

'Sandwich patch technique' to repair multiple trabecular ventricular septal defects – a case report

Operacja naprawcza mnogich ubytków w części beleczkowatej przegrody międzykomorowej przeprowadzona metodą „sandwich” z użyciem łąty z goreteksu

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Abstract

In the case of multiple trabecular ventricular septal defects, it is difficult to identify the exact locations and margins because of trabeculations of the right ventricle. It is also well known that ventriculotomy for closure of ventricular septal defects sometimes causes postoperative ventricular dysfunction or arrhythmia. To overcome these problems, we used the 'sandwich patch technique' to repair multiple trabecular ventricular septal defects.

Key words: ventricular septal defect, congenital heart

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A case

A 6-year-old girl was referred from the Paediatric Department with mild dyspnoea and growth retardation. The girl underwent pulmonary artery banding due to multiple ventricular septal defects and heart failure when she was 5 months old. Her vital signs were within normal ranges (body temperature 36.5°C; blood pressure 90/50 mmHg; and pulse rate 90/min). On physical examination, a pansystolic murmur was present at the left lower sternal border and the breath sounds were clear. Pre-operative echocardiography revealed a 10 × 12 mm large perimembranous ventricular septal defect and additional multiple ventricular septal defects which connected the left ventricle to the right ventricle through two discrete holes (Figure 1). The pressure gradient through the pulmonary artery banding was 75~80 torr.

The operation was performed under fentanyl general anaesthesia. A median sternotomy was made through a previous operative scar. The adhesions and residual pericardium were dissected from the heart. After adhesiolysis, heparin was infused. The ascending aorta,

right atrial appendage, and inferior vena cava were cannulated. Extracorporeal circulation was applied under moderate hypothermia. A vent catheter was inserted into the left atrial auricle. HTK solution was infused into the aortic root after an aortic cross clamp was applied. The right atrium was incised obliquely, and the perimembranous ventricular septal defect was confirmed. After the atrial septum was incised, the left ventricle was exposed. In the left ventricular septum, there were two holes which communicated with the multiple defects beneath the moderate band of the right ventricular septum. The thick silk strings attached to the sandwich-like Gore-Tex patch were then passed through the holes with a right-angled forceps, which was introduced from the left ventricular cavity. Gore-Tex patches were applied over the defects in the right ventricular side with the aid of the silk strings (Figure 2). The perimembranous ventricular septal defect was also repaired in the usual manner. The pulmonary banding site was resected and pulmonary angioplasty was carried out.

The patient was discharged from the hospital on postoperative day 8. The recent follow-up echo-

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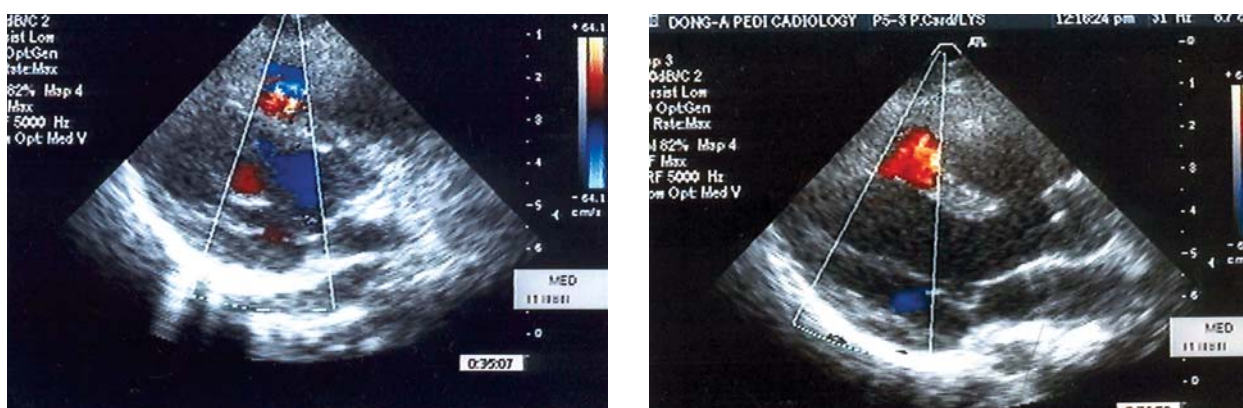


Figure 1. Preoperative echocardiographic findings. A – two definite openings on the left ventricular septum, B – left-to-right shunting via multiple defects on the right ventricular septum

