



# Acute pulmonary embolism due to coils after embolization of pelvic varices. Report of cases and review of the literature

## Embolia pulmonar aguda por espirales (*coils*) después de embolización de várices pélvicas. Presentación de casos y revisión de la literatura

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### Palabras clave (DeCS)

Várices  
Embolización terapéutica  
Embolia pulmonar  
Insuficiencia venosa

### Resumen

La embolización con espirales metálicas (*coils*) es una terapia con excelentes resultados para pacientes con síndrome de congestión pélvica, con dolor pélvico persistente o recurrente, y con baja tasa de complicaciones. Una de las complicaciones más graves asociadas a estos procedimientos es la embolia pulmonar no trombótica, la cual es poco frecuente, pero a su vez se ve relacionada con formación de coágulos, infección, infarto pulmonar, erosión bronquial e incluso la muerte. La mayoría de los pacientes son asintomáticos y menos del 6% son sintomáticos; la disnea y las palpitaciones son los síntomas más frecuentes. La modalidad diagnóstica de elección es la tomografía axial computarizada con medio de contraste y la modalidad de tratamiento preferida sigue siendo la recuperación del dispositivo por vía endovascular. En este artículo se presentan dos casos de embolia pulmonar aguda no trombótica asociada a complicación de embolización de varices pélvicas en pacientes con síndrome de congestión pélvica.

### Summary

Coil embolization is a therapy with excellent results for patients with pelvic congestion syndrome with persistent or recurrent pelvic pain, and with low complication rate. One of the most serious problems associated with these procedures is non-thrombotic pulmonary embolism, which is rare but is associated with clot formation, infection, pulmonary infarction, bronchial erosion and even death. Most patients are asymptomatic, and less than 6 % of patients are symptomatic, with dyspnea and palpitations being the most frequently presented symptoms. The diagnostic modality of choice is contrast enhanced computed axial tomography and the preferred treatment modality continues to be device retrieval via the endovascular route. In this article we present 2 cases of associated acute non-thrombotic pulmonary embolism associated with complication of pelvic variceal embolization in patients with pelvic congestion syndrome.

### Introduction

Coil embolization (CE) is a therapy with excellent results and low complication rate for patients with pelvic congestion syndrome with persistent or recurrent pelvic pain. However, rarely the coils can migrate to the pulmonary vasculature in an acute course or up to several years after the procedure. In the literature, there are few reviews of the subject and articles as case reports in which a minimal proportion of complications arising from embolization coil migration are described. Possible complications include clot formation, infection, pulmonary infarction, bronchial erosion and even death. However, less than 6% of patients are symptomatic. The vast

majority of iatrogenic foreign bodies can be retrieved by endovascular devices; although a minority will require surgical resection.

### Case report

#### Case 1

A 56-year-old female patient with a history of multiple reticular varicose veins and telangiectasias in thighs and legs. Doppler ultrasound of lower limbs showed incompetence of pelvic veins dependent on the left hypogastric vein, so she underwent embolization. Two months after the endovascular procedure, she con-

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sulted the emergency department for dyspnea on small and moderate exertion, with no other associated symptoms. On evaluation, the heart rate was 104 bpm, arterial oxygen saturation of 90%, respiratory rate of 28 rpm, blood pressure of 130/90 mm Hg and scarce subcostal retractions with no other positive findings on physical examination. The imaging evaluation began with a posteroanterior and lateral chest X-ray, which showed a radiopaque spiral image projected in the right pulmonary hilum, corresponding to migration of the embolization material (figure 1). Subsequently, a chest angiography was performed, confirming the presence of metallic spirals in the proximal aspect of the segmental artery for the right lower lobe, without associated changes in the parenchyma (Figure 2). The patient was evaluated by cardiovascular surgery who, given the risks involved in extraction surgery, opted for medical management. Due to clinical improvement and control imaging, the patient was discharged.

### Case 2

36-year-old patient with a history of pelvic varicose veins treated with gonadal phlebography on two occasions, in 2019 and 2021, in which coils were implanted. She consults for clinical symptoms of two months of evolution consisting of palpitations sometimes radiating to the neck, without other associated symptoms. She was evaluated by internal medicine, finding on physical examination a heart rate of 76 bpm, respiratory rate of 18 rpm, blood pressure of 110/80 mm Hg, temperature of 36 °C and normal cardiopulmonary auscultation. An electrocardiogram was performed with no relevant alterations and the patient was discharged. One month later, she consulted again for right costal pain and a chest angiotomography was performed, showing metallic spirals in the segmental artery of the right lower lobe, without associated parenchymal changes (Figure 3). The patient was evaluated by cardiovascular surgery who opted for medical management. After clinical improvement and control imaging, they decided to discharge the patient.

