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Case Report

Fungal pseudoaneurysm in pediatric patients: presentation of two cases

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ABSTRACT

Pseudoaneurysms are a rare and serious complication of infective endocarditis (IE), especially in patients with previous cardiac surgery. They can lead to serious complications, such as rupture, compression of cardiac structures or fistulization. The incidence is not exact, although it is known that certain congenital heart defects and surgical procedures can increase the risk of developing it. We present the cases of two patients who underwent surgery for the treatment of their congenital heart disease, presenting as a complication the development of infectious pseudoaneurysm: the first is a 2-year-old female patient, with a diagnosis of tetralogy of fallot, who underwent surgical correction at 22 months of age; 4 months after correction, he went to our hospital where a transesophageal echocardiogram showed loss of continuity at the level of the right sinus of Valsalva secondary to a 46×44 mm pseudoaneurysm, which generated obstruction of the outflow tract of the right ventricle, so it was decided to undergo the Bentall bono procedure. The second case is a 12-year-old female patient with a diagnosis of pulmonary atresia with ventricular septal defect (VSD), a rastelli procedure was performed at 12 months, presenting with fever, cough in fits and a pulsatile mass of 6×7 cm in the upper third of the wound wound. A transthoracic echocardiogram was performed, observing loss of continuity at the level of the pulmonary artery secondary to a 60×75 mm pseudoaneurysm, which causes dynamic obstruction at the level of LVST. Complete resection of the pseudoaneurysm capsule was performed, a bovine pericardium patch (Peri-Guard) was placed, and a mediastinal cavity was cleaned, and due to high suspicion of mediastinitis, it was decided to submit to the Molina protocol.

Keywords: Endocarditis, Cardiac surgery, Re-operation, Right ventricular outflow tract, Plunger, False aneurysm

INTRODUCTION

Pseudoaneurysms are a rare but serious complication of IE in children with operated congenital heart disease. Its formation occurs due to the destruction of the vascular wall or perianastomotic tissue by infection, resulting in a pulsatile cavity contained by fibrous tissue rather than a complete vascular wall. The appearance of pseudoaneurysms in this context increases the risk of embolization, rupture, and heart failure, which can compromise the patient's life.[1]

Although the exact incidence as a complication of IE in this population is not clearly established in the literature, it is known that previous surgeries with vascular anastomosis or placement of prosthetic canals such as tetralogy of fallot can increase the risk of IE and its complications, due to the colonization of prosthetic material, inflammation and tissue destruction that can weaken the structure of the arteries or myocardium, facilitating the formation of pseudoaneurysms.[2]

Pseudoaneurysms can form in different locations depending on previous surgery and infectious involvement.[3,4]

At the level of the aortic root: after Ross surgery or aortic valve repair.

In arterial anastomosis after surgery for coarctation of the aorta or pulmonary cavity connection in the Fontan procedure.

In right ventricular outlet, very common in patients operated on for tetralogy of fallot with transannular patch.

At the valvular level in patients with valve replacements or repair of septal defects.

Clinically, it can present with symptoms such as persistent fever, progressive dyspnea, new or fighting heart murmurs. Among its main complications is rupture of the pseudoaneurysm with catastrophic hemorrhage, one of the most catastrophic being setic embolization with systemic or pulmonary embolic phenomena.[4]

In patients with IE complicated with pseudoaneurysm, urgent surgery is indicated for 1 level B according to the 2015 ESC guidelines on the treatment of IE. Debridement and excision of necrotic and infected tissue should be performed to prevent the appearance of sepsis.[5]

Currently, the preoperative evaluation includes different diagnostic modalities, among them we find: transthoracic ultrasound, which serves as a first evaluation and to compare with previous studies; transesophageal ultrasound, used both before and during surgery to guide the surgical process, and computed tomography (CT), used to more accurately identify the anatomical relationship of the pseudoaneurysm with the rest of the structures.[6,7]

CASE REPORT

We described the case of a 2-year-old female diagnosed with tetralogy of failure, who underwent a pulmonary systemic fistula at 4 months; at 22 months of age, correction of 10x10 mm VSD with bovine pericardial patch (Peri-Guard)® with continuous suture + right ventricular outflow tract (RVVT) enlargement with bovine pericardium patch (Peri-Guard)® with continuous suture was performed. 4 months after correction he came to our hospital for fever, acute heart failure. A transthoracic echocardiogram was performed, and loss of continuity was observed at the level of the right sinus of Valsalva secondary to a pseudoaneurysm of 46×44 mm, which causes dynamic obstruction at the level of the DORV.

