

CASE REPORT

Severe aortic regurgitation secondary to closure of ventricular septal defect

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Ventricular septum defects account for up to 30% of all congenital heart disease. Within ventricular septal defects, the membranous type is the most common one up to 80% of cases. Severe aortic regurgitation occurs up to 5% of all patients treated with ventricular septal defect closure. We present the case of a patient diagnosed with severe aortic insufficiency secondary to closure of a perimembranous ventricular septal defect.

Key words: Ventricular septal defect; aortic valve regurgitation; Complications, cardiac surgery procedures.

Los defectos del septum ventricular representan hasta un 30% de todas las cardiopatías congénitas. Dentro de las comunicaciones interventriculares, la de tipo membranoso es la más común hasta en el 80% de los casos. La insuficiencia aórtica severa se presenta hasta en el 5% del total de pacientes tratados con cierre de comunicación interventricular. Presentamos el caso de una paciente con diagnóstico de insuficiencia aórtica severa secundaria a cierre de comunicación interventricular perimembranosa.

Palabras clave: Comunicación interventricular; Insuficiencia aórtica; Complicaciones, procedimientos en cirugía cardiaca.

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Ventricular septum defects have an incidence of 2%-5% in the population [1], being the most frequent congenital heart disease detected up to 30% of the series [2]. Ventricular septal defects can be isolated, multiple, and associated with other heart diseases. These defects are classified according to their location as infundibular, membranous, atrioventricular canal, and muscular [3]; out of them, being the membranous type defect the most common as 80% of cases [3]. In this epidemiological context, the closure of septal defects at the level of the ventricles is considered the most common operation in the pediatric population [1].

In patients with ventricular septal defect closure, it has been shown that the most frequent long-term complication in 19% of patients is residual ventricular septal defect [1,4]. Severe aortic regurgitation occurs in 5% of all patients treated with ventricular septal defect closure [4]. Aortic regurgitation is an important entity, which tends to progress once presented. The most important risk factors for its presentation are defects in the morphology of the left ventricular outflow tract, and the appearance of the Venturi effect increases flow velocities at the level of the aortic valve when there is leakage at the closure site or morphological alterations due to closure [4,5]. Once the diagnosis of severe aortic insufficiency has been es-

tablished, the proposed treatment is the aortic valve replacement in order to avoid complications of this entity such as endocarditis, aneurysms and rupture of the sinus of Valsalva [6].

CLINICAL CASE

We present the case of a 25-year-old female patient with a history of muscular and perimembranous ventricular septal closure in 2003, as well as a history of residual ventricular septal defect, tricuspid regurgitation and aortic regurgitation in 2017 secondary to perforation and plication of the non-coronary aortic valve, plication of the tricuspid septal valve and residual ventricular septal defect, which underwent non-coronary leaflet aortic valve plasty, tricuspid plasty and closure of the residual ventricular septal defect. The patient was referred to our institution's cardiology service after presenting episodes of dyspnea on medium exertion that progressed to small exertion, as well as palpitations and fainting, for which a study protocol was initiated with an echocardiogram showing severe aortic regurgitation without a stenotic gradient. (Vmax 2.1 m/s, Gmax 18 mmHg, Gmed 9 mmHg) with eccentric jet with 8 mm vena contracta, THP 350 ms, no residual VSD and chest CT showing preserved aortic dimensions. (Fig. 1) (Fig. 2)

Surgery was performed through median sternotomy, releasing adhesions and aortic and unicaval cannulation for cardiopulmonary bypass. Aortic cross-clamping and Custo-

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Figure 1. Aortic valve ring by Computed Tomography (CT) scan

