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Case Report

Omental flap transposition for inferior vena cava filter penetration

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ABSTRACT

A 40-year-old woman presented with uterine malignancy, deep vein thrombosis, and nonmassive pulmonary embolism in both lungs. Gunter-tulip filter was inserted, because she had severe genital bleeding, which is one of the contraindications to anticoagulation therapy. Total hysterectomy was conducted and anticoagulation therapy was started afterward. The thrombus worsened perioperatively, and the filter could not be retrieved. Since there was lymph node recurrence, the second time operation was performed. During operation, the struts were found to be penetrating the inferior vena cava. Omental flap was used to cover the struts, and no associated complications occurred after operation.

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Introduction

Inferior vena cava (IVC) filter placement is indicated in patients with acute pulmonary embolism (PE) who have absolute contraindications to anticoagulant therapy, and in those with objectively confirmed recurrent PE despite adequate anticoagulation treatment [1,2]. Patients with a retrievable filter should be evaluated periodically for retrieval within the specific filter's retrieval window, although the incidence of attempted filter retrieval is very low [3,4]. Long-term placement of the filter is reported to reduce the risk of recurrent PE, but it can also increase the risk of deep vein thrombosis (DVT) and cause late complications. We report a case of IVC filter penetration incidentally found during abdominal operation, and successfully covered with an omental flap.

Case report

A 40-year-old woman without significant past medical history was transferred to our hospital with complaints of pain in both lower legs, dyspnea, and severe genital bleeding. Physical examination showed pitting edema on the left lower leg with slight tenderness. Blood test on arrival showed severe anemia (Hb 5.7 g/dL) and high serum levels of cancer antigen (CA)19-9 (455.3 U/mL) and CA125 (176 U/mL). Increased D-dimer (19.0 µg/mL) and C-reactive protein (1.8 mg/dL) levels were also observed. Contrast-enhanced computed tomography (CT) showed a nonmassive PE in both lungs, DVT in the left external iliac vein and bilateral popliteal veins, and a tumor mass in the uterine cervix. Gynecological cancer was strongly suspected, and she was admitted immediately.

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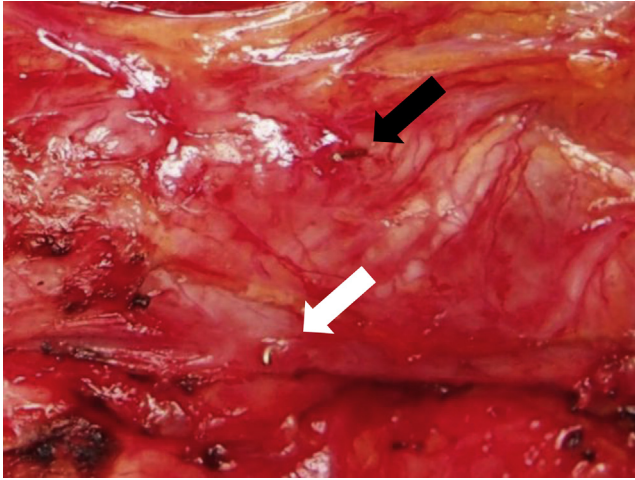


Fig. 1 – Intraoperative photograph demonstrates perforating anterior (black arrow) and medial (white arrow) struts of an inferior vena cava (IVC) filter.

Since it was difficult to start anticoagulation therapy because of severe uncontrollable bleeding, Günther-Tulip filter (Cook Medical, Japan) was inserted from the right jugular vein. Low molecular heparin was started 12 days after arrival considering the decreased level of bleeding. Total hysterectomy was conducted 19 days after arrival, and anticoagulation therapy was started 3 days after operation with unfractionated heparin and warfarin. Contrast-enhanced CT before operation showed that the thrombus extended massively from IVC filter to bilateral popliteal vein, and it was still seen in the contrast-enhanced CT 15 days after operation. In this way, the filter could not be retrieved at an early date.

CT showed disappearance of the DVT and PE 3 months after operation, but positron-emission tomography CT showed lymph node recurrence. Thus, lymph node dissection and partial omentectomy were performed. During the operation, 2 struts of the filter were incidentally found to be penetrating the IVC, which was already seen on preoperative CT looking back later (Figs. 1 and 2). Since she still had

high risk for PE postoperatively owing to the recurrent tumor that required chemotherapy, the filter was considered not to be retrieved. The struts adjacent to the duodenum seemed to have high risk for duodenal perforation; therefore, we used an omental flap to cover the penetrating struts. Contrast-enhanced postoperative CT confirmed that the filter struts were covered with the omental flap (Fig. 3). Chemotherapy and anticoagulation therapy were continued, and no associated complications occurred after operation.

