

Video-thoracoscopy closure of coronary artery fistula: case report

Videotoroscopia para fechamento de fístula coronário-pulmonar: relato de caso

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Abstract

The coronary artery fistulas (CAF) are rare and often found occasionally. The conventional treatment can be made by surgical closure with median thoracotomy or with embolization by catheterization. We describe an innovative technique to ligation of CAF, on a full endoscopy. Women, 45 years with symptomatic fistula between coronary artery anterior descending and trunk artery pulmonary, which took thoracoscopy left, pericardiotomy and ligation of fistula with metal clip without thoracotomy. There were no complications, stayed 24 hours in the ICU and was in hospital 4 days. The technique was effective, allows easy surgical accessibility and quick post-operative recovery.

Descriptors: Arterio-arterial fistula, surgery. Pulmonary artery, pathology. Coronary vessel anomalies, surgery. Video-assisted surgery.

Resumo

As fístulas da artéria coronária (FAC) são raras e, muitas vezes, achado ocasional. O tratamento convencional é realizado por fechamento cirúrgico com toracotomia mediana ou por meio de embolização por procedimento hemodinâmico. Descrevemos uma técnica inovadora para ligadura da FAC de forma totalmente endoscópica. Mulher, 45 anos, com fístula sintomática entre artéria coronária descendente anterior e tronco de artéria pulmonar onde se realizou toracosopia esquerda, pericardiotomia e ligadura do pertuito com clipe metálico. Não houve intercorrência, a paciente permaneceu 24 horas na UTI e teve alta hospitalar no 4º dia. A técnica foi efetiva, permitiu fácil acessibilidade cirúrgica e rápida recuperação pós-operatória.

Descritores: Fístula artério-arterial, cirurgia. Artéria pulmonar, patologia. Anomalias dos vasos coronários, cirurgia. Cirurgia vídeo-assistida.

INTRODUCTION

The coronary artery fistula (CAF) is defined as an abnormal communication of the coronary artery blood with a heart chamber, great vessels, or another capillary structure, avoiding the myocardial capillaries. It is a rare occurrence and corresponds to 0.2%-0.4% of the congenital heart defects [1].

It is generally congenital, representing the persistence of the embryonic and sinusoidal intertrabecular space [2]. They can be acquired when the cause is by coronary atherosclerosis, Takayasu arteritides or trauma [2].

Among the coronary fistulas, approximately 20% of them drain into the pulmonary artery; the rest will drain into other chambers and, in some cases, even into the coronary sinus. The fistulas with bigger *shunt* are related

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to symptoms and usually must be treated surgically or by hemodynamic embolization with disposable balloon. Sternotomy and open heart ligation represent a more common option, sometimes using extracorporeal circulation support in more complex fistulous tracts [1,3,4].

The first case of CAF was reported by Krause, in 1865. Bjork and Crafoord described the first successful surgical correction of CAF in 1947, and the first case of transcatheter closure was performed in 1983 [2,3].

Heart surgery allows the correction of most of the coronary anomalies, but thoracotomy and extracorporeal circulation (ECC) are associated to a higher number of preoperative and postoperative complications. Less invasive techniques of definitive surgical treatment may associate to a better clinical result with low morbidity.

The present article aims to describe a technique for CAF ligation by a totally endoscopic procedure using video-thoracoscopy and without ECC support.

CASE REPORT

Patient MJGR, female, 45 years, referred to the thoracic pain unit of our institution following a period of months presenting angina and dyspnea, electrocardiogram with right branch conduction disturbance, normal echocardiogram and inconclusive ergometric test. Due to a long and atypical history of angina, the patient was submitted to diagnostic catheterism that evidenced coronary arteries with normal angiographic aspect and presence of fistula involving the descending anterior coronary artery and pulmonary artery truncus, of caliber compared to the left coronary artery and important sequestrum by the pulmonary artery.

It was indicated closure of fistula by embolization, but it was discarded due to the difficult endoscopic access. The experience of the surgical team with video-thoracoscopy allowed programming the procedure without thoracotomy using only three small openings with 2 cm of width for the insertion of the instruments.

The procedure was performed in September 2005, after approval of the Ethics Committee of the hospital and signing of Approval Term by patient. Using general anesthesia and intubation with selective cannula it was performed a left lateral thoracoscopy. There were inserted the trocateres (in a 3-times access) for surgical instrumentation and insertion of the camera (thoracoscopy). Through thoracoscopy there were dissected the pleura and the mediastinum, until access to base vessels was possible. The pericardium was opened at the level of the pulmonary artery truncus and the coronary fistula was individualized. The ligation of CAF was performed by direct use of metallic clips, using three different charges of metallic clips (liga-clip 300), followed by thoracic cavity review and closure of pericardium and access openings (Figure 1).