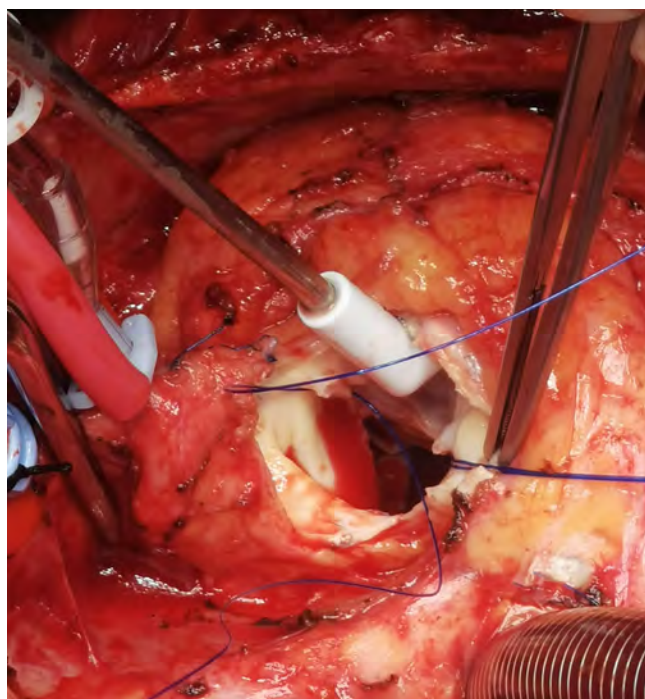


Figure 3. Aortic leaflets with loss of coaptation

diol-type antegrade cardioplegia was administered. Radiated stitches were placed in the aortic annulus and subsequently mounted on a 19 mm SJM Regent™ aortic valve prosthesis (Fig. 3) (Fig. 4). Adequate position was verified, as well as the absence of associated injuries. Aortorrhaphy and chest closure were performed as usual. Cardiopulmonary bypass time was of 57 min and aortic cross-clamping time of 50 min. She passed at the end of surgery to the coronary intensive care

unit, presenting a favorable post-surgical evolution and being discharged at 96 hours due to improvement and reaching anticoagulation goals.

COMMENT

Aortic regurgitation is an important complication of ventricular septal defect closures and can impair the patient outcome. The prevalence of aortic regurgitation is between 4.8% and 7.6% and tends to progress from its presentation [5]. Normally, the diagnosis is established by prolonged follow-up of the cases and by serial echocardiographic studies. At the time of diagnosis, they are classified as mild or moderate aortic regurgitation in most cases [6,7].

The main mechanism that allows the progression of aortic regurgitation in ventricular septal defect closures is the residual leak that, through the Venturi effect, generates an increase in turbulent flow and pressure difference at the level of the aortic annulus, which secondarily causes tissue dilation [6,7]. In our case, the aortic regurgitation was severe at the time of diagnosis; the residual leak due to the ventricular septal defect as the main agent producing regurgitation was replaced by the absence of coaptation of the leaflets that originated from the incidental plication of the non-coronary leaflet. In this case, as reported in the world literature, aortic regurgitation that was initially treated with valvuloplasty progressed and increased in severity, causing the patient to change functional class and the need for aortic valve replacement.

Aortic valve replacement should be the therapeutic option if symptoms are present and if echocardiographic criteria sug-



Figure 2. 3D reconstruction of the aortic root.

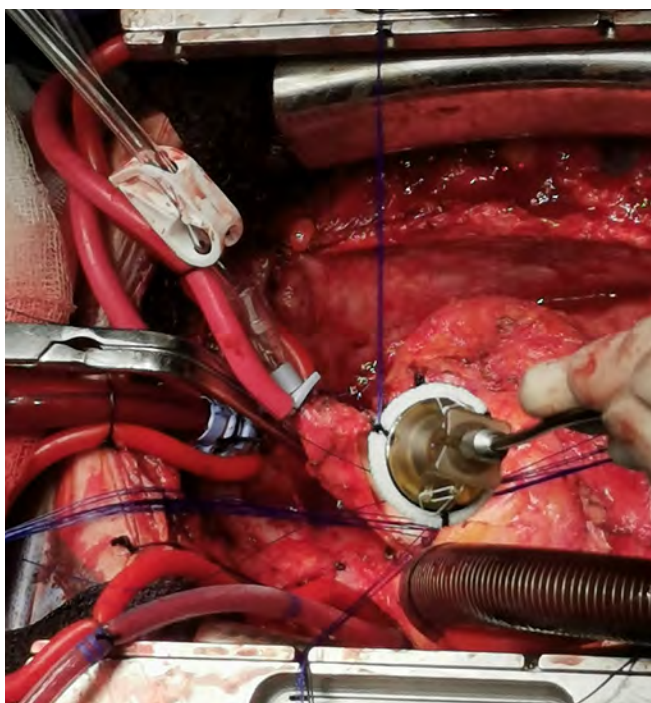


Figure 4. SJM Regent™ 19mm mechanical valve replacement

gestive of severity are present, with the aim of preserving adequate cardiac function and preventing disease progression [8]. Complications after ventricular septal defect closure are rare. However, through serial clinical and echocardiographic follow-ups for enough long-time interval, it is possible to diagnose and treat them in a timely manner, avoiding progression and a greater number of adverse effects.

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