

## Embolization of a PORT-A-CATH device in the main pulmonary artery and its percutaneous extraction in a patient with pinch-off syndrome

### “Pinch-off” sendromlu bir hastada PORT-A-CATH aletinin ana pulmoner artere embolizasyonu ve perkütan yöntem ile çıkarılması

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**Summary** – Totally implanted port devices play an important role in acute and chronic medical care of patients with various conditions and are widely used for infusion of fluids, medications, blood or other blood products, and for monitoring hemodynamic parameters. Embolization of a part of port devices is a rare but potentially serious complication of port catheter placement. We report distal embolization of a catheter fragment of a PORT-A-CATH device into the main pulmonary artery and right ventricle and its successful percutaneous retrieval in a patient with metastatic lung cancer, who was also found to have thoracic inlet syndrome or pinch-off syndrome.

**Özet** – Tamamen vücut içerisine yerleştirilen port aletleri hem akut hem de kronik olarak çeşitli sorunları olan hastalarda, sıvı verilmesi, kan ve diğer kan ürünlerinin verilmesi ve hemodinamik parametrelerin izlenmesi için oldukça yaygın bir şekilde kullanılmaktadır. Port aletinin parçalarının embolize olması narin görülen, ancak ciddi komplikasyonlara yol açabilecek bir durumdur. Bu yazıda, metastatik akciğer kanseri olan bir hastada, “pinch-off” sendromu sonucu PORT-A-CATH aletinin bir parçasının ana pulmoner arter ve sağ ventriküle embolize oluşu ve embolize parçanın perkütan yolla başarılı olarak çıkarılması sunuldu.

Totally implanted port devices play an important role in the modern acute and chronic medical care of patients with various conditions and are widely used for infusion of fluids, medications, blood or other blood products, and for monitoring hemodynamic parameters. Embolization of a part of port devices is a rare but potentially serious complication of port catheter placement and port device therapy. We report distal embolization of a component of a PORT-A-CATH device into the main pulmonary artery and right ventricle and its successful percutaneous retrieval in a patient with metastatic lung cancer, who was also found to have thoracic inlet syndrome or pinch-off syndrome.

#### CASE REPORT

A 56-year-old male with metastatic lung cancer and an 8-month history of PORT-A-CATH device placement on the right side of his chest for chemotherapy

presented to the oncology clinic earlier for his routine clinical follow-up and blood work. Although he reported no symptoms, catheter malfunction was detected and an anteroposterior chest X-ray was obtained, which revealed embolization of the catheter fragment into the main PA and RV (Fig. 1a). He was referred to interventional cardiology for percutaneous removal of the embolized catheter fragment. The patient was taken to the cardiac catheterization laboratory and via the right femoral vein a 5-Fr multipurpose catheter was advanced into the distal portion of the main PA. Using a 25-mm GooseNeck snare, the distal portion of the embolized catheter fragment was captured and pulled into the right femoral vein and externalized (Fig. 1b-d). The following morning, elective removal of the remaining port reservoir was performed and the patient had uneventful recovery.

#### Abbreviations:

PA Pulmonary artery  
RV Right ventricle

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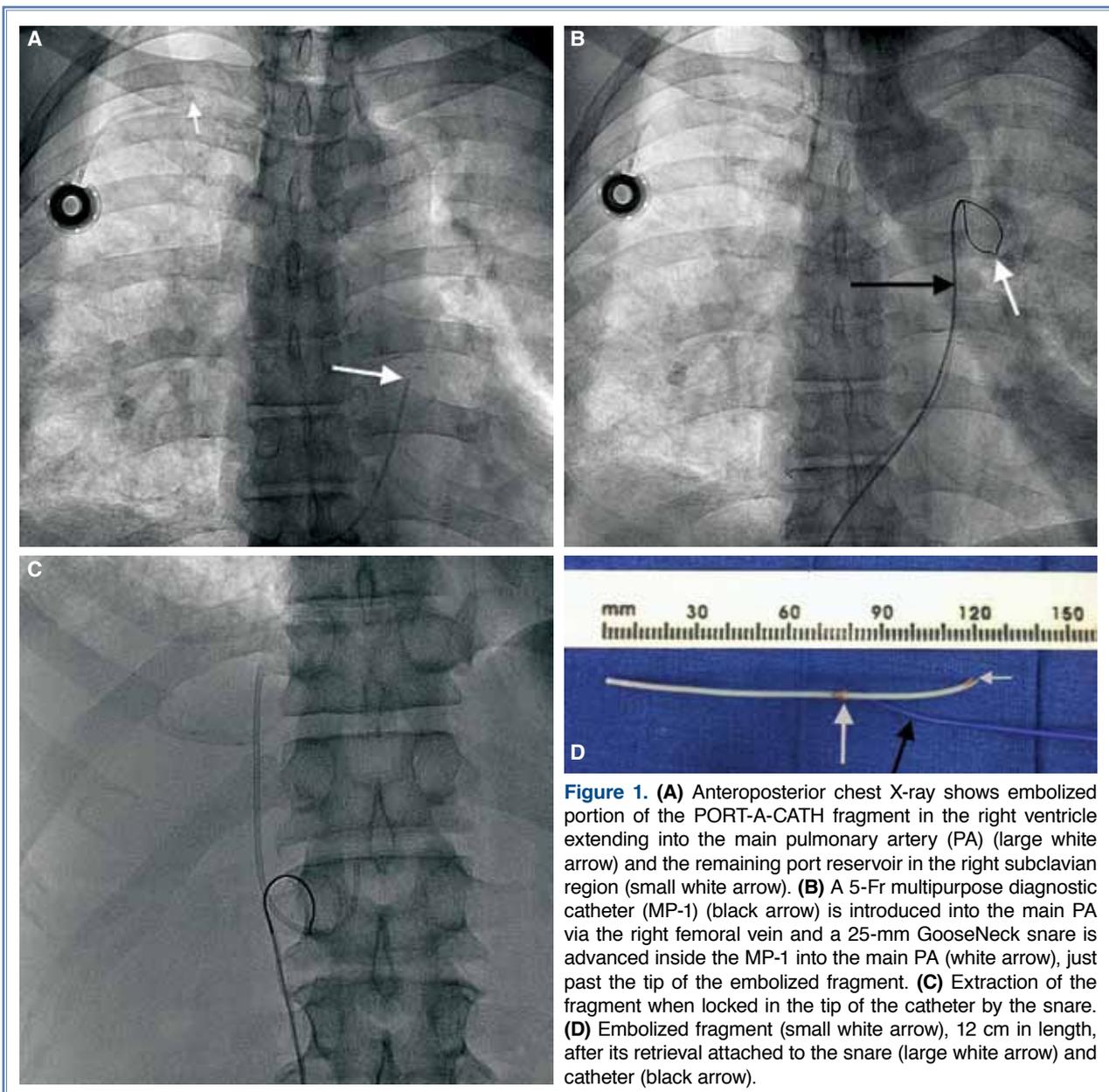
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## DISCUSSION