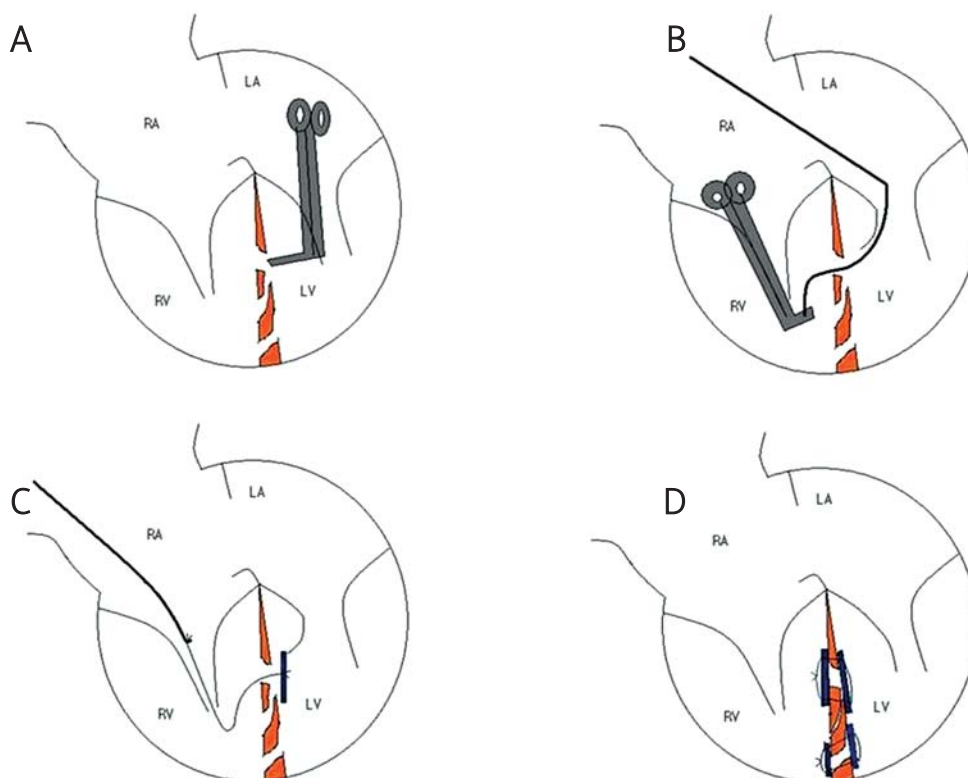


Figure 2. Two openings on the left ventricular septum are closed with two Gore-Tex patches on each opening

cardiography revealed that no residual shunt remained (Figure 3).

Discussion

Despite improved surgical techniques, the repair of multiple trabecular ventricular septal defects is cumbersome due to postoperative residual shunts or ventricular dysfunction from the ventriculotomy. Sometimes, a right or left ventriculotomy is needed to adequately expose the lesions. However, many surgeons

avoid these techniques because of postoperative ventricular dysfunction or arrhythmia. On the other hand, an approach through a right atriotomy has limited exposure of the lesions and definitive repair is difficult. Leca et al. [2] introduced closure of multiple ventricular septal defects with biological glue. Kumar et al. [3] described a technique in which they closed the lesions by implanting a transcatheter device. However, this technique has the risk of embolism and perforation of the left ventricle. Alsoufi et al. [5] described the reendo-

cardialization technique via an atrial incision and showed good results without heart failure or residual shunts after surgery, but it demanded relatively longer cardiopulmonary bypass time with a risk of intracardiac conduction pathway injury during the procedure.

This sandwich technique was introduced based on the following rationales: 1) the boundaries of defects on the right ventricular side are obscure, while the boundaries are relatively clear on the left interventricular septum; 2) in light of the left-to-right shunt, closure of the defects in the left interventricular septum is more important for a secure repair to eliminate the risk of a residual shunt. Moreover, this technique is relatively simple.

Some surgeons [6, 7] have reported a similar technique with excellent results, suggesting that this technique is a simple and safe method, which enables one to avoid left ventricular dysfunction, aneurysm formation, and ventricular arrhythmias due to left ventriculotomy in both the early and late postoperative periods.

We therefore believe that the sandwich patch technique can address multiple trabecular ventricular septal defects safely and securely with reduced operative time.

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Figure 3. The follow-up echocardiography revealed that the small residual shunt flow had resolved

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