### Discussion

Non-thrombotic pulmonary embolism is characterized by partial or complete occlusion of the pulmonary vasculature secondary, as the name implies, to an etiology other than thrombosis. Possible causes include tumor thrombosis, thrombosis secondary to infectious agents, and embolism of different substances such as fat, amniotic fluid, gases and foreign bodies. In 1993, Moriel published the first clinical case of asymptomatic pulmonary migration of a coil after pelvic embolization (1, 2).

Coil embolization is a therapy with excellent results and low complication rate for symptomatic patients with persistent or recurrent varicoceles. Rarely, coils can migrate to the pulmonary vasculature. In the literature there are few reviews of the subject and case report articles in which a minimal proportion of complications from coil migration are described. Possible complications include clot formation, infection, pulmonary infarction, bronchial erosion and even death; less than 6% of patients are symptomatic. The vast majority of iatrogenic foreign bodies can be retrieved by the use of endovascular devices, although a minority will require surgical resection. Another aspect to be taken into account is that coils have been described that migrate up to 11 years after implantation (3, 5).

Diagnosis is challenging due to the non-specificity of symptoms and laboratory and radiological findings. Therefore, identification of a possible underlying disease and clinical history are important in establishing the differential diagnosis. Chest radiography may show a linear density in an unusual anatomic location, but CT is the gold standard for confirming the position of the foreign body, the pattern presented depending on the type of embolization. Small scattered metallic radiopaque densities, centrolobulillar ground-glass opacities, and miliary micronodules and nodules, as well as fibrotic or consolidation opacities, may indicate nonthrombotic pulmonary embolism (1, 4).

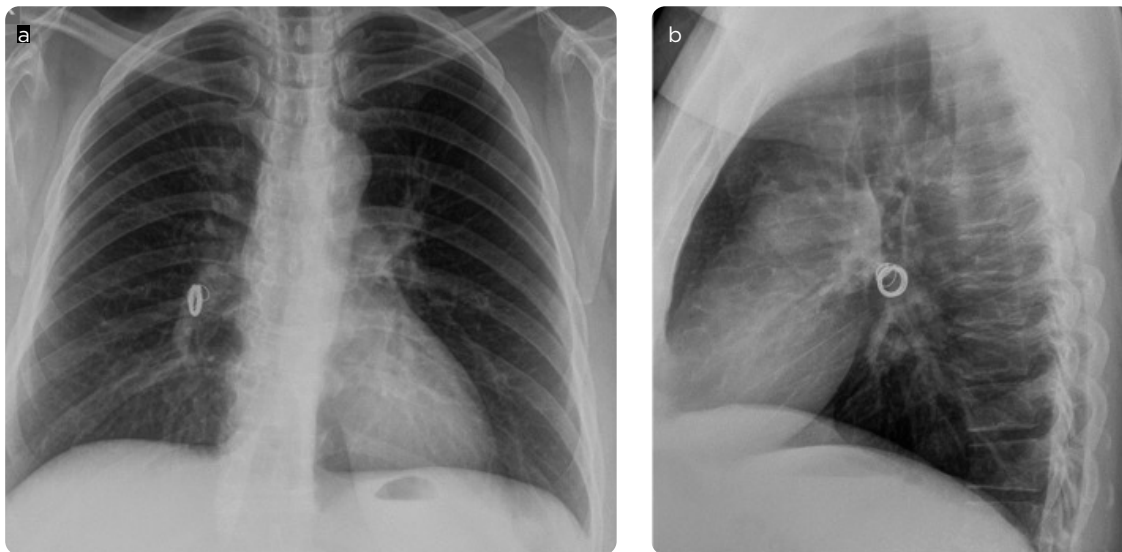


Figure 1. Posteroanterior and lateral chest X-ray: radio-opaque spiral image projected in the right pulmonary hilum, corresponding to migration of the embolization material.