Fig. 1 – Panoramic view of the coronary-pulmonary fistula with metal clips over the pulmonary artery

The time for the procedure was 40 minutes, occurring with no interruptions. The patient was extubated while still in the surgical room. In the postoperative, the patient required a minimum amount of analgesics, not reporting thoracic discomfort and remaining in the intensive care unit (ICU) for 24 hours. There was no need for hemoderivative reposition. The patient was signed out of hospital in the fourth day of postoperative. Returning a week later for follow-up, the patient presented excellent evolution, not reporting any pain and expressing appreciation for having undergone the surgical procedure. After two years of follow-up, there is no report of cardiovascular symptoms. The postoperative coronariography confirmed the expected surgical result, presented in Figure 2.

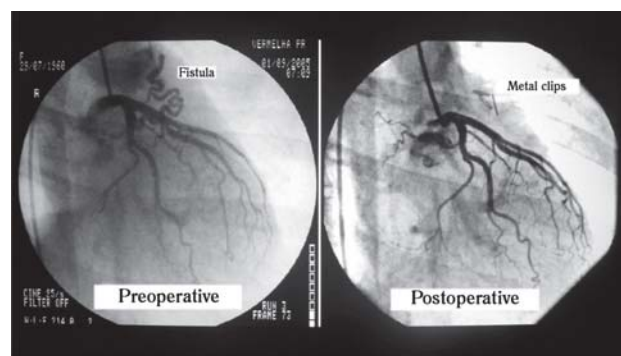


Fig. 2 – Preoperative and postoperative coronariography of coronary-pulmonary fistula. A: involving anterior descending coronary artery and pulmonary artery; B: result after clip-ligation of the fistula

DISCUSSION

The clinical presentation of CAF depends on the gravity of the left-right *shunt*. The majority of adult patients is

asymptomatic compared to the pediatric cases that present higher frequency of symptoms. The clinical chart may include fatigue, dyspnea, orthopnea, angina, endocarditis, arrhythmias, myocardial ischemia or acute myocardial infarction (AMI). Myocardial ischemia occurs due to the decrease of blood flow directed to the fistula and it has been reported in patients with coronary fistula with no evidence of coronary atherosclerosis. If there is a great *shunt*, serious complications may occur such as pulmonary hypertension and congestive heart failure, as well as rupture, thrombosis or arterial aneurism [3].

In a review of 174 patients with CAF complications, 12% presented congestive heart failure, 4% AMI, 3% endocarditis and 6% death. The main referrals for surgical correction are the symptomatic cases, especially heart failure or myocardial ischemia. A previous criterion for the operation is in the presence of *shunt* (pulmonary blood/systemic blood - Qp/Qs >2.0) and hemodynamic changes with heart insufficiency symptoms [1,3].

Only 36% of CAF are capable of being closed with transcatheter embolization. Furthermore, complications associated to this technique include T wave inversion in the electrocardiogram, increase in the level of creatinine, pulmonary artery embolism or arrhythmias [4]. The postoperative result is satisfactory. The prognostic following a successful closure of CAF is excellent.

The results of open heart surgery are successful in the great majority of cases and even sternotomy with or without support of ECC is associated to positive results in the postoperative. Among the domestic works, we have found the articles of Groppo et al. [5], in 2002, that reported the experience of three operated cases; two of them supported by ECC, with no reports of complications. Toledo et al. [6], in 2007, described five cases of CAF operated with ECC support, using the pulmonary arteriotomy technique and the anomalous ostium closure technique. In the conclusion, they considered the surgery as first choice in the treatment of CAF, since the surgical risks are low compared to the complications related to the anomaly [6].

Our report uses a minimally invasive technique and performs the ligation of CAF by thoracoscopy, without ECC support and with low operative risk. The coronary-pulmonary fistula (20% of CAF) found in this case facilitates the use of the technique shown, for it presents a lateral tract to the pulmonary artery and its clip-ligation could be performed with safety through a small incision in the pericardium, close to the base vessels. In cases of more

complex fistulous tracts, the minimally invasive technique will probably not offer the same results.

We consider that the procedure, in selected cases, can be carried out with safety, the method is simple, but experience with thoracoscopy is a must. Also the ideal instruments for the endoscopic surgery are essential. In a review of the present literature we have not come across a similar report.

CONCLUSION

The ligation of coronary fistula by thoracoscopy seems to be a break-through. The surgical technique took place with no complications, presenting easy surgical access and fast postoperative recovery with no interurrences. In selected cases and with larger clinical experience, it could be referred as an option to the present array of therapies.

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