

Massive PTE Following an Elective Arthroscopic Meniscal Repair: A Case Report and Literature Review

Elektif Artroskopik Menisküs Onarımı Sonrası Masif PTE: Bir Olgu Sunumu ve Literatürün İncelemesi

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ABSTRACT

Venous Thromboembolism (VTE) is an unusual complication after arthroscopic meniscus surgery. There is no consensus for anticoagulant therapy following routine arthroscopic meniscus surgery. Here we present a case of near-fatal pulmonary thromboembolism after an elective arthroscopic meniscus repair.

Key Words: Arthroscopy; meniscus; repair; pulmonary thromboembolism; knee; anticoagulant

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ÖZET

Venöz Tromboembolizm (VTE), artroskopik menisküs cerrahisi sonrası alışılmadık bir komplikasyondur. Rutin artroskopik menisküs cerrahisini takiben antikoagülan tedavi konusunda fikir birliği yoktur. Burada elektif artroskopik menisküs onarımı sonrası ölüme yakın bir pulmoner tromboembolizm olgusu sunuyoruz.

Anahtar Sözcükler: Artroskopi; menisküs; tamir etmek; pulmoner tromboembolizm; diz; antikoagülan

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INTRODUCTION

Arthroscopy is the gold standard for surgical management of meniscal tears. Many techniques such as Inside-out, Outside-in and All-inside have been described for meniscal repairs. These techniques have steep learning curves and often time-consuming. Unlike the Meniscal balancing procedure (meniscectomy), a meniscal repair, especially involving the posterior third or meniscal root, warrants longer tourniquet time, as it is a constrained space and manipulating instruments are time consuming and challenging. Use of tourniquet in knee arthroscopy could potentially lead to venous stasis (Virchow's triad) and precipitate thromboembolism. Some of the other recognised predisposing risk factors in patients undergoing knee arthroscopy include age older than 65 years, BMI over 30 kg/m², smoking, use of oral contraceptives/hormone replacement therapy, history of chronic venous insufficiency, and history of VTEs [1]. In the absence of these classic risk factors, it has been suggested that routine preoperative measurement of three common familial thrombophilias: factor V Leiden, factor VIII, and homocysteine [2]. However, this is not a widely popular practice and the resources for routine testing for these parameters are usually limited. When compared with ligament reconstructions, other arthroscopic surgeries such as meniscal surgery, diagnostic arthroscopy, or chondroplasty possess a lower risk of thrombosis [3].

Literature suggests the incidence of symptomatic venous thromboembolism after arthroscopic meniscectomy to be approximately 0.34% [4]. Although several cases of thrombosis complications have been reported, the risk of a thromboembolic complication is low in arthroscopic knee surgery & routine prophylaxis against thromboembolism has been thought to be unnecessary [5]. Despite the rarity, this potential complication cannot be overlooked, as it may lead to serious life-threatening condition which may need intensive care support, closed monitoring besides increase in morbidity and mortality to the patient.[6]

CASE REPORT

A 51-year-old female presented to our Knee clinic with a history of right knee pain of one-month duration. The pain started following a twisting injury, and she had difficulty in sitting and squatting. The Body Mass Index (BMI) of the patient was 24.22 kg/m². She had no medical co-morbidities. The knee range of movements was near normal, except terminally painful. The McMurray's test for the meniscus injury was positive. The neurovascular examination was found to be normal. The plain x-rays of the knee were unremarkable. The Magnetic Resonance Imaging (MRI) study of the knee revealed a radial tear of the posterior root of the medial meniscus (Figure 1A & Figure 1B).