The patient underwent surgery, femoral cannulation was performed to establish extracorporeal circulation, and hypothermia was taken to 28°C. Surgery showed a 4 mm VSD, abscess in aortopulmonary continuity with involvement of pulmonary artery trunk, ascending aorta and root, pus in TSVD. Debridement and cleaning of the affected areas were carried out and after that, the Konno type aortic ring was widened with enlargement to VSD and valvulated graft was made with intergard woven tube 18 mm and Regent aortic prosthesis 17 mm, repair of the pulmonary artery trunk with a bovine pericardium patch on the anterior wall of the pulmonary artery trunk at the level of the outflow tract of the right ventricle with stitches continuous suture.

The rest of his hospital stay presented a right basal lung abscess and a cavitary lesion in the right upper lobe, suggesting septic embolism requiring lobectomy of the right lower lobe; presents generalized clonic convulsions, showing bilateral symmetrical hypodensity in the lower portion of the basal ganglia, which could correspond to ischemic events (CT image) conventional tracheostomy and stamm-type gastrostomy, Blood cultures reported Stenotrophomonas maltophilia sensitive to trimethoprim-sulfamethoxazole complying with a 7-day schedule, however, it persisted with a torpid evolution adding rectal prolapse, he presented cardiac arrest initiating maneuvers, without achieving a return to spontaneous circulation.

The second case is a 12-year-old female patient with a diagnosis of pulmonary atresia with VSD, a rastelli procedure was performed at 12 months, at 11 years of age she presented severe stenosis of rastelli valvado for which a rastelli tube peeling was performed with placement of a 21 mm aortic prosthesis (Magna Ease aortic)® in pulmonary position + ATSVD with bovine pericardial patch (Peri-Guard)® with continuous suture. After the last intervention, she presented heart failure and echocardiogram showed severe pericardial effusion + stenosis of the RVVT, so it was decided to reoperate 17 days later, submitting her to ATSVD with bovine pericardial patch (Peri-Guard)® with continuous suture. Two months after ATSVD, he came to our hospital with fever, cough in fits and a pulsatile mass of 6×7 cm in the upper third of the wound wound. A transthoracic echocardiogram was performed, observing loss of continuity at the level of the pulmonary artery secondary to a 60×75 mm pseudoaneurysm, which causes dynamic obstruction at the level of LVST.

The patient was operated on in our hospital. Considering the multiple surgical interventions, a femoral approach was chosen, and medium resternotomy was performed with an oscillating saw. Cannulation of the femoral artery and vein is performed. Extracorporeal circulation was

established and hypothermia of 28°C was taken. In the surgery we observed very edematized tissues, puncture was performed on the site of the pulsatile mass obtaining old venous blood and later of purulent chocolate appearance, firm epicardial-sternal adhesions were observed, active bleeding by 3 small perforations on the TSVD patch at the level of the anastomosis of the patch with the prosthetic ring. Complete resection of the pseudoaneurysm capsule was performed, simple stitches were given for closure of TSVD patch perforations and a bovine pericardium patch (Peri-Guard)® was placed with continuous suture on the old patch, the mediastinal cavity was cleaned, due to high suspicion of mediastinitis it was decided to perform the Molina protocol, suspending irrigation 3 days after the surgical procedure and removing probes 6 days after surgery. Rest of the hospital stay was carried out without eventualities.

Wound cultures reported Serratia marcences sensitive to ciprofloxacin and meropenem, complying with a 42-day schedule. Attending a control consultation in 1 and 6 months in adequate conditions.

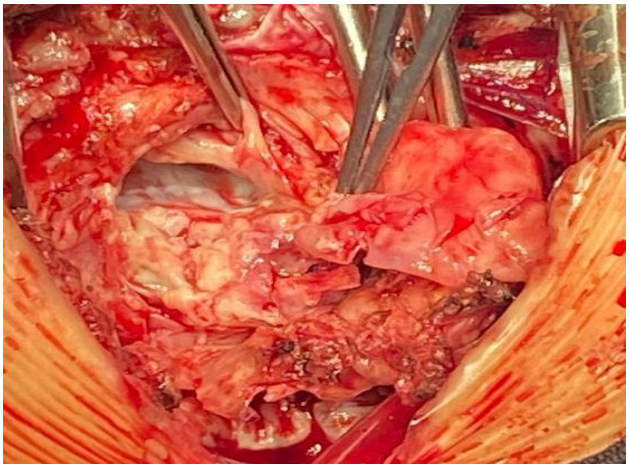

Figure 1: Opening of mycotic pseudoaneurysm.

