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Single patch closure of multiple VSDs through right atrial approach



ARTICLE INFO

Article history:

Received 21 February 2016

Available online 11 January 2018

Keywords:

VSD closure

Patch closure

Multiple VSD

ABSTRACT

Multiple ventricular septal defects (VSD) are traditionally considered as surgical challenges and often ventriculotomy is needed. We report our experience with single patch closure of multiple VSDs in 4 children with a median weight was 5.6 kg. VSDs were closed via right atrium with a single Goretex patch with no operative death and short mean intensive care stay. To conclude, surgical approach to multiple VSDs is still a challenge, but a select approach to septate through right atrium adds to the surgical armamentarium to handle this difficult problem.

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Multiple ventricular septal defects (VSD) are difficult surgical problems. They occur in all the four segments of ventricular septum, namely, perimembranous, muscular, apical and trabecular outlet septum. When VSDs are present in all four segments in a single patient, it is called swiss-cheese VSDs.

Four consecutive children with the diagnosis of multiple VSDs (Median age 7 months) were operated between June 2009 and March 2010. The median weight was 5.6 kg. The mean number of defects per patient was 3. There were no associated defects. VSDs were closed via right atrium using standard cardiopulmonary bypass with mild hypothermia and antegrade cardioplegia and a single Goretex patch. The factors considered for single patch septation were the myocardial septal bridge between the VSDs and the extent of right ventricular hypertrophy. Goretex patch (WL Gore Associates Inc. Arizona, USA) was used to close the VSDs. A larger patch was used, and patch was kept untailed till the end. The initial part of closure was conventional as that of perimembranous part, but the patch was extended down towards apex as was necessary for the additional defect. Before reaching the inferior margin of the lower most defects, the patch was refashioned and placed under the tricuspid chordal attachments and fixed to the inferior margins. Moderator band was not divided in any of these cases, and additional sutures were placed in the middle of patch to further anchor this towards the septum and preventing it from bowing.

There was no operative death. The mean intensive care and hospital stay were 2.8 and 8.4 days, respectively and there were no reoperations. Follow-up was 100% complete at 12 months and there was one late death due to aspiration pneumonitis. Postoperative and follow-up echocardiography had shown tiny residual VSD in one and good ventricular function in all patients.

Management of multiple VSDs have traditionally remained as surgical challenges due to complexity in approach for their closure. Treatment has to take the considerations of associated anomalies, and the complexity of the repair.¹ Echocardiographic assessment remains the gold standard for diagnosis, and this can help in identifying both the nature of defect and the ability to surgically close them. Surgical closure of the VSDs remain the gold standard of management of this difficult condition, though hybrid approach and at times catheter based device closure of entirely muscular defects have all been reported.² There are various approaches described to close the respective VSDs. Perimembranous VSDs can be closed by traditional right atrial approach so also the muscular inlet or mid-muscular defects. Outlet trabecular defects may need pulmonary arteriotomy for further access while apical defects need ventriculotomy often for exposure anterior and inferior margins. Whichever approach one uses, the aim is to close all the defects with no residual component, and a competent tricuspid or semilunar valve. Right ventriculotomy is often needed as mentioned above for apical defects and left ventriculotomy has been considered by some for effective closure of these “Swiss-cheese” defects from left ventricular aspect of septum.^{3,4} Ventriculotomy often causes depressed ventricular function in the postoperative period, and may be a trigger for postoperative arrhythmias. The authors use single patch through right atrial approach due to the nature of these complications secondary to ventriculotomy. Moreover, authors didn't come across the problems of tricuspid valve dysfunction, nor patch bulging causing secondary RV dysfunction in any of these cases. As shown by various series, creative approaches are often rewarding. To conclude, right atrial approach, if selected in appropriate cases, offers a promising approach to close multiple VSDs including those in apical part of

the septum. They help in avoiding ventriculotomy and can be used even when the infants are small with less morbidity.

Conflict of interest

None

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Received 21 February 2016

Available online 11 January 2018