

The accidental expansion of an inferior vena cava filter which migrated to the pulmonary artery

Pulmoner artere embolize olan vena cava inferior filtresinin yanlışlıkla açılması

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Deep venous thrombosis (DVT) may result in fatal pulmonary thromboembolism. Inferior vena cava filters are used to prevent thromboembolic events in patients who are not eligible for anticoagulant therapy. However, the major disadvantage of these filters is they migrate to the pulmonary artery. In this article, we report the case of a 68-year-old female patient for whom the inferior vena cava filter accidentally expanded after it migrated to the pulmonary artery.

Key words: Deep venous thrombosis; embolization; migration; vena cava inferior filter.

Deep venous thrombosis (DVT) is a common presenting complication of any post-surgical period that requires long bed rest. It can also be related to malignancy or other factors. Mostly DVT remains restricted to the calf veins. Deep venous thrombosis that extends to the femoral or iliac veins has a higher risk of pulmonary thromboembolism, (PTE) leading to morbidity and mortality.^[1-2] The first line of treatment for DVT is anticoagulation.^[3] Although it does not dissolve the thrombus, it prevents it from spreading and decreases the complication rate. When anticoagulation is contraindicated, inferior vena cava (IVC) filters are used to reduce the risk of PTE.^[4] The probability of the filter migrating to the heart is a rare, but it is a potentially fatal complication.^[5] In this report, we present a case of an IVC filter that migrated to the pulmonary artery and required surgical removal.

Derin ven trombozu (DVT), ölümcül pulmoner tromboembolizm ile sonuçlanabilir. Antikoagülan tedaviye uygun olmayan hastalarda vena cava inferior filtresi tromboembolik olayları önlemek için kullanılmaktadır. Ancak bu filtrelerin en büyük dezavantajı pulmoner artere yer değiştirmesidir. Bu yazıda, vena cava inferior filtresi pulmoner artere yer değiştirdikten sonra kazara açılan 68 yaşında bir kadın olgu sunuldu.

Anahtar sözcükler: Derin ven trombozu; embolizasyon; yer değiştirme; vena cava inferior filtresi.

CASE REPORT

A 68-year-old woman began receiving oral warfarin sodium as an anticoagulant for acute DVT four months prior to her admission to our hospital with ascites and abdominal discomfort. Physical examination along with laboratory and radiological exams revealed a diagnosis of ovarian adenocarcinoma, and surgical removal of the mass was indicated. The warfarin treatment was to be discontinued despite her history of DVT. Therefore, the Department of Cardiovascular Surgery was consulted for the preoperative prophylaxis. Doppler ultrasonography demonstrated subacute thrombus in the femoral and iliac veins. Therefore, intravenous heparin infusion was started to keep the activated coagulation time (ACT) between 150-200 seconds. Implantation of the IVC filter was planned preoperatively. On the day of the scheduled implantation, the patient was taken to the catheterization room, and the IVC was catheterized



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through the right internal jugular vein. The filter was introduced via catheter into the IVC. Just before implantation of the filter, it was released prematurely from the catheter. The filter migrated superiorly to the heart. Cardiac catheterization demonstrated that the filter was in the main pulmonary artery, and it had not yet expanded. A catheter was introduced through the internal jugular vein, and the filter was caught by a snare (35 mm) to prevent further migration to the pulmonary arterial bed (Figure 1). Taking into consideration the probability of injury to the tricuspid valve, removal of the filter was not attempted via the snare. The patient was then taken immediately to the operating room. After a median sternotomy, cardiopulmonary bypass (CPB) was achieved by the usual manner. The aorta was not cross-clamped. On palpation of the pulmonary artery, the filter was found to be located in the main pulmonary artery close to the bifurcation, partly facing the left pulmonary artery. An incision was made on the lateral aspect of the main pulmonary artery and extended to the left pulmonary artery (Figure 2). The filter was easily visualized in the lumen of the main pulmonary artery. Contrary to the radiographic finding, it had expanded and sunk into the pulmonary arterial wall by its spikes. It was removed from the endothelium with difficulty, and there was thrombus formation

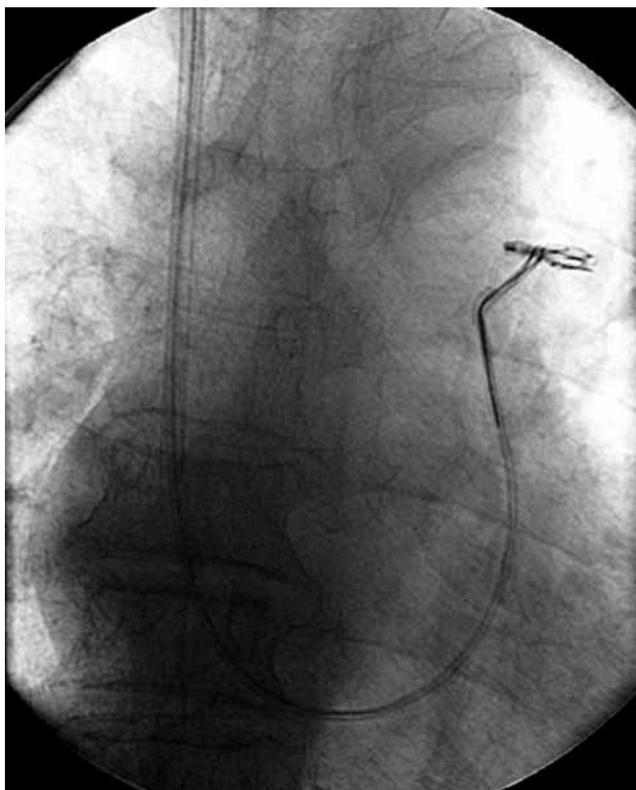


Figure 1. The filter caught by the snare in the pulmonary artery.

around the filter (Figure 3). The pulmonary arteriotomy was then closed, and the peri- and postoperative period were uneventful. Chemotherapy was begun for the malignancy. The heparin was continued for one month, and then enoxaparin was started.

