Case Report

Pulmonary thromboendarterectomy in an 80-year-old patient*

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Pulmonary hypertension secondary to thromboembolism is a serious and debilitating disease. It occurs in approximately 0.5-1.0% of patients who survive an episode of acute thromboembolism. This is the first reported case of successful thromboendarterectomy performed in an elderly patient in Brazil. The patient, an 80-year-old man, presented favorable postoperative evolution. The authors believe this surgical procedure is a viable option for treatment of this type of pulmonary hypertension even in patients of advanced age, providing that there are no comorbidities.

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INTRODUCTION

Acute pulmonary thromboembolism (PTE) is frequently seen in clinical practice and the presentation is generally severe. The condition can be defined as the migration of one or more blood clots from the venous system into the pulmonary vascular bed[1]. Due to the positive results seen from new therapeutic options tested over the last 20 years, there has been considerable interest in the study of the circulatory system and, in particular, the diverse forms of embolisms caused by thrombi, including chronic thromboembolic pulmonary hypertension (CTEPH). The CTEPH condition presents as pulmonary hypertension for at least 3 months following at least 1 episode of pulmonary embolism, although other causes of pulmonary hypertension should be ruled out before making a diagnosis of CTEPH. Secondary pulmonary hypertension is seen in approximately 0.5-1.5% of PTE cases[1]. For patients with CTEPH, there are currently 2 forms of surgical treatment available: a) lung transplant (indicated in cases in which the thrombi are located in the distal portion of the pulmonary blood vessels) and b) thromboendarterectomy (the procedure of choice when the vascular obstruction is lobar or segmental – i.e. proximal to the pulmonary artery).

Due to the high complexity of the procedure, thromboendarterectomy is performed in only a few reference centers. Nevertheless, it has been used with ever-increasing frequency in the treatment of chronic PTE. Herein, we report the first Brazilian case of an octogenarian submitted to successful thromboendarterectomy.

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CASE REPORT

An 80-year-old male, farmer, reported a sudden episode of dyspnea concomitant with pain and edema in his left leg for 4 years. On that occasion, the patient was diagnosed with deep venous thrombosis and pulmonary embolism. He subsequently developed progressive dyspnea upon exertion that evolved rapidly, classified according to the New York Heart Association (NYHA) system as NYHA functional class III. The initial clinical evaluation revealed hyperphonesis of the second heart sound, discrete edema of the lower limbs, and at-rest arterial oxygen saturation of 92% (pulse oximetry).

In the chest X-ray (Fig. 1), we observed bilateral hilar enlargement resulting from the increased interlobar component of the pulmonary arteries, as well as prominence of the pulmonary artery. Computed angiotomography of the chest revealed evidence compatible with pulmonary hypertension secondary to chronic pulmonary embolism. Notably, the pulmonary artery trunk was dilated to a diameter of 35 mm (normal, 29 mm), and the diameter of the right interlobar artery had increased to 20 mm (normal, 16 mm). In addition, an eccentric thrombus was seen in the right pulmonary artery and its interlobar branch (Fig. 2). In all, in the analysis of the parenchyma, the profile was compatible with bilateral mosaic perfusion.

Abbreviations used in this paper:
PTE – Pulmonary thromboembolism
CTEPH – Chronic thromboembolic pulmonary hypertension
NYHA – New York Heart Association

Pulmonary arteriography (Fig. 3) showed bilateral thrombi and pulmonary artery systolic pressure of 75 mmHg. The patient was submitted to thromboendarterectomy by median sternotomy under deep hypothermia. Cardiorespiratory function was halted for 59 minutes, and extracorporeal circulation time was 140 minutes. The patient subsequently developed hemodynamic instability and reperfusion injury. On postoperative day 10, a

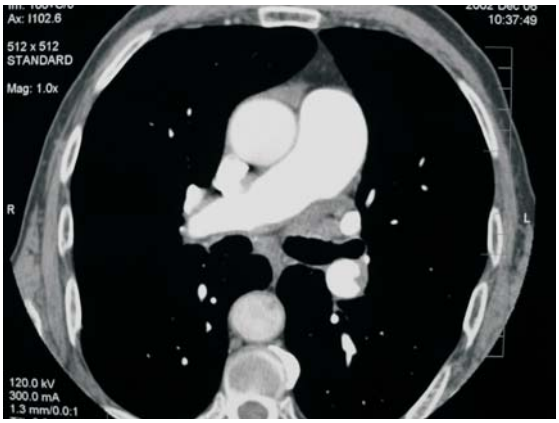

Figure 2 – Computed angiotomography of the lungs. Dilation of the pulmonary artery trunk. Eccentric thrombus in the right pulmonary artery and in the left interlobar artery.

