Case Report

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Report of the successful Senning procedure from Nepal

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Abstract

A child born with transposition of great arteries should undergo arterial switch, preferably within 2 to 3 weeks of life. Sometimes, this can be extended even up to 2 months of life, if left ventricular mass is adequate. When child presents very late left ventricle may have regressed, so the options left is either left ventricular training and arterial switch or atrial switch. We present here, a 3 years old child presenting with transposition of great arteries, who underwent successful Senning procedure.

Keywords: Congenital heart disease, Senning procedure, Transposition of great arteries

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Introduction

Transposition of the great arteries (TGA), also referred to as complete transposition, is a congenital cardiac malformation characterized by atrioventricular concordance and ventriculoarterial discordance. It constitutes 5% to 7% of all congenital heart defects.[1,2,3] Its Prevalence is estimated at 1 in 3,500–5,000 live births, with a male-to-female ratio 1.5 to 3.2:1.[4] TGA is the most frequent cyanotic CHD[5] and the most frequent CHD diagnosed in the neonatal period.[1]

Case Report

Three years old male presented with history of bluish discoloration. Echocardiography showed transposition of great arteries with intact ventricular septum. Catheterization revealed LV systolic pressure of 36 mmHg, while systemic systolic arterial pressure was 80 mmHg. Due to his deconditioned left ventricle, decision was taken to do atrial switch.

On 12th July 2022, he underwent modified Senning procedure due to the late presentation. In the operation theatre, standard monitoring system including ECG, invasive blood pressure, central venous pressure, pulse oximeter and temperature monitoring was established. The pre-bypass heart rate was between 102-124/min, opening CVP was 11 mmHg. Systolic blood pressure ranged between 81-93mmHg and diastolic blood pressure was between 42-47 mmHg. Pulse oximeter showed patient oxygen saturation between 65-73% with FIO2 of 60% and the arterial blood gas showed PaO2 of 48mmHg. Atrial septum was excised and PTFE patch was used as first layer to separate mitral valve from pulmonary veins. Lateral wall of right atrium was sutured to the medial aspect of atrial septum to drain systemic vena cava into the mitral valve. Pericardial patch along with medial wall of right atrium was used to channel pulmonary venous return into the tricuspid valve. (Figure 1) Total cardiopulmonary bypass time was 155 minutes. Total cross clamp time was 111 minutes. Patient was weaned from the Cardiopulmonary bypass with sinus rhythm and heart rate ranged between 108-118/min, CVP was 13mmHg. Patient was under inotropic support of Dopamine at 5mcg/kg/min and Adrenaline at 0.05mcg/kg/min. His systolic blood pressure ranged between77- 81mmHg and diastolic blood pressure was between 38-42 mmHg. Pulse oximeter showed patient oxygen saturation between 97-100% with FIO2 of 60% and the arterial blood gas showed PaO2 of 188mmHg. Patient was shifted to the intensive care unit with low dose of inotropic support and extubated the next day. He had atrial tachyarrhythmia on 3rd post-operative day, which subsided itself without any intervention. He was shifted out of ICU on 5th post op day. Echocardiography done at the time of discharge showed good biventricular function without any baffle leak. Patient was discharged on 8th post operative day and his hospital stay was uneventful. Patient had visited out-patient department for three-months follow-up. His echocardiography report showed unobstructed flow from pulmonary veins to RA baffle and unobstructed flow in SVC and IVC to Left Atrium. Biventricular function was normal. This could probably be the report of the first successful Senning procedure from Nepal.

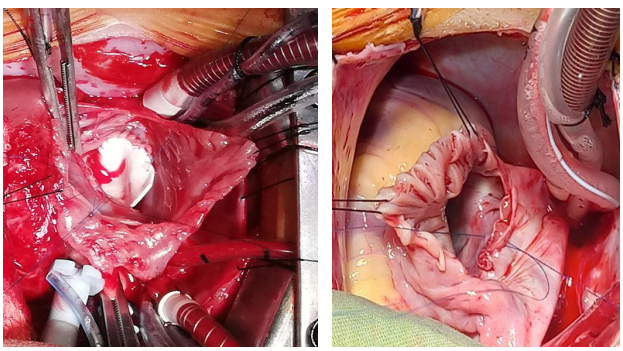

Figure 1: Intraoperative view

Discussion

In the specific context of transposition with intact septum, the newborn should be operated preferably within the first two-weeks of life. This would ensure that left ventricle has not suffered significant involution, and its contractility is still able to support the systemic circulation.[6] The arterial switch operation is the procedure of choice used to achieve complete physiological and anatomical repair. Its supremacy has been corroborated by long-term results that show preservation of good left ventricular function, sinus rhythm and a low mortality with a survival rate of 88% at both 10 and 15 years.[7] Whenever the arterial switch is not feasible, alternative approaches are required as of in our case where the case presented late with deconditioned left ventricle. A repair at atrial level, either by a Mustard or a Senning procedure, is particularly suitable for hearts with an intact ventricular septum. The systemic venous return is redirected at atrial level to the left ventricle. Likewise, pulmonary venous blood is diverted to the right ventricle.[8]

The Senning procedure[9] was originally proposed to achieve physiological correction of complete transposition of the great arteries (D-TGA). Using the right atrial flap, the systemic venous return was rerouted to the pulmonary, morphological, left ventricle, and the pulmonary venous return was redirected to the systemic, morphological, right ventricle. Throughout the 1970s and 1980s, Senning procedure was the treatment of choice for TGA patients being the first surgical technique allowing TGA infants to survive and reach adulthood.[10]

The functional status and quality of life of TGA patients following atrial switch operation are reported to be satisfactory throughout the childhood period up to the beginning of adulthood.[11] However, the hazards of the right ventricle being the systemic ventricle comprise sudden death, right ventricular dilatation, right ventricular dysfunction, cardiac arrhythmias, sinus node dysfunction, baffle leaks and obstruction to the pulmonary and or systemic pathways.[12] These factors are associated with a less satisfactory survival rate of 77.7% and 67.2% at 10 and 30 years respectively, with an early mortality accounting for 16%.[13] Particularly adverse outcomes are present in patients with an advanced New York Heart Association functional class or with arrythmias.[14] Early follow-up echocardiography in our case showed no baffle leak with unobstructed flow in systemic and pulmonary pathway.

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