Discussion

Filter struts outside the IVC wall are a common finding on CT for about 78%–85.9% of cases, but recent large-scale observational study revealed that penetration was reported in 19% of patients [5–7]. IVC filters are commonly placed in an infrarenal position, thus they can injure adjacent organs such as the aorta, portal vein, intestine, kidney, spinal cord, diaphragm, and genitourinary system [8]. Patients with a long-term contraindication to anticoagulation therapy require permanent implantation, leading to a life-long risk of these complications.

In our case, retrieval therapy was not selected because the patient was still considered to have a high risk of PE after the second time operation. Instead, we used an omental flap to cover the struts of the filter and reduce the associated complications without retrieving the filter. Basakara et al [9] have already reported the omental flap usage to the penetration of Cook Celect filter; however, they excised the filter struts and used the omentum around the ureter, not around the struts. Although this technique requires the excising device, our technique only needs omentum. Moreover, it is possible that the remaining struts may come out again; therefore, using omentum around the struts as our technique might prevent it.

Recent large-scale observational study reported that 19% of IVC filter penetrations showed evidence of organ or structure involvement, and 26% of those required intervention [7]. Although exposing IVC and placing omental flap may require further procedure even if it is done in addition to abdominal

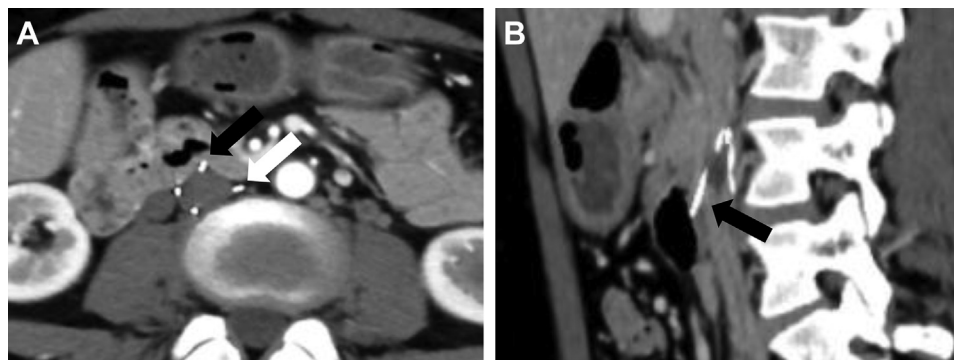


Fig. 2 – (A) Preoperative axial arterial phase contrast-enhanced computed tomography images again demonstrate the perforating anterior (black arrow) and medial (white arrow) struts of the IVC filter. The anterior strut abuts and indents the adjacent duodenum. (B) Preoperative sagittal phase contrast-enhanced computed tomography images demonstrate the perforating anterior struts of the IVC filter (black arrow).

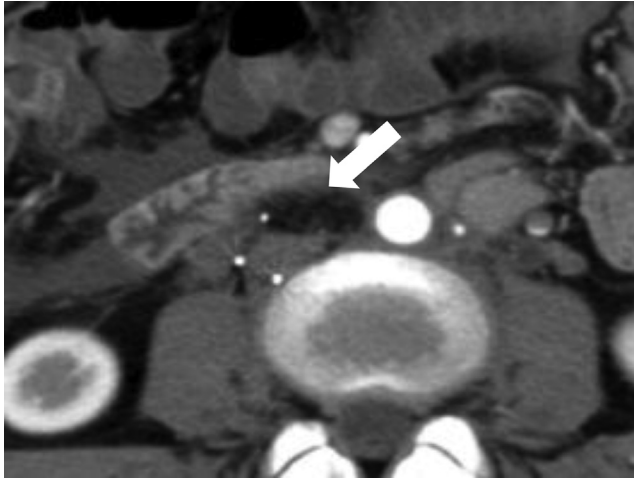


Fig. 3 – Postoperative axial arterial phase contrast-enhanced computed tomography images demonstrate that the perforating struts of the IVC filter were successfully covered with an omental flap (white arrow).

operation, it is impossible to overlook the incidence of organ involvement and that of the need for intervention.

Thus, we recommend surgeons to visually confirm the filter penetration when they perform the abdominal operation to the patients who were suspected the strut penetration in the preoperative CT.

Conclusions

Omental flap transposition is a simple technique and can protect organ from penetrating struts. It should be taken into consideration when the surgeons find the filter struts penetration, which seems to have risk for organ injury.

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