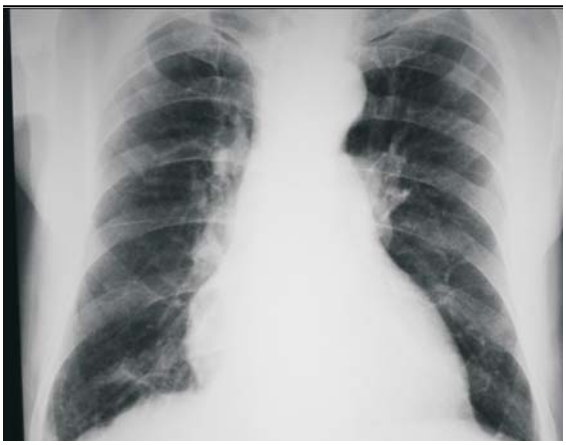

Figure 1 – Chest X-ray. Prominent medial pulmonary artery. Bilateral hilar enlargement.

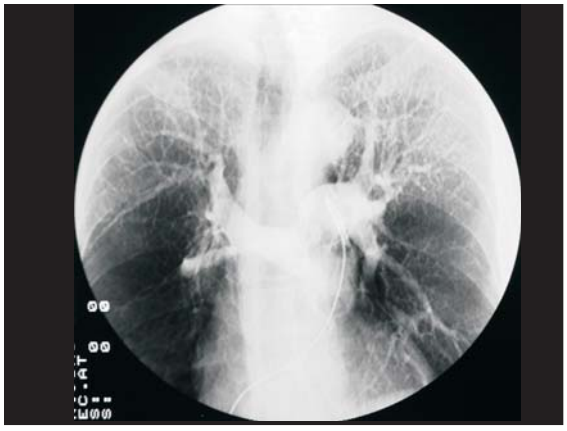

Figure 3 – Pulmonary arteriography. Bilateral proximal thrombi.

tracheostomy was performed, and the patient was maintained on mechanical ventilation until post-thromboendarterectomy day 16. The patient was discharged after a marked improvement in symptoms (to NYHA functional class I). Evaluated 6 months after the procedure, he presented dyspnea only upon maximum exertion, arterial oxygen saturation of 95 mmHg, and lower pulmonary artery systolic pressure (estimated at 30 mmHg by echocardiogram).

DISCUSSION

The natural history of pulmonary thromboembolism remains less than clear. However, recent studies suggest that the proportion of patients that develop chronic pulmonary thromboembolism is greater than previously thought, up to 1.5% of patients who survive the acute event. The elderly are at higher risk for developing venous thrombosis or pulmonary embolism, and the risk for mortality from thromboembolic phenomena is higher in this population. Using tomography, we can observe some characteristics that allow us to distinguish between acute thromboembolic phenomenon and CTEPH. Mosaic perfusion (regions of significant transparency interspersed with areas of greater radiological opacity), eccentric thrombi, and enlargement of the pulmonary artery trunk (suggestive of hypertension) are, taken together, classic characteristics of CTEPH.

It is possible that new tomography techniques such as multislice spiral computed tomography may soon replace pulmonary arteriography as the reference of choice in diagnosing all forms of PTE, as well as in vascular staging of CTEPH patients who are candidates for surgical intervention in the form of thromboendarterectomy[1].

Pulmonary arteriography is the definitive exam used in the diagnosis of PTE[2]. Best results are obtained when the catheter into which the contrast medium will be introduced is inserted into the right or left pulmonary artery. In addition to providing good visual access to the ipsilateral pulmonary vasculature, this technique allows the measurement of pulmonary artery pressure to be proportioned.

In PTE, the characteristic alteration, in terms of arteriography, is the lack of well-defined intraluminal flow. In CTEPH, ill-defined vascular distribution of the contrast medium is seen, reflecting the differing and complex patterns of organization and partial recanalization of the thrombi[3].

Arteriography is an invasive procedure and therefore not without risk. In addition, the technique is not widely available, which greatly limits it use. In a Duke University study of 1350 patients[4] submitted to pulmonary arteriography, 3 deaths occurred as a direct result of the procedure (0.2%). This method continues to be the reference for the diagnosis of acute and chronic thromboembolic episodes of any kind.

In CTEPH patients, thromboendarterectomy is indicated principally when there is significant functional impairment and pulmonary hypertension resulting from proximal thrombi that are surgically accessible. Despite the reduction in perioperative mortality (from 22% to approximately 8% in some studies), the procedure still presents significant risk for morbidity and mortality, and is contraindicated in patients of advanced age or presenting comorbidities. The outcome achieved in this case, in which there were immediate postoperative complications (possible for patients in any age bracket), suggests that elderly patients with pulmonary hypertension secondary to pulmonary thromboembolism can be evaluated as potential candidates for thromboendarterectomy.

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