by postoperative CAVB associated with interventional therapy. As mentioned previously, our results indicate that removing the device instead of pursuing conservative treatment can return the CAVB to sinus rhythm immediately or shortly after heart surgery and can prevent recurrence of CAVB.

References

1. Bharati S, Lev M. The conduction system in double outlet right ventricle with sub-pulmonic ventricular septal defect and related hearts (the Taussig-Bing Group). *Circulation*. 1976;54:459-66.
2. Weindling SN, Saul PJ, Gamble WJ, Mayer JE, Wessel D, Walsh EP. Duration of complete atrioventricular block after congenital heart disease surgery. *Am J Cardiol*. 1998;82:525-7.
3. Walsh MA, Bialkowski J, Szkutnik M, Pawelec-Wojtalik M, Bobkowski W, Walsh KP. Atrioventricular block after transcatheter closure of perimembranous ventricular septal defects. *Heart*. 2006;92:1295-7.
4. Yip WC, Zimmerman F, Hijazi ZM. Heart block and empirical therapy after transcatheter closure of perimembranous ventricular septal defect. *Catheter Cardiovasc Interv*. 2005;66:436-41.
5. Butera G, Gaio G, Carminati M. Is steroid therapy enough to reverse complete atrioventricular block after percutaneous perimembranous ventricular septal defect closure. *J Cardiovasc Med (Hagerstown, Md)*. 2009;10:412-4.

EDITORIAL COMMENTARY

New procedures, new complications, and new strategies to deal with them

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See related article on pages 530-1.

The importance of the report by Hu and colleagues¹ is not in the large number of patients with membranous ventricular septal defect (VSD) who have been treated with pericardiac (transthoracic) device closure of VSD by cardiac surgeons in People's Republic of China. Indeed, several Chinese series have now been published, each reporting on several hundreds of patients.² Unlike the complete atrioventricular block (CAVB) that occurs after open VSD repair, CAVB after device closure of VSD typically occurs in a delayed fashion, often days after the procedure. At that point, patients are likely to have been discharged and are unmonitored at home. This situation can easily be lethal. This delayed occurrence is the reason that the incidence of CAVB that occurs after device closure of VSD might be underreported, and it is the main reason the US Food and Drug Administration has not allowed device closure of membranous VSD in the United States.

These findings notwithstanding, the significance of this report lies in the fact that the authors took every patient diagnosed with CAVB back to surgery and removed the device and closed the VSD in a traditional manner. All patients recovered to normal sinus rhythm. New procedures, such as device closure of membranous VSD, often result in new, previously unseen complications, and this then leads to the need to develop new management strategies. Indeed, I believe the authors have shown that whenever CAVB occurs after percutaneous or pericardiac device closure of VSD, the correct treatment is now to proceed to open heart repair with device removal.

References

1. Hu S, Yang Y, Wu Q, Zhao T. Surgical treatment for patients with complete atrioventricular block after device closure of perimembranous ventricular septal defects. *J Thorac Cardiovasc Surg*. 2015;149:530-1.
2. Xing Q, Wu Q, Shi L, Xing Y, Yu G. Minimally invasive transthoracic device closure of isolated ventricular septal defects without cardiopulmonary bypass: long term follow-up results. *J Thorac Cardiovasc Surg*. 2014;14:1051-4.

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