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Letter to Editor A SCITECHNOL JOURNAL

Double Patch Repair for Complete Atrioventricular Septal Defect Using the Invengenx® Patch

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Abstract

Complete congenital Atrio-Ventricular (AV) septal defect repair is a complex technique and can be performed as a single patch, modified single patch or a double patch technique. In addition, reconstructive surgeries make it more challenging as the native pericardium available for the repair is limited and of poor quality. Thus, the use of engineered bovine pericardium can help in the reconstruction of large AV canal defects. We used the Invengenx® patch for the repair of a complete AV canal defect and Pulmonary Artery (PA) plasty in a 20 month old female child with a previous PA banding. The patch had good flexibility, mechanical strength, suturability and there were no complications such as thrombosis or infection on follow up.

Reconstructive surgery in congenital cardiac anomalies is fraught with challenges due to surgical complexities and the limited availability of native pericardium for performing the repair of large defects. We used the Invengenx® bovine pericardial tissue patch for the repair of a complete AVSD (post-pulmonary artery banding) and found the patch to be suitable for the re-do procedure and noted uniform thickness, good flexibility, mechanical strength, suture retention and no infection or thrombosis.

Keywords: Atrio-Ventricular Septal Defect (AVSD); Congenital Heart Disease (CHD); Congenital heart surgery; Pediatric; Bovine pericardium patch; Tissue engineering; Pulmonary vascular resistance/hypertension

Letter to the Editor

The editor

Repair of congenital complete Atrio-Ventricular Septal Defect (AVSD) is a technically demanding procedure which has evolved from the single patch technique to the modified single and double patch techniques, commonly using tissue engineered Bovine Pericardial Tissue Patch (BPTP) [1,2]. We used the Invengenx® BPTP for the repair of a complete AVSD which has shown safety and efficacy in repair of complex congenital cardiac defects [3]. Permission was taken from the parents to report the case.

A 20-month old female child presented with a history of congenital AVSD diagnosed at birth. She had undergone pulmonary artery banding at 3 months of age for prevention of pulmonary hypertension. The child weighed 10 kg, was 66 cm tall, had a pulse rate of 100/min, blood pressure 90/60 mmHg and a room air O_2 saturation of 90%, no cyanosis or clubbing, normal peripheral pulses, normal first and second heart sounds and no audible murmur, normal vesicular breath sounds bilaterally and an unremarkable abdominal and nervous system examination. The echocardiography showed a complete AVSD, a small Ventricular Septal Defect (VSD), moderate Atrioventricular Valve Regurgitation (AVVR) and a mean Pulmonary Artery (PA) pressure gradient of 80 mmHg. Laboratory investigations were within normal limits. The child was taken under general anesthesia for complete AV canal defect repair and PA plasty. After median sternotomy, heparinization and aorto-bicaval cannulation, Cardiopulmonary Bypass (CPB) was established, followed by Aortic Cross Clamping (ACC) under hypothermia. After giving antegrade del Nido cardioplegia and snaring the superior and inferior vena cavae, the right atrium was opened. A large ostium primum atrial septal defect (single atrium) with a small VSD and a tense PA were noted. The native pericardium available was insufficient to close the large defect. Thus, a suitably sized Invengenx® BPTP was used to perform a double patch repair of the defect along with de-banding of the PA and PA plasty [4]. The AVV was repaired and mitral annuloplasty done using interrupted and pledgeted prolene sutures, respectively. The saline test done subsequently showed no mitral or aortic regurgitation on intraoperative transesophageal echocardiography. CPB was gradually weaned off as per protocol followed by heparin reversal, decannulation and chest closure. The CPB and ACC times were 124 minutes and 64 minutes, respectively.

The echocardiography post-procedure showed no pericardial effusion and there was good biventricular activity. The child was extubated in the pediatric cardiac unit on the day of the surgery and was discharged on the 5th postoperative day. Re-do surgery in congenital cardiac anomalies, especially in developing countries, is fraught with challenges due to surgical complexities and the disease burden. The use of bovine pericardium in reconstruction of large cardiac defects is beneficial since the native pericardium is often of poor quality and insufficient, more so in small children who have undergone a previous cardiac surgery [5]. In our experience, the Invengenx® BPTP was suitable for reconstructive procedures in complex congenital heart defects. We noted uniform thickness, good flexibility, mechanical strength, suture retention and no infection or thrombosis [6].

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Authors' statement

The authors confirm that the parents of the child consented to the publication of the case.

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