*Case Report*

# Surgical Repair of a Common Atrium in an Adult

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**We report a rare successful surgical repair of a common atrium (CA) with mild tricuspid valve (TV) regurgitation due to valvular annulus enlargement in a 39-year-old man, who had a complete atrial septum defect (ASD) without the characteristic of an endocardial cushion defect. The left-to-right shunt ratio was 85 percent and the Qp/Qs was 6.7 due to the CA. Left ventriculogram revealed no evidence of typical goose-neck deformity and no mitral valve regurgitation. The operation consisted of making a new atrial septum with an autologous pericardial patch and tricuspid annuloplasty (DeVega) using extracorporeal circulation. There was no evidence of a cleft on the anterior leaflet of the mitral valve or the septal leaflet of the TV. The postoperative echocardiogram showed no residual shunt flow through a new atrial septum and no TV regurgitation, and atrioventricular (AV) dissociation did not occur. We consider this procedure to be widely applicable in consideration of the favorable results obtained after surgical treatment. (Ann Thorac Cardiovasc Surg 2003; 9: 130–3)**

**Key words:** common atrium (CA), surgical repair, tricuspid regurgitation

## Introduction

Common atrium (CA), a rare congenital anomaly occasionally associated with abnormalities of the venae cavae and coronary sinus, is thought to be one form of endocardial cushion defect, and was first described by Young and Robinson in 1907.[1)] We report a rare case of surgical repair of a common atrium without an endocardial cushion defect in an adult.

## Case Report

A 39-year-old man with a common atrium and mild tricuspid valve (TV) regurgitation was referred to our hospital with dyspnea on effort and palpitation which was classified as New York Heart Association (NYHA) functional class grade II. A large atrial septal defect (ASD) was suspected in medical examination during infancy, but the patient remained asymptomatic until adulthood. He had been treated with a diuretic for one year previous to surgery. A grade III/VI systolic ejection murmur was present along the left sternal border. The chest radiograph revealed increased pulmonary vascularity (Fig. 1). The cardiothoracic ratio was 0.54. The electrocardiogram revealed an atrial rhythm with an incomplete right bundle-branch block. Laboratory tests revealed no remarkable changes except for hemoglobin 15.8 g/dl, hematocrit 47.6%, and total bililbin 1.6 mg/dl. The echocardiogram revealed a complete absence of the atrial septum with mild tricuspid valve regurgitation, an intact interventricular septum, and a dilated right ventricular chamber (Fig. 2). Cardiac catherization was easily advanced into the left atrium and revealed that $O_2$ was stepped-up in the right atrium, the left-to-right shunt ratio was 85 percent, Qp/Qs was 6.7, the systolic right ventricular pressure (RVSP) was 28 mmHg, and the systolic pulmonary artery pressure was 17 mmHg.

Angiocardiograms found no associated cardiovascular anomalies and the coronary arteries appeared normal. A left ventriculogram showed no evidence of the typical goose-neck deformity and no mitral valve regurgitation

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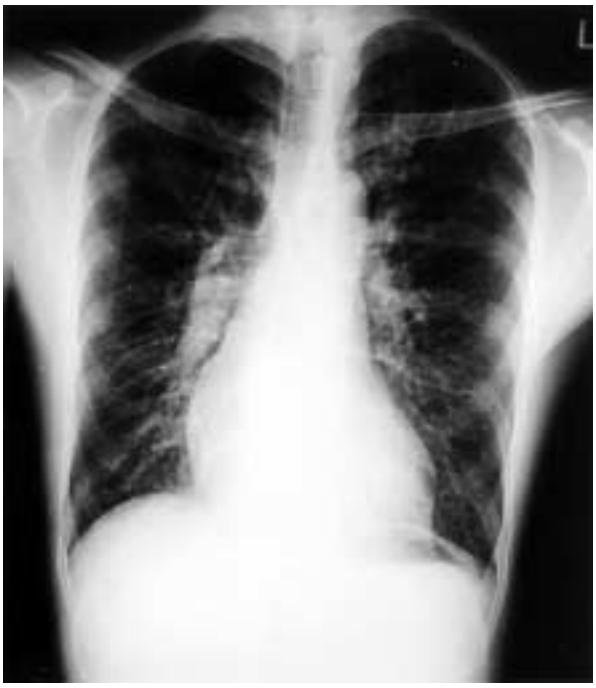

**Fig. 1.** Chest roentgenograph revealed increased pulmonary vascularity.

(Fig. 3). The operation consisted of making a new atrial septum with an autologous pericardial patch and tricuspid annuloplasty (DeVega) using extracorporeal circulation. A right atrial incision was made longitudinally along the sulcus terminalis. The defect in the atrial septum was complete and was totally different from a large ASD. However, there was no evidence of a cleft on the anterior leaflet of the mitral valve or the septal leaflet of the TV. We diagnosed this case as a CA. The atrial defect was reconstructed using an autogenous pericardial patch, the lower edge of which was anchored by 10 superficial interrupted sutures to the tissues between the two atrioventricular (AV) valves to avoid conduction injury. The remaining circumference was sutured in a continuous fashion to the atrial walls, thus separating the two atria and leaving the coronary sinus in the right atrium (Fig. 4). The postoperative echocardiogram showed no residual shunt flow through a new atrial septum and no TV regurgitation, and AV dissociation did not occur. The postoperative course was uneventful and the patient was discharged on the 32nd postoperative day.

