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Myocardial revascularization surgery in a patient with Situs Inversus Totalis: A case report

Cirugía de revascularización miocárdica en un paciente con Situs Inversus Totalis: Reporte de un caso

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Abstract

Dextrocardia with situs inversus totalis is a rare congenital abnormality. Most coronary artery bypass grafting surgeries in patients with dextrocardia were performed with anastomosis, using the right internal thoracic artery to revascularize the left anterior descending. It should be noted that in the literature there are few reports of coronary artery bypass grafting surgery, in a patient with this abnormality, its anatomical complexity constitutes a challenge in planning the surgical technique and the grafts to be used. We present an unusual case of a patient with situs inversus totalis and coronary artery disease who underwent coronary artery bypass grafting surgery making it a more technically complex procedure for surgeons, in addition to the difficulty in choosing grafts.

Keywords: dextrocardia, myocardial revascularization, situs inversus, congenital abnormalities, coronary disease.

Resumen

La dextrocardia con *situs inversus totalis* es una anomalía congénita poco frecuente. La mayoría de las cirugías de injerto de derivación de arteria coronaria en pacientes con dextrocardia se realizaron con anastomosis, utilizando la arteria torácica interna derecha para revascularizar la descendente anterior izquierda. Cabe señalar que en la literatura existen pocos reportes de cirugía de injerto de bypass coronario, en un paciente con esta anomalía. Su complejidad anatómica constituye un desafío en la planificación de la técnica quirúrgica y los injertos a utilizar. Presentamos un caso inusual de un paciente con *situs inversus totalis* y enfermedad arterial coronaria que se sometió a una cirugía de revascularización coronaria, lo que lo convierte en un procedimiento técnicamente más complejo para los cirujanos, además de la dificultad para elegir los injertos.

Palabras clave: dextrocardia, revascularización miocárdica, situs inversus, anomalías congénitas, enfermedad coronaria.

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Introduction

Dextrocardia with situs inversus totalis (SIT) is a rare congenital abnormality that occurs in approximately 1 in 10,000 patients.(1) The incidence of coronary artery disease in these individuals is the same as in the general population.(2) The clinical presentation and evolution do not appear to differ from patients with normal cardiac position, except that, in most cases, chest pain is usually localized on the right side. Most coronary artery bypass grafting (CABG) surgeries in patients with dextrocardia were performed with anastomosis, using the right internal thoracic artery (RITA) to revascularize the left anterior descending (LAD).(3) It should be noted that in the literature there are few reports of CABG in a patient with SIT.(4-6) The anatomical arrangement of this anomaly constitutes a challenge in planning the surgical technique and the grafts to be used.(7,11)

Case Presentation

63-year-old female patient with typical chest pain in the last 6 months, characterized as Canadian Cardiovascular Society (CCS) II, but which worsened in the last month, even reaching rest, without dyspnea. She has a history of dyslipidemia, arterial hypertension, and SIT.

On physical examination, stroke cordis on the right, normophonetic sounds without murmurs, adequate perfusion, and no signs of congestion. Electrocardiogram with negative P waves in D1 and aVL, while regression of the QRS complex from V1 to V4 in precordial leads (figure 1). The chest tomography revealed the heart on the right, as well as the liver and the raised diaphragmatic dome on the left (figure 2). Echocardiogram without systolic dysfunction, ejection fraction in 58%, without segmental alterations or significant valvular disease.

Catheterization was performed with a 70% distal lesion of the left main coronary artery (LMCA) and involvement of the ostium of the LAD and 80% in the

middle third, circumflex artery (CA) with 90% in the proximal third, first obtuse marginal artery (OM1) branch with 90% proximal and 80% middle, right coronary artery (RCA) without lesions and a Syntax I score 34. (figure 3).