Intravascular embolization of catheter fragments, albeit a relatively uncommon event, can be associated with potentially serious complications.<sup>[1]</sup> Totally implantable port devices are usually implanted in patients with chronic medical conditions such as cancer for long-term chemotherapy infusions, serial blood draws, and to make the treatment more comfortable and convenient. PORT-A-CATH is a totally implantable venous access system. It is composed of a lightweight, durable titanium portal reservoir that is designed for patient comfort and ease of portal palpation

and a polyurethane catheter which is kink-resistant, biocompatible and radiopaque. The catheter portion is engineered to minimize outer/inner diameter ratio and maximize flow rate.

These catheters are implanted in the subclavian vein, a location that carries a particular catheter injury risk, exposing them to greater total repetitive traumatic injury and risk for fragmentation. The most common location of the catheter fracture is the infraclavicular region secondary to the so-called pinch-off syndrome or thoracic inlet syndrome. Previous data suggest that material fatigue may play a key role in catheter fracture.<sup>[2]</sup>



**Figure 1.** (A) Anteroposterior chest X-ray shows embolized portion of the PORT-A-CATH fragment in the right ventricle extending into the main pulmonary artery (PA) (large white arrow) and the remaining port reservoir in the right subclavian region (small white arrow). (B) A 5-Fr multipurpose diagnostic catheter (MP-1) (black arrow) is introduced into the main PA via the right femoral vein and a 25-mm GooseNeck snare is advanced inside the MP-1 into the main PA (white arrow), just past the tip of the embolized fragment. (C) Extraction of the fragment when locked in the tip of the catheter by the snare. (D) Embolized fragment (small white arrow), 12 cm in length, after its retrieval attached to the snare (large white arrow) and catheter (black arrow).

The clinical presentation of catheter embolization varies considerably. While most of the patients remain asymptomatic, they may occasionally present with palpitations, cough, dyspnea, thoracic pain, or local swelling and erythema. In most cases, the first sign of catheter embolization is catheter malfunction. In such cases, fluid injection or blood aspiration becomes impossible or may be associated with local pain and subcutaneous swelling at the injection site. Thus, venous catheters implanted via the subclavian vein should be checked regularly for this complication, especially when there are signs of catheter malfunction. When the signs of infraclavicular catheter compression are seen, especially catheter narrowing, the catheter should be explanted.<sup>[3]</sup> There have been a few reports in the literature suggesting that the pinch-off syndrome may be prevented by insertion of the catheters more laterally.<sup>[4,5]</sup> Many electrophysiologists have abandoned subclavian electrode introduction and favor use of the extrathoracic portion of the junction of the subclavian/axillary vein to avoid electrode crush injury. This syndrome can also be prevented by using the internal jugular vein.<sup>[5]</sup>

If the signs of catheter damage are suspected at follow-up, a chest radiograph should be obtained to evaluate and, in case of catheter embolization, to locate the embolized catheter fragment. The most common locations for embolized catheter fragments are the PA, right atrium, and RV, in decreasing order of frequency.<sup>[6]</sup> In some cases, the catheter fragments are long enough to span several sites, as in this case, the most common combination involving the PA and RV. Mortality and morbidity after venous catheter embolization may depend on the location of embolized fragments. Most recent literature reports mortality after catheter embolization around 1.8%.<sup>[6]</sup>

Percutaneous extraction of embolized catheter fragments is usually achieved by a radiologist or interventional cardiologist using femoral venous access. This approach represents the gold standard for the removal of intravascular foreign bodies in the venous system.<sup>[7]</sup> It is recommended that the long-term risk of complications is sufficient to justify surgical extraction if all percutaneous techniques fail.

In conclusion, our case shows that intravascular catheter embolization can go undiagnosed for prolonged periods. The causes of intravascular catheter embolization include pinch-off syndrome, catheter injury during explantation, catheter disconnection, and catheter rupture. The majority of patients have no or modest symptoms, but some may develop substantial sequelae. The morbidity is highest when fragments lodge in the right heart, lower in the PA, and lowest in the vena cava or peripheral veins. Most cases of catheter embolization can be managed by percutaneous extraction.

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**Key words:** Catheterization, central venous/adverse effects; device removal; embolism/etiology; heart catheterization.

**Anahtar sözcükler:** Kateterizasyon, santral venöz/yan etki; cihaz çıkarma; embolizm/etyoloji; kalp kateterizasyonu.