

# Symptomatic proximal deep venous thrombosis extending to the inferior vena cava after arthroscopic meniscectomy: A case report

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## Abstract

**Introduction:** Symptomatic deep venous thrombosis (DVT) is a relatively rare complication following arthroscopic meniscectomy, however, it has the potential to develop into pulmonary embolism that can be life-threatening. Although DVT has been reported to develop on the affected side, iliac vein compression is a known cause of left-sided DVT, particularly in female patients.

**Case Presentation:** A 54-year old woman complaining of painful locking of her left knee underwent arthroscopic meniscectomy at our hospital. She had no obvious risk factors for DVT other than the age. Thirteen days after the surgery, she complained of left leg swelling and pain. Contrast enhanced computed tomography revealed a DVT that had extended to the inferior vena cava with iliac vein compression.

**Conclusion:** The iliac vein compression was a possible cause of the DVT. We believe all patients undergoing left knee arthroscopic surgery should have a careful observation for DVT and be considered for pharmacological DVT prophylaxis.

**Keywords:** Deep venous thrombosis, Iliac vein compression, Arthroscopic meniscectomy

## Introduction

Deep venous thrombosis (DVT) is a relatively rare complication after arthroscopic meniscectomy, however, it has the potential to develop into pulmonary embolism (PE) that can be life-threatening. The consensus is that the more proximal the DVT, the higher the risk of PE. Previous reports revealed that there was no significant difference in the incidence of DVT between both legs after knee arthroscopy [1], and DVTs were typically reported to develop on the affected side [2]. However, iliac vein compression is a known cause of left-sided DVT [3]. The left iliac vein is prone to compression by the right iliac artery and the fifth lumbar vertebra, resulting in obstruction of the venous outflow, which can lead to DVT developing in the left leg. Kibbe et al. measured the iliac vein compression in patients without DVT, and reported that the mean compression of the left iliac vein was

35.5% and, notably, that it was significantly greater in women than in men (women, 41.2%; men, 27.0%) [4]. Here we report a case of symptomatic proximal DVT that extended to the inferior vena cava (IVC) with iliac vein compression after arthroscopic meniscectomy.

## Case Presentation

A 54-year old woman with a 5-year history of painful locking of the left knee visited our outpatient clinic complaining of worsening symptoms. Although she had undergone arthroscopic anterior cruciate ligament (ACL) reconstruction on the left knee at another hospital 25 years before, neither DVT nor any other significant health problem had been diagnosed. Her body mass index (BMI) was 24.4 kg/m<sup>2</sup> (150 cm, 55 kg). On physical examination, the range of motion of her left knee was 0 to 150 degrees, with a positive McMurray's test. She had no

visible varicose veins on either leg. There was no swelling of the left lower extremity. Magnetic resonance imaging of her left knee revealed a bucket-handle tear of the medial meniscus. A medial meniscus injury was diagnosed, and arthroscopic meniscectomy was performed on the left knee (Fig. 1). The surgery was performed under general anesthesia with a pneumatic tourniquet, and standard anterolateral and anteromedial portals were used. During the surgery, we noticed that the reconstructed ACL had somewhat loosened, and there were chondral defects in the patella-femoral joint. The tourniquet and operation times were 49 minutes. To prevent postoperative DVT formation, the patient's left leg was pressured using elastic bandages, and her right leg was pressured by a compression stocking perioperatively. One day after the surgery, gait rehabilitation with full weight bearing was started. Four days after the surgery, the

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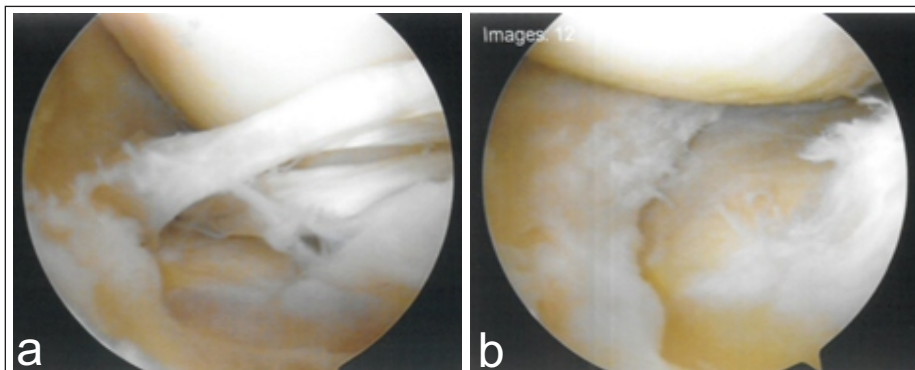
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**Figure 1:** (a) Arthroscopic findings showed a bucket handle tear of the medial meniscus. (b) The bucket handle tear of the medial meniscus was arthroscopically resected.

patient was discharged from our hospital without any obvious complications.

Thirteen days after the surgery, however, she returned to our hospital complaining of left leg swelling and pain. Although PE was excluded with contrast enhanced computed tomography (CT), a DVT that had extended from calf veins to the IVC with iliac vein compression was observed (Fig. 2). The patient was immediately admitted for anticoagulant therapy with heparin and warfarin, which resulted in a gradual improvement of her symptoms. No evidence of thrombophilia such as anti-phospholipid syndrome or protein C/S deficiencies was found. Eleven days after readmission, the patient was discharged from our hospital. We advised her to continue using compression

stockings for an indefinite period. At 21 months after the operation, her symptoms had disappeared with no signs of recurrence.