## Discussion

Previously, CA, a rare congenital anomaly, was thought to be a form of endocardial cushion defect. It was characterized by complete absence of the atrial septum and is commonly, if not always, associated with a persistent AV canal. According to Campbell and Nissen,[2] the anomaly can be classified into three groups: persistent ostium primum, a partial AV canal, and a complete AV canal. Rastelli and associates[3] noted the following three features: (1) complete absence of the atrial septum or its rep-

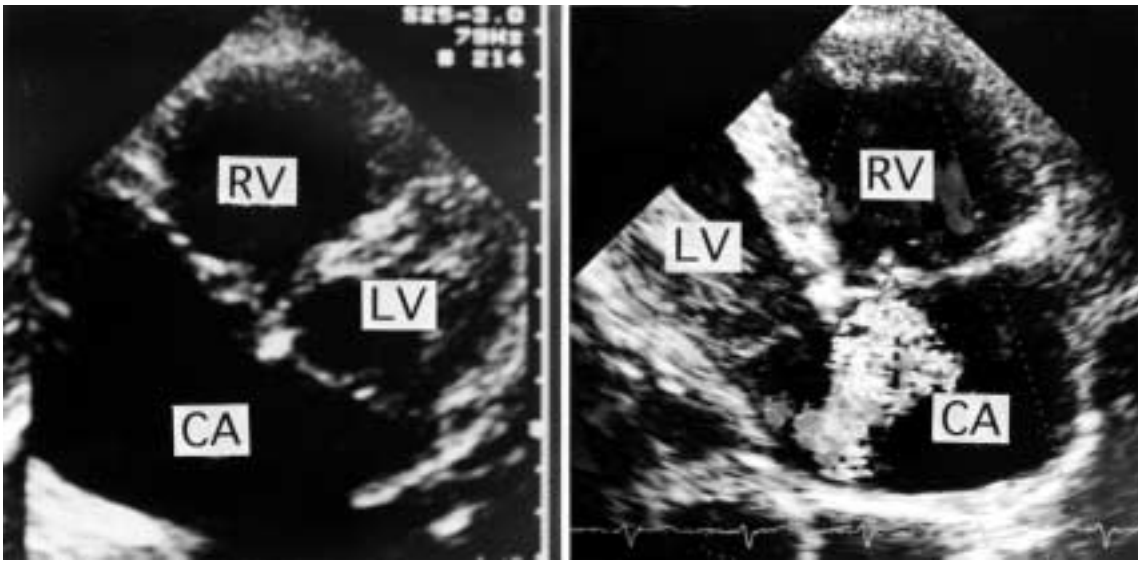


**Fig. 2.** Preoperative transthoracic echocardiogram showed a common atrium (A) with mild tricuspid valve regurgitation, an intact interventricular septum, and a dilated right ventricular chamber (B).
LV: left ventricle, RV: right ventricle, CA: common atrium.

