

Surgical treatment of aortic-left ventricular fistula

Tratamento cirúrgico do túnel ventrículo esquerdo-aorta

José Alberto CALIANI, Flávio Reis GOUVÊA, Luiz Carlos SIMÕES, Ana Helena DORIGO, Erika PORTO, Flávio Reis NEVES, Odilon Nogueira BARBOSA.

RBCCV 44205-688

Abstract

An 8-month-old boy, presenting with heart failure and murmur was investigated using echocardiogram and cardiac catheterization revealing an aortic-left ventricular tunnel between the aorta and the left ventricle, bypassing the aortic valve and thereby causing massive regurgitation through this connection as was demonstrated by Doppler ultrasonography. The patient was submitted to surgery to occlude the fistula through the aortic orifice under cardiopulmonary bypass. A postoperative echocardiogram revealed complete occlusion of the tunnel and the patient is completely free of symptoms.

Descriptors: Tunnel, heart. Tubular communication, aortic regurgitation. Surgery.

Resumo

Criança do sexo masculino, oito meses, com quadro clínico de insuficiência cardíaca e sopro. Durante a investigação foi realizado ecocardiograma e estudo cineangiocardiógráfico que evidenciou comunicação secundária tipo túnel entre o ventrículo esquerdo e a aorta, a qual apresentava regurgitação severa. O paciente foi submetido a tratamento cirúrgico com auxílio de circulação extracorpórea, sendo o túnel fechado com sutura direta através de aortotomia convencional. O ecocardiograma pós-operatório não evidenciou fluxo pelo túnel e o paciente apresenta-se em grau funcional I (NYHA).

Descritores: Túnel, coração. Comunicação tubular, insuficiência aórtica.

Work performed in the Instituto Nacional de Cardiologia, Laranjeiras – Rio de Janeiro.

Pediatric Cardiovascular Surgery and Child and Adolescent Cardiology Departments

Correspondence address: Dr. José Alberto Caliani. Rua das Laranjeiras, 374 Rio de Janeiro – RJ – CEP 22240-005

Tel: (21) 2285.3344 or 2285.4594

E-mail: jcaliani@incl.saude.gov.br

Article received in April, 2004

Article accepted in May, 2004

INTRODUCTION

The aorta-left ventricle tunnel (Ao-LVT) is considered to be a rare congenital disease [1-3], in which there is an abnormal connection between the left ventricle and the aorta, that is, a connection bypassing the aortic valve. Generally, this condition results in severe aortic regurgitation, rapidly evolving to cardiac decompensation and death [1,2].

From an anatomic point of view, it is characterized by a tubular connection between the left ventricle and the aorta. The orifice in the aorta is located distally on the tubular sinotubular junction, separated from the Valsalva's sinus by a prominent transverse border, whilst the ventricular orifice is located on the transition between the right and left coronary valves.

The Ao-LVT soon creates an abnormal and secondary passage in the normal ventriculo-arterial junction, however, it does not penetrate the septal musculature [3]. This has implications in the surgical approach to these patients [2-4].

The surgical treatment of Ao-LVT can be achieved by convention transverse aortotomy, two centimeters above up the Valsalva's sinus, aiming at its closure, without leaving paravalvular connections [4].

In this study we will describe a case of Ao-LVT in an eight-month-old boy who was successfully treated by surgery.

CASEREPORT

An eight-month-old boy arrived in our department presenting with dyspnea and fatigue after the slightest effort, symptoms that had started one month previously.

He was in a regular general state, acyanotic, anicteric, afebrile and tachydyspneic. The murmur was constant, both systolic and diastolic, with an aortic focus and aortic accessory, hyperphonestic at two times. The heart rate was 110 bpm and the arterial pressure was 100/400 mmHg.

The thoracic radiograph presented an expansion in the heart volume affecting the left ventricle.

The electrocardiogram evidenced sinus rhythm with an overload of the left ventricle.

A 2-dimensional Doppler echocardiogram was performed to elucidate or to exclude the diagnosis of aortic valve insufficiency. However, it revealed significant paravalvular regurgitation, suggesting Ao-LVT. Aiming at confirming this diagnosis, obtaining anatomic details and excluding possible associated anomalies, cardiac catheterization was performed (Figure 1).

In view of the clinic state of the patient and the complementary exams, surgical treatment was indicated.