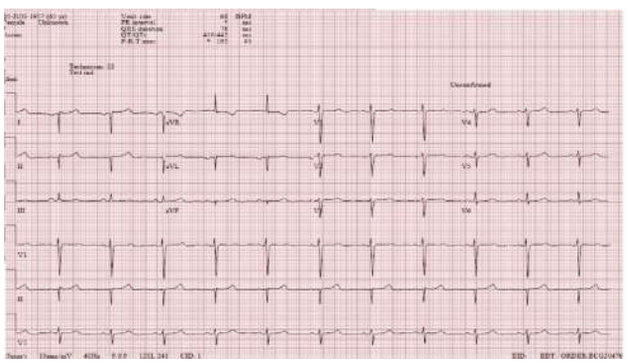

Figure 1

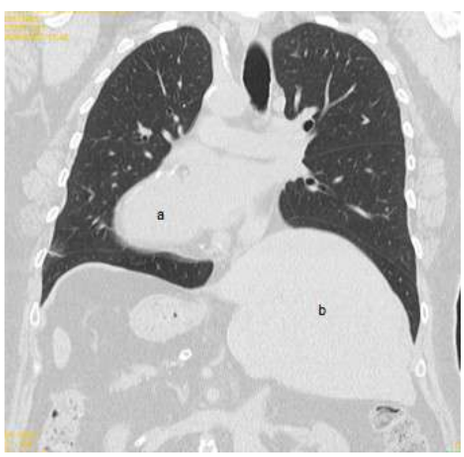

Figure 2

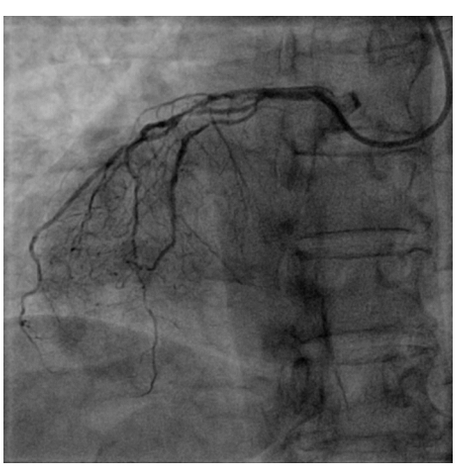

Figure 3

Revascularization was indicated by prognosis due to LMCA significant stenosis. The surgical risk calculated by Euroscore II was 2.97% and STS 0.9%. She underwent CABG with extracorporeal circulation (EC) , cannulation of the aorta and right atrium, or inferior vena cava. During surgery, SIT was identified (figure 4), performing RITA arterial graft for LAD and left internal thoracic artery (LITA) as a free graft for OM1, with a EC time of 90 minutes and without complications. (figure 5). The patient was discharged after 8 days, with optimized medical therapy for secondary prevention of coronary artery disease.

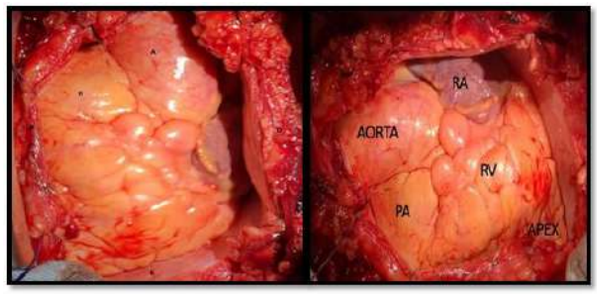

Figure 4

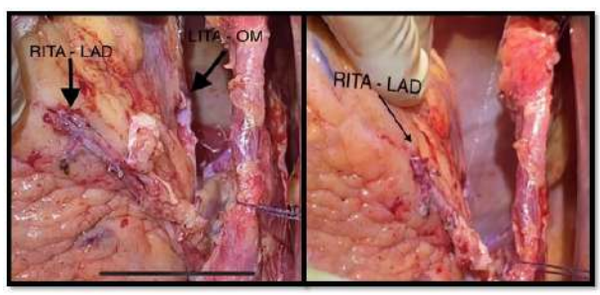

Figure 5

Discussion

Dextrocardia was first described in humans in 1606 by surgeons Hieronymus Fabricius and Marcus Aurelius Severinus, in 1643, SIT was reported.8 Dextrocardia can occur as an isolated abnormality, although this is rare in adults presenting with CABG, most reports in this surgical setting mention dextrocardia associated with SIT. A review of the 32 cases reported in recent times showed that the EC times were similar and most of the two types of grafts (arterial and venous) were used, and as expected, RITA was the most used for LAD, but the use of two internal thoracics is rare.(8-10)

The preoperative evaluation of patients with CABG and dextrocardia is similar to that of the general population and includes clinical examination, electrocardiogram, chest radiography, echocardiogram and coronary angiography, the latter in these patients requiring only minor changes in the catheter insertion technique and interpretation of projections.(8)

The surgical procedure in these patients has several peculiarities, since some steps are easier to perform on the right side of the patient like sternum opening and cannulation of the bypass, others like heart positioning for anastomosis are easier on the left side, so the surgeon may choose to switch places during surgery. Graft configuration is certainly one of the main challenges, since LITA usually does not reach adequately the LAD. Even when it reaches the LAD, it will be positioned across the mediastinum making future reoperations more

difficult. Among the technical problems with EC, we have cannulation of the vena cava, retrograde cardioplegia, and other cannulations of vascular structures that may be necessary during surgery.(8)

When choosing grafts, LITA may be too short to revascularize the LAD, but can still be used to revascularize the circumflex region by passing it through the transverse sinus or using it as a free graft, with proximal anastomosis on the aorta.10 Thus, to reduce the difficulty in choosing, it is recommended to open the pericardium and measure the approximate lengths before choosing them. In SIT patients RITA to LAD must be conduit of choice if using only one internal thoracic artery.(1,8) Regarding the long-term patency of grafts, it has already been shown that arterial grafts are better than venous grafts for patients with normal cardiac anatomy and levocardia, with the LITA becoming the graft of choice. We do not have randomized studies on this disease in patients with dextrocardia. Due to this difficulty and the risk of distal injury when using LITA, it has been shown that the use of RITA is the most patent and with the least risk of complications during surgery.(8)

Conclusion

This is an unusual case of a patient with SIT and coronary artery disease who underwent CABG for prognosis and symptoms, making it a more technically complex procedure for surgeons, in addition to the difficulty in choosing grafts, mentioning that the use of both thoracic arteries in revascularization is rarely reported, as in this case. The great learning of the present case focuses on the complexity and surgical planning, the use of RITA as a graft of first choice and guides the way to approach a patient with these characteristics, which occurs infrequently.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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