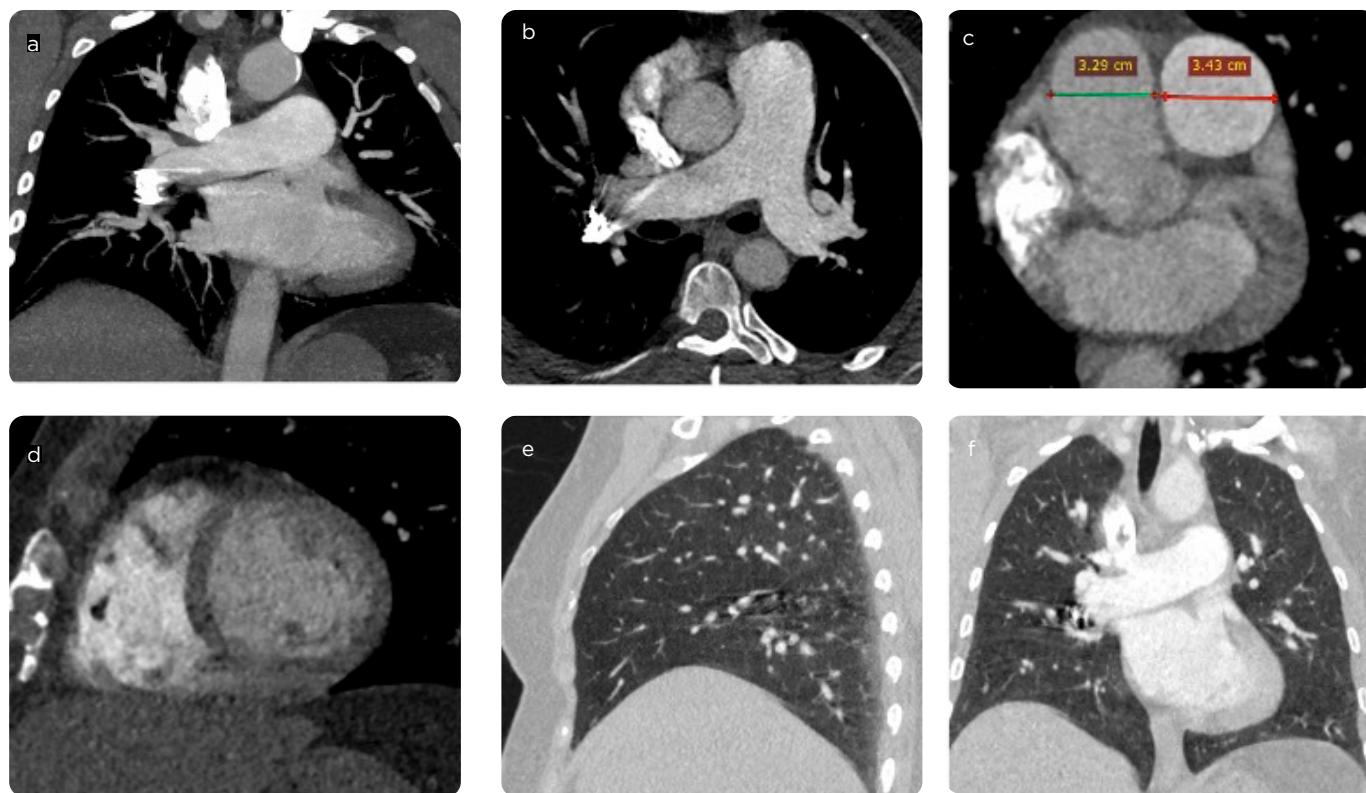


Figure 2. Chest angiotomography. a and b) Coronal and axial slices with maximum intensity reconstructions showing metallic spiral located in the artery for the right lower lobe. c and d) Axial and sagittal slices of the heart, where signs of pressure overload in right cavities and increase in the diameter of the pulmonary artery are ruled out. e and f) Sagittal and coronal slices in pulmonary window, with no evidence of parenchymal compromise.