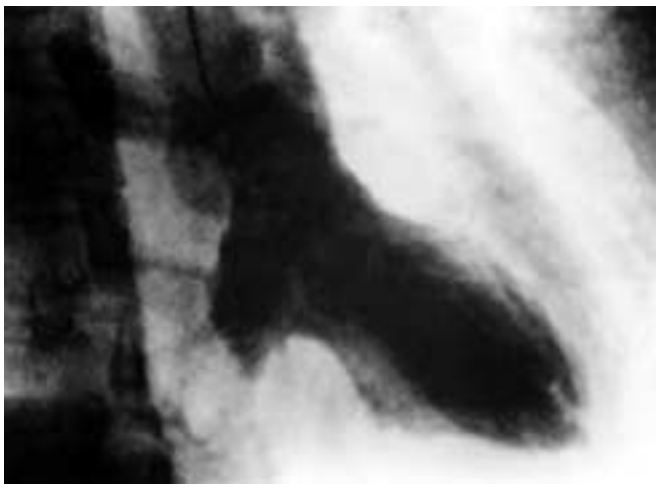

**Fig. .3.** Left ventriculogram showed no typical goose-neck deformity and no mitral valve regurgitation.

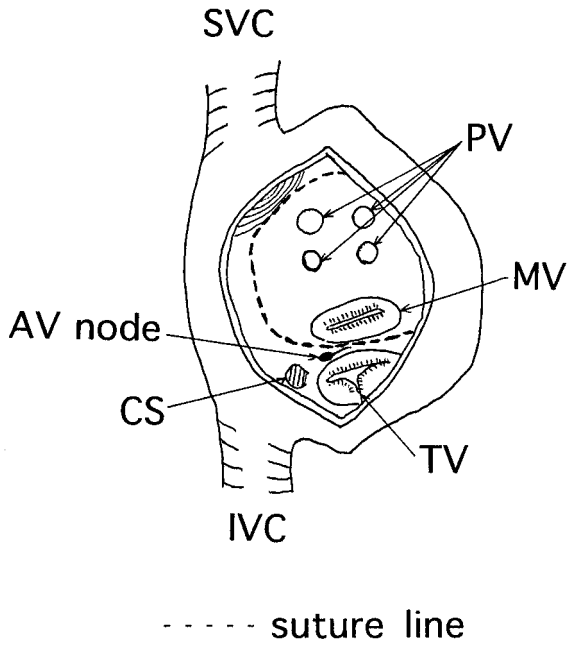


**Fig. 4.** Schema of intraoperative findings and repair of the common atrium.
PV: pulmonary vein, MV: mitral valve, TV: tricuspid valve, SVC: superior vena cava, IVC: inferior vena cava, AV node: atrioventricular node, CS: coronary sinus.

resentation by a small strand of tissue present in the cephalad wall of the common chamber, (2) absence of interventricular communication, and (3) an accompanying cleft in the anterior leaflet of the mitral valve. Levy and associates,[4] however, reported a case of complete absence of the atrial septum, indicating that this condition may exist alone as a specific entity, without an endocardial cushion defect. They recommended that the term single atrium should be used to denote the condition characterized by (1) complete absence of the atrial septum, (2) absence of malformation of the AV valves, and (3) absence of interventricular communication. They suggested that the term CA should be used to denote the condition of complete absence of the atrial septum, accompanied by malformation of the AV valves, with or without interventricular communication. Gerbode[5] described the condition under the headings of septum primum defect with intact valves, septum primum defect with cleft mitral and TV, and complete AV canal. In the literature, there would appear to be some nosologic confusion regarding the use of terms such as common atrium or single atrium.

In cases of complete absence of the atrial septum without an endocardial cushion defect such as in our case, the clinical picture and physical findings do not differ from those of a large ASD at the level of the fossa ovalis. Patients show dyspnea on effort and frequent upper respiratory infections. The physical findings are also typically those of ASD of the fossa ovalis type. There is prominence of the precordial area, a soft systolic murmur in the pulmonary area, and a constant wide splitting of the second pulmonary sound. The radiologic findings are similar to those found in the ordinary type of ASD: cardiomegaly of variable degree due to enlargement of the right cardiac chambers with normal left chambers, a prominent pulmonary artery segment at the hilar vascular shadow, and plethora of peripheral branches of the pulmonary vasculature. The hemodynamic findings are complete mixing between systemic venous and oxygenated pulmonary venous blood at the atrial level. Notably, a common atrium with AV regurgitation can increase mixing. A definitive diagnosis can be established on the basis of angiographic findings. The path followed by the catheter is also characteristic of a very large ASD and CA. On the other hand, in cases of complete absence of the atrial septum with an endocardial cushion defect, patients seem to show a decrease in exercise tolerance early in life, increased fatigability, shortness of breath, mild cyanosis or obvious heart failure, a high pitched systolic murmur at the apex radiating towards the axilla, characteristic of mitral regurgitation, a form of marked pruning of the dilated pulmonary arteries and decreased peripheral pulmonary vasculature due to the early development of pulmonary hypertension, and a typical goose-neck deformity as evidenced by left ventriculogram.

A special surgical consideration is avoidance of injury to the conduction system, for there are no marks by which the location of the AV node and his bundle area can be visually confirmed. To minimize the incidence of block, many technical modifications have been devised. Some surgeons have used the base of the mitral valve to anchor sutures, whereas others have placed the stitches on the annulus of the TV.[6] In our case, we anchored the pericardial patch by superficial interrupted sutures to the tissues between the two AV valves to avoid conduction injury. The stitches were placed so superficially that they could be visualized through the endocardium. This method resulted in freedom from complete block and arrhythmia postoperatively. We consider this procedure to be widely applicable in consideration of the favorable results obtained after surgical treatment.

## Conclusion

We report a rare successful surgical repair of a common atrium without the characteristics of an endocardial cushion defect in a 39-year-old man.

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