of his ASD with an Amplatzer septal occluder (32 mm). There was no sustained ventricular/supraventricular arrhythmia noted during the procedure. Three weeks following the closure he complained of palpitations. His ECG showed atypical atrial flutter (AFl) with 2:1 atrioventricular (AV) conduction and a ventricular rate of 150/min [Figure 1]. Echocardiography showed the device to be in an appropriate position with no residual shunt. The right heart chambers showed partially reversed remodeling, and there was no evidence of any thrombus or pericardial effusion. The routine serum biochemistry and thyroid function tests were normal.

He was admitted and administered heparin and intravenous amiodarone (1 g over 24 h), which reduced the ventricular rate but did not restore the sinus rhythm. Subsequently, he was started on metoprolol succinate (50

Access this article online	
Quick Response Code:	Website: www.annalspc.com
	DOI: 10.4103/apc.APC_72_19

mg twice a day) and dabigatran (150 mg twice a day). After 4 weeks, since the AFl persisted, it was decided to give him a trial with flecainide which was started initially in the dose of 50 mg twice daily, and later increased to 100 mg twice daily. Over the next 2 months, while his pulse rate was within the normal range, the AFL persisted. Hence, flecainide was stopped, and oral amiodarone was instituted. Two months later, he still complained of palpitations on effort; his ECG continued to show AFL at the atrial rate of 300/min, with varying AV conduction and a ventricular rate of 80/min [Figure 2]. Given the adverse effects of long-term amiodarone therapy, it was decided to go back to the original regimen of metoprolol succinate in the dose of 50 mg twice daily. He continued to remain on dabigatran throughout this period. During all this time, cardioversion was not attempted in view of the possibility of device embolization during the delivery of the shock.

After 6 months following the device closure since the AFI persisted, it was presumed to be safe to convert him electrically. He was subjected to transesophageal echocardiography, which confirmed the device to be

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Ravella K, Bhoskar S, Bachani N, Lokhandwala Y, Dalvi B. Persistent atypical atrial flutter after device closure of the atrial septal defect in a young man. Ann Pediatr Card 2021;14:79-81.

Address for correspondence: Dr. Shrikant Bhoskar, Department of Cardiology, Holy Family Hospital, Bandra (W), Mumbai - 400 050, Maharashtra, India. E-mail: bhoskar.shrikant61@gmail.com

Submitted: 17-May-2019

Revised: 09-Dec-2019

Accepted: 20-Jun-2020 Published: 19-Oct-2020

© 2020 Annals of Pediatric Cardiology | Published by Wolters Kluwer - Medknow

in a proper position [Figure 3a] without any thrombus over the device or in the left atrial appendage; there was no residual shunt [Figure 3b]. He was cardioverted with 100J biphasic DC shock and sinus rhythm was restored [Figure 4]. Six weeks later, his antiarrhythmics and anticoagulant were discontinued. At 6 months following cardioversion, he continues to remain in sinus rhythm.

DISCUSSION

Atrial arrhythmias are well known in patients with ASD. The incidence is reported to be 1% before 40 years and >15% after 40 years of age.^[1] Among the atrial arrhythmias, AFL/atrial fibrillation is more common in the elderly due to mechanical and secondarily electrical remodeling of the right atrium consequent to long-standing volume and pressure overload.^[2] Surgical repair of the ASD, if done later in life, does not significantly reduce the incidence of atrial arrhythmias.^[1]

The occurrence of atrial arrhythmias following device closure has also been reported and is known to be related to the age of the patient, occluder size, the presence of multiple defects, evidence of septal aneurysm and underlying thyroid or mitral valve disease.^[3] Atrial fibrillation/AFl pose a unique therapeutic problem, especially when they occur early because the device has not endothelialized during that period and hence is more prone to developing thrombi with its embolic sequelae. These patients, therefore, need to be treated

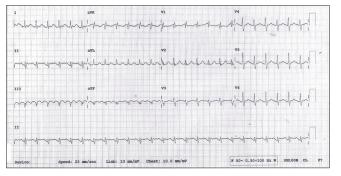


Figure 1: Electrocardiogram at first presentation: Atrial flutter with 2:1 atrioventricular conduction and a ventricular rate of 150/min

