

Closure of Secundum Atrial Septal Defect with Autologous Right Atrial Patch: Case Report

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ABSTRACT

Background: Although various synthetic materials and pericardium have been used for atrial septal defect (ASD) closure, investigators are continuing to search for an ideal material for this procedure. We report and evaluate a case in which autologous right atrial wall tissue was used for ASD closure.

Case: In this case, we closed a secundum ASD of a 22-year-old woman who also had right atrial enlargement due to the defect. After establishing standard bicaval cannulation and total cardiopulmonary bypass, we opened the right atrium with an oblique incision in a superior position to a standard incision. After examining the secundum ASD, we created a flap on the inferior rim of the atrial wall. A stay suture was stitched between the tip of the flap and the superior rim of the defect, and suturing was continued in a clockwise direction thereafter. Considering the size and shape of the defect, we incised the inferior attachment of the flap, and suturing was completed. Remnants of the flap on the inferior rim were resected, and the right atrium was closed in a similar fashion.

Results: During an echocardiographic examination, neither a residual shunt nor perigraft thrombosis was seen on the interatrial septum. The patient was discharged with complete recovery.

Conclusion: Autologous right atrial patch is an ideal material for ASD closure, especially in patients having a large right atrium. A complete coaptation was achieved because of the muscular nature of the right atrial tissue and its thickness, which is a closer match to the atrial septum than other materials.

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INTRODUCTION

Although various synthetic materials and pericardium have been used for atrial septal defect (ASD) closure, investigators are continuing to search for an ideal material for this procedure. Pericardium and prosthetic materials have been used to date, but they have been associated with various complications such as hemolysis and perigraft leak [Alehan 2001, Jemielity 2001, Kouchoukos 2003]. We report and evaluate a case in which autologous right atrial wall tissue was used for ASD closure.

CASE REPORT

A 22-year-old woman was admitted to the Clinic of Cardiovascular Surgery at Harran University with a secundum ASD located in the fossa ovalis. She also had right atrial enlargement due to the defect. She had normal pulmonary pressure with sinus rhythm and no other congenital or acquired cardiac disease.

During surgery a median sternotomy was performed. After standard bicaval cannulation and total cardiopulmonary bypass were established, the right atrium was opened with an oblique incision in a position superior to a standard incision. After examining a large secundum ASD with a size of 4 cm in diameter, we created a flap on the inferior rim of the atrial wall. A stay suture was stitched between the tip of the flap and the superior rim of the defect, and it was continued in a clockwise direction thereafter (Figure 1). The inferior attachment of the flap was incised with consideration of the size and shape of the defect, and suturing was completed (Figure 2). Remnants of the flap on the inferior rim were resected, and the right the atrium was closed in a similar fashion. The patient was discharged with complete recovery.

RESULTS

The patient was in sinus rhythm postoperatively. An echocardiographic examination was performed on an early postoperative day and 6 months after the procedure. Neither a residual shunt nor perigraft thrombosis was seen on the interatrial septum. A complete coaptation was detected between the graft and the interatrial wall.

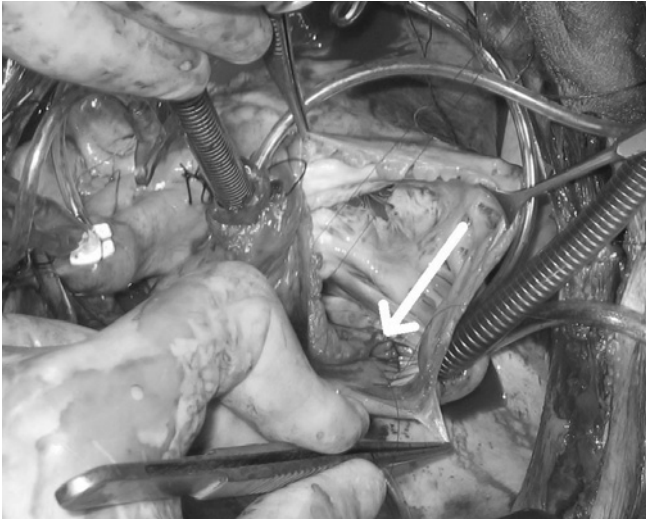


Figure 1. Sewing tip of atrial wall flap to superior rim of the defect (arrow).

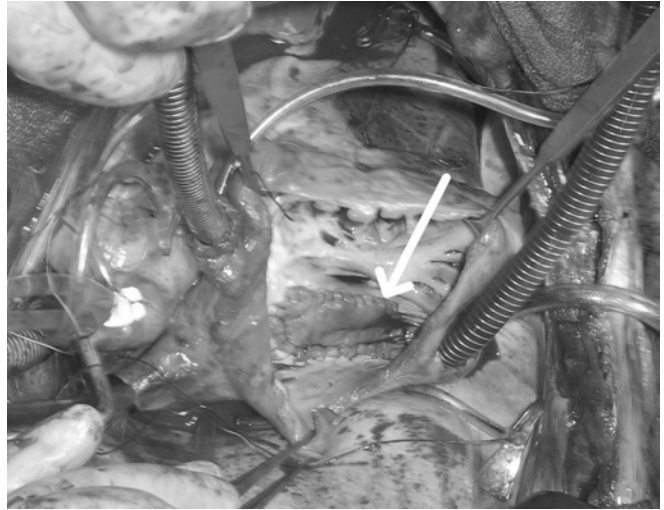


Figure 2. Closed appearance of the defect with right atrial wall (arrow).

DISCUSSION

In previous studies, various methods of ASD closure have been investigated, including percutaneous occlusion devices and surgical interventions [Levinson 1998, Han 1999, Kumar 2002, Kouchoukos 2003]. Although percutaneous transcatheter closure has been performed with a variety of devices since 1976, many catastrophic complications of these procedures have been revealed, whereas surgical repair remains a reliable and safe method of ASD closure with low morbidity and mortality [Berdar 2000, Kouchoukos 2003, Preventza 2004].

Patch materials that have been used to date for surgical closure of a large defects include glutaraldehyde-treated pericardium, knitted polyester, and polytetrafluoroethylene. For all these patch materials, however, hemolysis due to synthetic materials and residual shunt due to lack of pericardial patch coaptation have been drawbacks [Alehan 2001, Jemieliity 2001, Kouchoukos 2003].

According to literature about alternative patch materials, Kumar et al used a right atrial free-wall patch, as we did, in 12 patients with no residual defect [Kumar 2002]. But our procedure differed because we used the right atrial wall as a flap at the beginning of the procedure, and we incised lower side of the flap after the completion of suturing of the superior rim of the defect. During this procedure, we aimed at complete coaptation and sizing of the wall graft. Postoperative echocardiography showing the absence of residual intracardiac shunt demonstrated the success of our procedure.

Although many studies have been performed investigating surgical approaches to ASD closure, only a few evaluated novel surgical patch materials [Levinson 1998, Kumar 2002, Doll 2003]. We thought that autologous right atrial patch might be an ideal material for ASD closure, especially in patients having a large right atrium. A complete coaptation

was achieved because of the muscular nature of the right atrial tissue and its thickness, which is a closer match to the atrial septum than other materials. The endothelialized surface of the right atrium might also provide additional advantages related to freedom from thrombosis formation. Further studies including serial studies of patients are required for better evaluation of this technique.

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