Median sternotomy was performed and conventional cardiopulmonary bypass was established under moderate

hypothermia at 30 °C. The aortic root was opened two centimeters above the Valsalva's sinus. Cooled antegrade cardioplegia was introduced directly to the coronary ostium. The aortic orifice of the fistula was identified at the base by the side of the right coronary valve and was occluded by

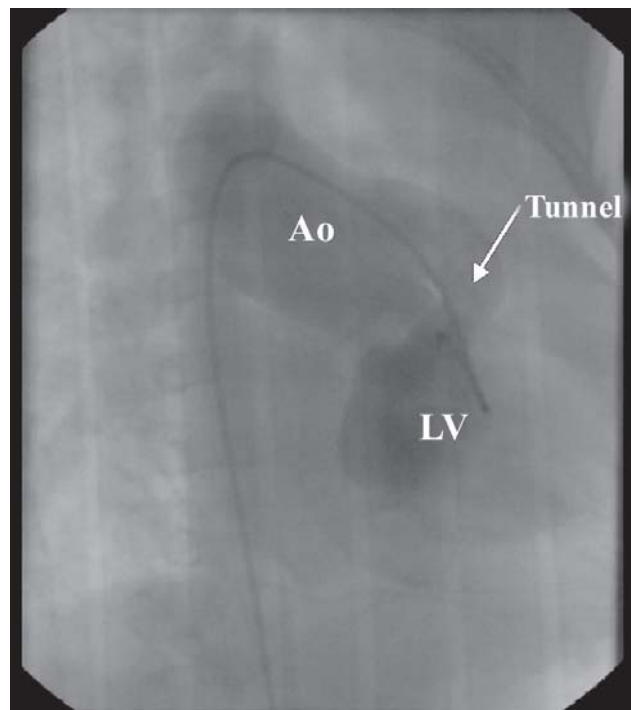


Fig. 1 – Cardiac catheterization demonstrating the presence of an aortic-left ventricular tunnel

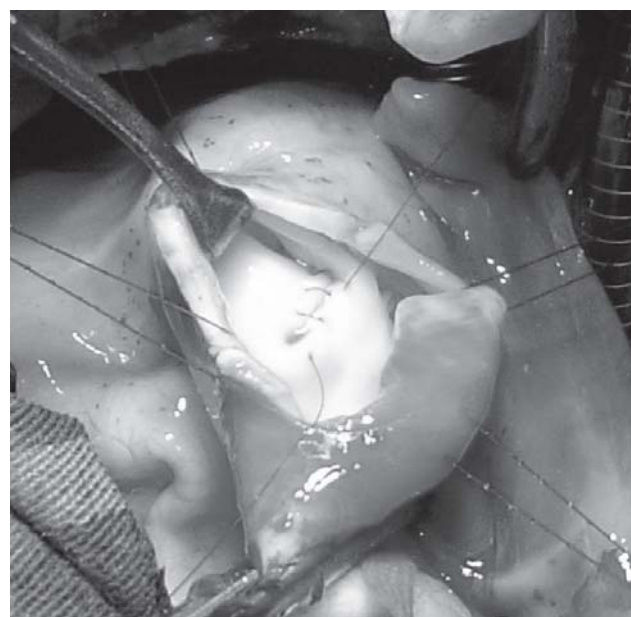


Fig. 2 – Direct suturing to occlude the aortic-left ventricular tunnel

direct suturing (Figure 2). The aortotomy was closed performing external plication.

There were no adverse events in the postoperative period. The patient was discharged on the sixth postoperative day. A control echocardiogram demonstrated complete occlusion of the tunnel.

In the follow-up the patient is completely free of symptoms and is in functional class I (NYHA).

COMMENTS

Ao-LVT has a congenital etiology [1-3], which can be associated with anomalies of the aortic valve and fetal hydrops or not [2]. Depending of the severity of the aortic regurgitation, intrauterine death can occur or the newborn can die within a few hours of birth [2].

Ao-LVT affects the right coronary valve in about 92% of the patients and the left coronary valve in the remaining cases [4]. It results in severe aortic paravalvular regurgitation and rapid cardiac decompensation. The symptoms depend on the magnitude of the regurgitation to the left ventricle and on the diameter of the tubular tunnel as, in some patients, diagnosis and successful surgical treatment have even been reported in older children [4,5] and in asymptomatic adults [6].

The most important complementary exam to diagnose this disease is the 2-dimensional Doppler echocardiogram, which demonstrates aortic regurgitation to the left ventricle through the aortic paravalvular tubular tunnel. [7]

Treatment is basically surgical at any age [1,2,4-7] and it is important to avoid distortion of the aortic valve and/or the annulus as well as dilation of the left ventricle, which can in turn cause aortic valve insufficiency and the necessity of reoperation for valve replacement [8]. Regarding the surgical technique, the fistula can be closed by direct suturing through of aortic orifice [6], as demonstrated in this report, or using bovine pericardium patches to close the aortic orifice [5], to occlude the ventricular orifice [4] or to occlude both ventricular and aortic orifices [4].

Based on the good evolution, technical facility to perform

the surgery and the bibliography review, we believe that the surgical treatment of this disease should be widely used at the earliest possible moment.

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