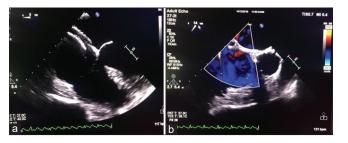


Figure 3: (a) Transesophageal echocardiogram showing the device in the proper position without any thrombus. (b) Transesophageal echo showing no residual shunt across the interatrial septum

aggressively with antiarrhythmics to restore sinus rhythm as well as with anticoagulants to prevent thrombus formation.^[4,5]

In normal circumstances electrical cardioversion can be attempted after failure of drugs, to restore sinus rhythm. In our patient this was not advisable early on because of the fear of device displacement and embolization.^[6] Therefore, it is worth waiting with pharmacological therapy for a period of at least 3 months, till which time, the device gets endothelialised and becomes stable, before contemplating cardioversion as was done in our case. Although the process of endothelialization is complete within 8–12 weeks with smaller devices,^[7] in our patient, we waited for 6 months because the device was 32 mm in size.

There has been a previous report of radiofrequency ablation in a small child for persistent AFL appearing after ASD device closure.^[8] In our patient, we did not consider this an option because the AFL was atypical, not easy to ablate and could have necessitated a transseptal approach.

CONCLUSION

AFL is a rare complication following device closure of ASD in young patients.^[9] Rhythm control should be aggressively pursued with anti-arrhythmic agents, along with anticoagulation. In rare instances of the failure of pharmacotherapy, electrical cardioversion



Figure 2: After adequate rate control. The atrial rate is till 300/min; the *P*-waves are predominantly negative in lead V1, diagnostic of atypical atrial flutter

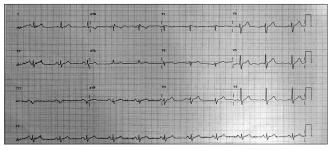


Figure 4: Normalization of the ECG after electrical cardioversion

can be safely undertaken after 6 months even with larger devices.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- 1. Berger F, Vogel M, Kramer A, Alexi-Meskishvili V, Weng Y, Lange PE, *et al.* Incidence of atrial flutter/fibrillation in adults with atrial septal defect before and after surgery. Ann Thorac Surg 1999;68:75-8.
- 2. Komar M, Przewłocki T, Olszowska M, Sobień B, Stępniewski J, Podolec J, *et al.* Conduction abnormality and arrhythmia after transcatheter closure of atrial septal defect. Circ J 2014;78:2415-21.

- 3. Chiu SN, Wu MH, Tsai CT, Lai LP, Lin JL, Lin MT, *et al.* Atrial flutter/fibrillation in patients receiving transcatheter closure of atrial septal defect. J Formos Med Assoc 2017;116:522-8.
- 4. Krumsdorf U, Ostermayer S, Billinger K, Trepels T, Zadan E, Horvath K, *et al.* Incidence and clinical course of thrombus formation on atrial septal defect and patient foramen ovale closure devices in 1,000 consecutive patients. J Am Coll Cardiol 2004;43:302-9.
- 5. Yorgun H, Canpolat U, Kaya Eb, Aytemir K, Oto A, *et al.* Thrombus formation during percutaneous closure of an atrial septal defect with an amplatzer septal occluder. Tex Heart Inst J 2011;38:427-30.
- 6. Szkutnik M, Lenarczyk A, Kusa J, Białkowski J. Symptomatic tachy-and bradyarrhythmias after transcatheter closure of interatrial communications with Amplatzer devices. Cardiol J 2008;15:510-6.
- 7. Chessa M, Butera G, Frigiola A, Carminati M. Endothelialization of ASD devices for transcatheter closure: Possibility or reality? Int J Cardiol 2004;97:563-4.
- 8. John B, George OK, Joseph G, Lokhandwala YY. Incessant atrial flutter after device closure of atrial septal defect: Successful radio frequency ablation. Indian Pediatr 2007;44:700-2.
- 9. Park KM, Hwang JK, Chun KJ, Park SJ, On YK, Kim JS, *et al.* Prediction of early-onset atrial tachyarrhythmia after successful trans-catheter device closure of atrial septal defect. Medicine (Baltimore) 2016;95:e4706.