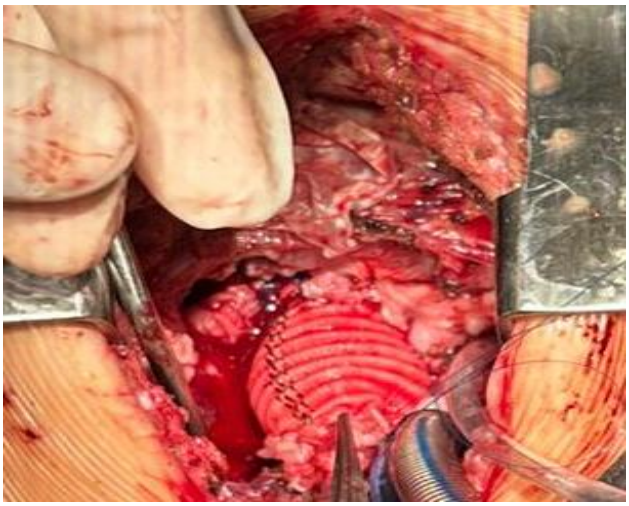

Figure 2: Ascending aorta replacement with 18 mm Dacron graft.

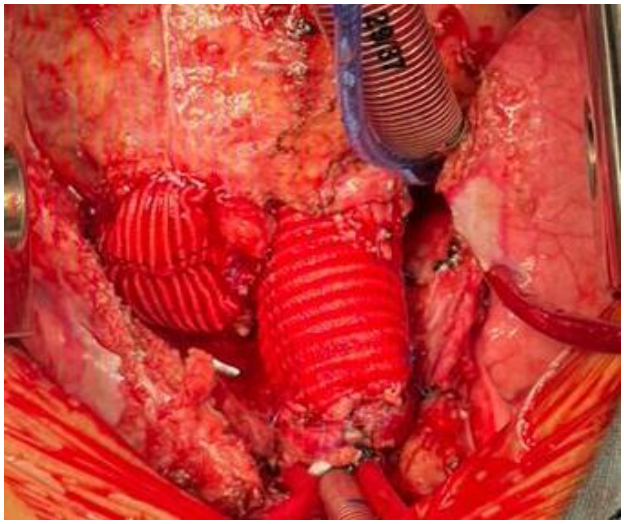

Figure 3: Interposition of Dacron graft in the pulmonary artery trunk at the level of the RVVT.

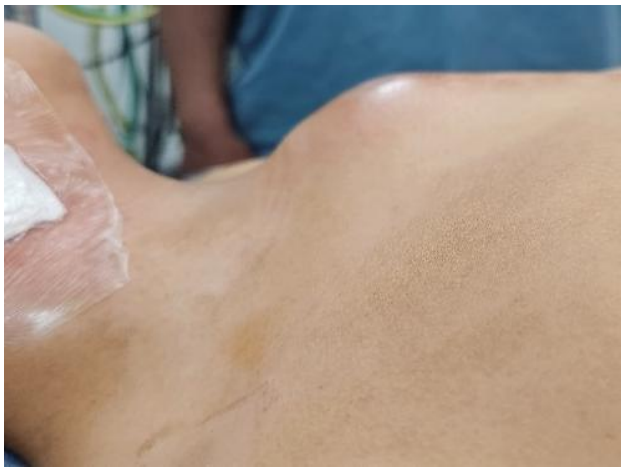

Figure 4: Sternal pulsatile mass.

DISCUSSION

Resection of the pseudoaneurysm is a high-risk procedure that can predispose to the formation or release of thrombi organized within it. If the pseudoaneurysm is located on the left side, the embolism will be systemic, while pseudoaneurysms on the right side of the heart will give rise to pulmonary embolism.

In the case described, I present one of the most serious complications of a pseudoaneurysm, the presence of pulmonary and systemic embolization, this may be due to the fact that during surgery fragments of infected tissue can be released that act as septic emboli causing pulmonary or systemic embolisms.[8] In addition, vascular reconstruction with synthetic or biological sutures and patches can generate areas of turbulence in the blood flow that favor the activation of the coagulation cascade and thrombus formation at the puncture site. We must consider that during cardiac surgery, a transient state of hypercoagulability is induced, which increases the risk of

thrombosis and embolization, together with persistent inflammation due to endocarditis, presenting a higher risk of thromboembolism, which in this case was fatal.[9]

Surgery for a pseudoaneurysm should be carefully planned. Among the crucial aspects to take into account, we find: access route to the pseudoaneurysm, cannulation strategy and need for hypothermic cardiocirculatory arrest. A preoperative imaging study is necessary to delineate the relationship between the aorta, pseudoaneurysm, heart, and sternum.[10] In our case, the echocardiogram did not help us to identify the distance of the pseudoaneurysm from the sternum, so we opted to perform resternotomy using an oscillating saw, femoral cannulation, and moderate systemic hypothermia.

CONCLUSION

Pseudoaneurysm in IE in children operated on for congenital heart disease is a dangerous source of pulmonary and systemic embolization. Early diagnosis through imaging studies and blood cultures, together with aggressive antibiotic treatment and surgery, are key to reducing mortality and preventing serious complications.

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