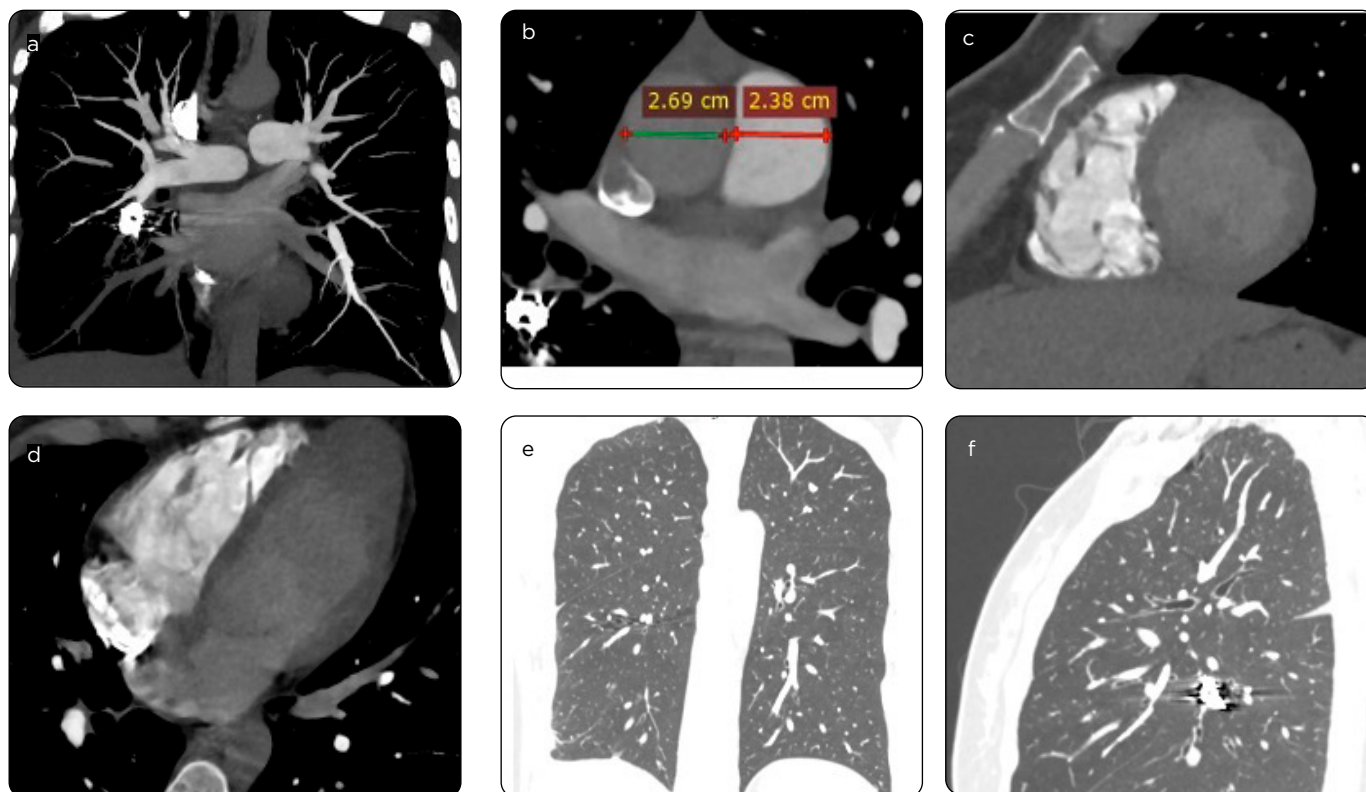


Figure 3. Chest angiotomography. a and b) Coronal and axial views, maximum intensity reconstructions, metallic coils located in right inferior segmental artery. c and d) Sagittal and axial views of the heart, no signs of pressure overload in right cavities or increase in size of the pulmonary artery. e and f) Coronal and sagittal views in pulmonary parenchyma window without evidence of parenchymal compromise.

Most cases documented in the literature are asymptomatic and do not require additional endovascular or open treatment. If the patient develops persistent symptoms without improvement after medical treatment with systemic anticoagulation, such as the case reported by Shashi, et al. (2), endovascular removal of the coil should be the first-line approach and should be considered immediately before the foreign body becomes firmly attached to the vascular wall. This approach could be performed using the same previous access, except when the access has not yet been removed (3).

Among the recommendations put forward to reduce the risk of embolization of the material, it is indicated that the diameter of the coil should be larger than that of the venous structure, if possible between 20% and 50% larger than that of the target vein. In addition, coils with a stronger radial force should be used to counteract the greater elasticity between the vessel wall and the coils, since the pelvic veins have a large capacity and are therefore stretched in the erect position. On the other hand, it is very important to consider that Valsalva maneuvers or manipulation of the pelvic structures are risk factors that the surgeon must consider in order to avoid this type of complications (1, 2).

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