Featured Correspondence

Transcatheter closure of perimembranous ventricular septal defect

To the Editor: Increasing concerns about the potential for atrioventricular (AV) block after transcatheter closure of perimembranous ventricular septal defect (VSD) were emphasised by Ian Sullivan in a recent issue of *Heart*.¹ This complication has been highlighted in a clinical series published by Walsh *et al.*² Their patients developed heart block after closure of perimembranous VSD (pmVSD) within 10 days of the procedure. Because of two instances of very late onset of complete atrioventricular block (cAVB) 24 and 39 months, respectively, after successful and uncomplicated percutaneous closure of pmVSD using the asymmetrical Amplatzer pmVSD occluder (AGA Medical, Golden Valley, Minnesota, USA), all patients who underwent percutaneous closure of pmVSD were reviewed at our institution (The Royal Children's Hospital, Melbourne, Victoria, Australia). Of 36 patients who had undergone interventional pmVSD closure, 3 patients developed AV block requiring permanent pacemaker implantation. One patient developed cAVB within 6 days of closure, presenting with syncope and hypotensive seizures. After implantation of a permanent pacemaker, his AV conduction normalised. Another patient who presented with tiredness at 24 months after intervention had AV block with 2:1 conduction and periods of cAVB. Another recent patient had intermittent cAVB 39 months after the procedure, and fatigue and dizziness for 5 months identified only after focused interrogation. Holter monitoring showed frequent periods of AV block with 2:1 conduction, Mobitz type II and intermittent cAVB (fig 1). The longest pause was for 9.6 s. Both patients required permanent pacemakers; their conduction has not normalised. Because of the late onset and severity of symptoms, we did not attempt steroid therapy.³ The incidence of cAVB in our patient cohort is 8.3% compared with 1–5% report in published data.^{2,4,5} After the first instance of late cAVB, we ceased our programme of interventional pmVSD closure. Despite routinely performed preinterventional and postinterventional Holter monitoring, we have recalled all patients for ECG and Holter

monitoring. Late onset of cAVB in children, after interventional closure of pmVSD, has been reported.⁶ Very late onset has been reported only after surgical closure.^{7,8} It is important to be alert to the unpredictability and high incidence of very late onset of this potentially fatal complication and to recommend that AV conduction be followed carefully. It is time for all units performing this procedure to consider whether it is ever indicated with the currently available device.

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The author's reply: The letter from Melbourne by Dumitrescu *et al.* reporting complete heart block occurring in 3 of 36 patients after transcatheter closure of perimembranous ventricular septal defect adds weight to the concern expressed about this complication.¹ Most disturbing is the detection of new-onset heart block more than 3 years after the interventional catheter procedure. This supports the view that steroid treatment in the immediate postimplantation period will not necessarily prevent the late development of this important complication. The age or size of the affected patients at the time of device implantation is not stated, but all were children.

Interventional catheterisation occlusion of a perimembranous ventricular septal defect in children, whether using the existing asymmetric Amplatzer occluder or other occlusive devices, should be performed with caution, and only as part of a prospective clinical trial or with submission of data to a registry. Continuing follow-up of patients who have undergone the procedure is required. There is a responsibility to alert patients and their families to seek advice should relevant symptoms suggesting bradycardia occur, and also to report further experience of heart block should this be recognised. If similar experience of late-onset heart block becomes widespread, the question of prophylactic pacemaker insertion may even need consideration.

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Figure 1 Intermittent cAVB 39 months post intervention.