CASE REPORT

An unreported cause of early postoperative dislocation following total hip revision: Massive intra-capsular oedema related to inferior vena cava filter thrombosis

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Accepted: 11 October 2012

KEYWORDS
Total hip replacement;
Inferior vena cava filter;
Hip dislocation

Summary Inferior vena cava (IVC) filters are widely used to prevent pulmonary embolism (PE) in patients with an absolute or relative contraindication for anticoagulants, during the peri-operative period of trauma or total joint replacement. No complication specific to the orthopaedic’s aspect of this practice has been described. We report the case of a patient who had major femoral head/cup separation mimicking dislocation following revision total hip arthroplasty related to massive intra-capsular oedema produced by IVC filter thrombosis. The patient could be successfully treated non-operatively. Orthopaedic surgeons should identify and refer patients with a complicated IVC filter, to identify any migration or occlusion, and also be aware that removable filters must not be kept in situ, once the high-risk phase of developing PE is past.

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Introduction

Venous thromboembolism (VTE) remains a major complication following total hip arthroplasty (THA), with a risk for fatal pulmonary embolism (PE) ranging up to 5%, in the absence of mechanical or pharmacologic prophylaxis [1]. Therefore, it is well admitted that patients undergoing THA require prophylaxis, while the ideal mode is still debated. In the presence of proven VTE but contraindication for anticoagulation, or recurrent VTE despite adequate anticoagulation treatment, guidelines [2,3] recommend the use of an inferior vena cava (IVC) filter. Several studies
[4–6] have indicated that IVC filter was an effective way of preventing fatal PE in patients undergoing THA. However, complications of IVC filters have been also extensively described in the vascular surgery and radiology literature such as air embolism, arrhythmias, filter misplacement, fracture, premature deployment, tilting, angulation, migration and embolization or even erosion into pericaval structures [7, 8]. Although orthopaedic surgeons are faced with an increasing number of patients requiring filter placement prior to surgery, no peri-operative specific recommendations exist in the orthopaedic literature.

We report the case of a patient who had an original incident related to his IVC filter thrombosis mimicking an early postoperative dislocation following revision THA. Dislocation occurs in 60% of cases within the first 5 weeks postoperatively. Excluding abductor muscle weakness due to nerve palsy and soft tissue or foreign body articular entrapment, early dislocation is commonly a multifactorial event, although many efforts have been made since long time in classifying different etiologies [9]. However, little is written about capsular distension in the development of this process [10]. It can be assumed that capsular distension is a significant element in dislocations related to hematoma, inflammatory synovitis or infection, but also intra-capsular oedema after vena cava thrombosis. The patient was informed that data concerning the case would be submitted for publication, and he consented.

Case report

A 50-year-old man was referred to our department for left-sided groin pain 10 years after a staged bilateral primary total hip replacement. Two years before, the patient had presented in the preoperative period of right THA revision a major venous thromboembolism that required placement of an IVC permanent filter (Vena-Tech LGM, BBraun, Boulogne Billancourt, France). The patient underwent warfarine treatment for 6 months. The patient had no discomfort related to the IVC filter that was kept in place.

The left hip had been painful until 6 months prior to the time of presentation related to aseptic loosening of both components (Fig. 1). The patient had revision of both components (Fig. 2). A usual full dose of enoxaparin 4000 IU was administrated 12 h prior to the surgery followed by a full dose daily. The patient’s discharge was postponed as 10 days postoperatively, he presented acute left hip painless discomfort associated with major swelling of both inferior limbs and bilateral hydrocele tests. No calf pain was found. Radiologic examination showed a major femoral head separation mimicking dislocation (Fig. 3). Given the thromboembolic history of this patient with a permanent IVC filter, a computed tomography (CT) with contrast injection was performed and demonstrated infrarenal inferior vena cava occlusion related to a 2 cm long thrombus around the filter (Fig. 4). Anticoagulation therapy associating 8000 IU enoxaparin twice a day and warfarin was started. Once the INR was between 2 and 3, enoxaparin was discontinued. The patient was kept on bed rest with his lower limbs in suspension for 7 days. The evolution of the femoral head separation was monitored with serial radiographs. These showed progressive relocation of the femoral head inside the cup that was completely achieved after 7 days of anticoagulation treatment (Fig. 5). After 10 days, the patient was mobilized with compression elastic stockings. Swelling completely resolved and warfarin was discontinued after 6 months (Fig. 6). The patient remained asymptomatic up to 8-year follow-up.

Discussion

To the best of the authors’ knowledge, IVC occlusion leading to massive intra-capsular oedema and prosthetic femoral head separation has never been described. This complication could have been misdiagnosed as an early postoperative dislocation. Anticoagulation therapy allowed for progressive relocation of the femoral head, and no surgical intervention was needed.
Inferior vena cava filter thrombosis presenting as early dislocation

In cases of anticoagulation contraindication or inefficiency, interruption of the inferior vena cava using a filter is a safe and effective alternative to prevent fatal PE, in patients undergoing THA [4–6]. However, in these reports the threshold for insertion of an IVC filter was low, some of the indications being outside of the guidelines [2,3], revealing a notable increase during the past two decades [8,11–13].

Nevertheless, complications of IVC filters occur [8]. The cumulative risk at 9 years of caval occlusion of a permanent filter was recently estimated at 33.2% [7]. However, insufficient data are available to support indefinite anticoagulation in patients with permanent IVC filter [2]. The length of anticoagulation therapy after filter placement should be balanced between the thrombotic risk and the likelihood of bleeding complications. Guidelines also advocate for the use of removable filters in patients with VTE and a short-term contraindication to anticoagulant therapy [2], thus including total joint patients in the peri-operative period. However, the rate of removal of retrievable filters is low, ranging from

**Figure 3** Radiograph 10 days postoperatively, showing major femoral head separation mimicking a postoperative dislocation.

**Figure 4** CT scan showing a caval occlusion related to a thrombus around the filter (arrow) that is extending below the renal veins.

**Figure 5** Five days after anticoagulation, the femoral head has almost completely relocated inside the cup.
4.5 to 22% [14], due to the fact that the patients are usually not followed-up by the physician that has placed the filter.

Most frequently, IVC occlusion is progressive or even asymptomatic [7], with the development of collateral circulation preventing leg swelling [15]. Another possible explanation to IVC filter occlusion could be captured thrombi in the filter [16], resulting from venous stasis, endothelial injury, and hypercoagulability, usually observed in the early postoperative course of total joint patients. The observed acute leg swelling in the current case is highly suggestive of an abrupt IVC occlusion.

Orthopaedic surgeons should be aware of IVC filters complications, including occlusion in the postoperative course. In addition, prior to operating a patient with an IVC filter, surgeons should refer the patient for abdominal radiographs to determine filter placement stability, duplex examination to identify recurrent DVT or chronic venous insufficiency, and scanning to identify extracaval filter extension or caval thrombosis. Finally, when a removable filter has been placed, the surgeons should avoid that filter be left in situ, once the high-risk phase of developing PE is no more present.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

Ethical review committee statement: each author certifies that his or her institution has approved or waived approval for the human protocol of this investigation and that all investigations were conducted in conformity with ethical principles of research.

References