### Discussion

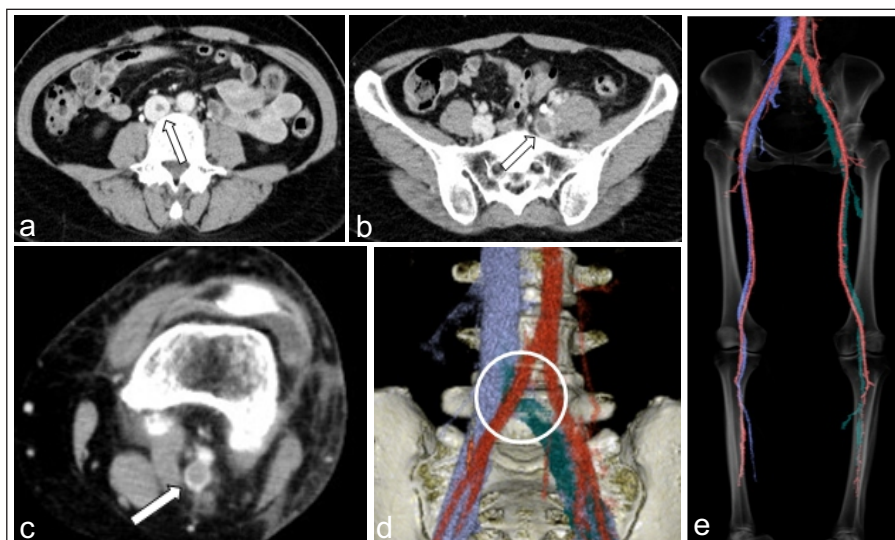
Most DVTs form within the distal calf veins and remain asymptomatic, and proximal symptomatic DVTs are very rare. Ilahi et al. performed a meta-analysis and reported that the incidence of DVT after arthroscopy in patients without any prophylaxis was 9.9% overall, and 2.1% for proximal DVT [5]. A meta-analysis by Sun et al. showed that the incidence of proximal DVT was very low, regardless of whether the patients received low-molecular-weight heparin (LMWH) prophylaxis (4 of 2,184) or not (29 of 1,814) [6]. Moreover, in large population using large

database, the incidence of symptomatic DVT was reported as being 0.25% to 0.37% [2, 7]. Therefore, symptomatic DVT that extends to the IVC after arthroscopic meniscectomy, as seen in our patient, appears to be very rare.

Regarding risk factors for DVT after knee arthroscopy, Demers et al. performed an analysis that included age, sex, personal or family history of venous thromboembolism (VTE), medication use, type of anesthesia used, type of procedure performed, duration of surgery, duration of immobilization, and tourniquet time. Among all these factors, only a tourniquet time of more than 60 minutes was found to be a significant risk factor for VTE [8]. Delis et al. studied the following criteria: age over 65 years, BMI over 30, smoking, hormone replacement or contraceptive use, history of chronic venous insufficiency, and history of previous VTE. In this series, a history of previous VTE or two or more risk factors for thromboembolism significantly increased the risk of DVT formation [9]. Yeo et al. performed an analysis that included age, gender and ethnicity. Among them, the age of 40 years or older was found to be a significant risk factor for DVT [10]. In our patient, none of the above risk factors other than the age was present. Since the DVT was accompanied by iliac vein compression, the iliac vein compression was thought to be the cause or exacerbating factor of the left-sided DVT, in our patient. To the best of our knowledge, our patient is the first case of symptomatic proximal DVT associated with iliac vein compression after arthroscopic meniscectomy. But we believe that this is probably not the only case, since iliac vein compression is not uncommon [4].

In addition to iliac vein compression, a decrease in daily activity due to our patient's left knee pain caused by the surgery and excessive pressure from the elastic bandage restricting blood flow also could have contributed to the DVT.

Although LMWH is known to be effective for reducing DVT after knee arthroscopy [6], it remains controversial whether the benefits of prophylaxis outweigh the risks and costs [11]. Therefore, routine pharmacologic prophylaxis for DVT in knee arthroscopy is probably not justified. However, it must be noted that there are reported cases of fatal PE in patients who did not receive perioperative



**Figure 2:** Contrast enhanced computed tomography (CT), showing a deep venous thrombosis (DVT) that had extended to the inferior vena cava (IVC) with iliac vein compression. DVT (white arrow) was observed in the IVC (a), common iliac vein (b), and the popliteal vein (c). Three-dimensional (3D) CT showed the iliac vein compression (white circle) (d), and the DVT extended from the left calf vein to the IVC (e). In these 3DCT, blue, red, and dark green indicate the vein, artery, and DVT, respectively.

pharmacological prophylaxis [12, 13], and that our patient may have benefited from such intervention. Further study is needed to determine the indication for LMWH use.

### Conclusion

We report a rare case of symptomatic proximal DVT that extended to the IVC after arthroscopic meniscectomy. DVT can develop after arthroscopic meniscectomy in patients without any obvious risk factors for DVT other than the age. Iliac vein compression is a possible cause of left-sided DVT, particularly in female patients. We believe all patients undergoing left knee arthroscopic surgery should have a careful observation for DVT and be considered for pharmacological DVT prophylaxis.

### Clinical Message

Symptomatic DVT can develop even after arthroscopic meniscectomy in patients without any obvious risk factors for DVT. Iliac vein compression is a possible cause of left-sided DVT, particularly in female patients. Patients undergoing left knee arthroscopic surgery should have a careful observation for DVT.

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