DISCUSSION

Pulmonary thromboembolism is a potentially fatal complication of DVT. The risk increases if the patient is left untreated and is without anticoagulation. The need for an IVC filter is indicated when anticoagulation is contraindicated due to concurrent bleeding diatheses or active hemorrhage. It is also not recommended when anticoagulation is thought to be ineffective because of recurrent pulmonary artery embolism or pulmonary hypertension. In addition, in patients with severe trauma, hypercoagulable states, prolonged immobilization, and severe cardiopulmonary disease, IVC filters can be used prophylactically.^[4]

Percutaneous filters have been available since the 1970s. However, they have a high complication rate, including caval occlusion and recurrent pulmonary embolism. The probability that they will migrate to the heart and pulmonary artery is also a major disadvantage.^[6] When examined by immediate post-implantation X-ray, a displacement of more than 1 cm

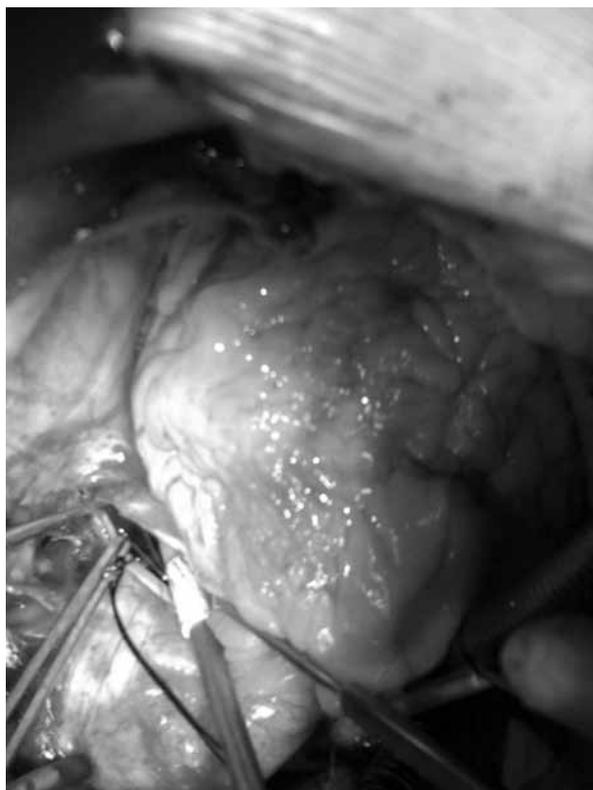


Figure 2. View of the filter in the pulmonary artery.

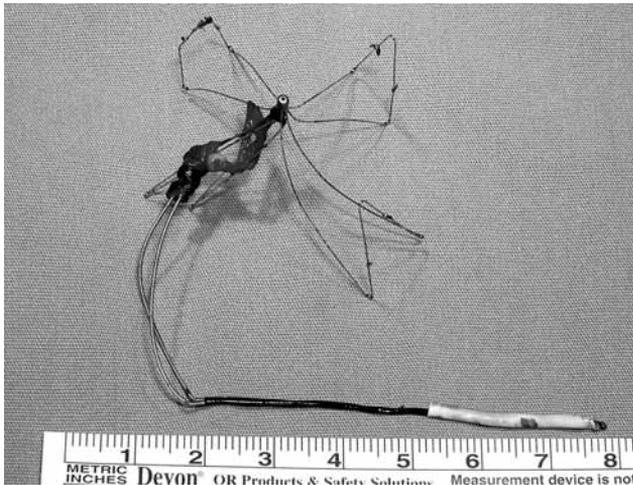


Figure 3. Thrombus formation around the filter.

either in the cranial or caudal direction was described as filter migration.^[5] In the medical literature, only a few cases have been reported.^[7] In uncomplicated cases, the filter can be removed by a percutaneous approach. In cases in which the filter can not be removed due to valvular and chordal involvement, a surgical approach is inevitable.^[8] For this reason, insertion of the IVC filter should be performed in a hospital where cardiothoracic surgical backup is available.

Gelbfish and Ascer^[9] reported two patients with filters in the tricuspid valve for 42 months and the pulmonary artery for 60 months without any complication or hemodynamic problems. However, Konstantinov et al.^[8] reported that all patients with IVC filters were anticoagulated because of the probability that the filter could become overloaded with emboli. In our case, we decided to immediately operate on the patient. Preoperatively, we discontinued the oral anticoagulation and promptly started intravenous anticoagulation with heparin. However, we still observed thrombus formation around the filter.

Although the pulmonary angiogram showed that the filter caught by the snare had not expanded, surgery revealed that not only had it expanded, but it was also firmly attached to the pulmonary arterial wall. A meticulous dissection was necessary to remove the filter

from the endothelium. Thus, intraoperative explorative palpation should not be done or should be performed delicately and carefully.

In conclusion, the IVC filter was removed on account of the possibility that it would overload with thrombus formation if it migrated to the heart or pulmonary artery. Removal of the filter should be carried out surgically, even in patients with a high surgical risk, because of possible injury to the tricuspid valve and other intracardiac structures.

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