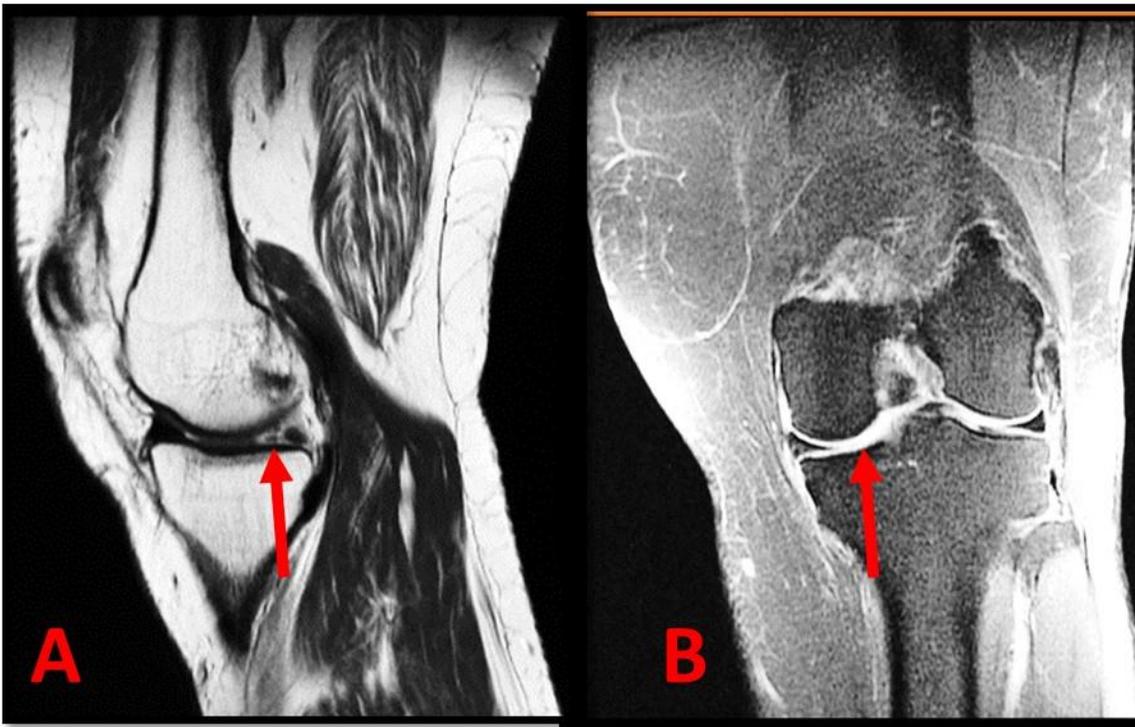


Figure 1A: MRI T2 weighted Sagittal image showing the radial tear of the posterior root of the medial meniscus (red arrow)

Figure 1B: MRI T2 weighted coronal image (red arrow)

Under tourniquet control and spinal anaesthesia, she underwent arthroscopic assisted root repair of the medial meniscus by suture pull-through technique

(Figure 2A & Figure 2 B) and radiofrequency chondroplasty for Outerbridge grade 3 cartilage changes in the medial femoral condyle.

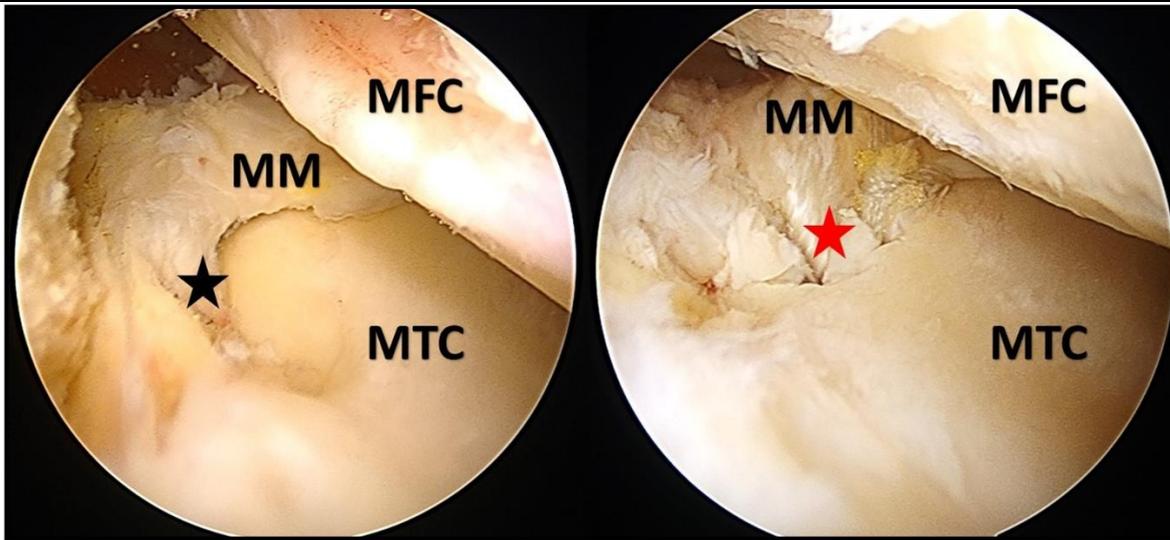


Figure 2: Arthroscopic Images: left - showing the medial meniscus root tear (black asterisk); right - showing the repaired meniscus (red asterisk). MM –Medial Meniscus; MFC – Medial Femoral Condyle; MTC – Medial Tibial Condyle.

The total duration of the surgery was about 50 minutes. Knee bending, quadriceps strengthening exercises and non-weight bearing with walker support were initiated on postoperative day one and discharged. Four days after surgery, the patient presented to the Emergency Room with sudden onset of chest pain, difficulty in breathing and vomiting. The D-dimers was found to be elevated [1.4µg/mL (normal 0-0.5 µg/mL)].

The Arterial Blood Gas Analysis showed pO₂ 91.7 mmHg (83.0 – 109 mmHg) and pCO₂ 41.9 mmHg (35 – 48 mmHg). There was normal sinus rhythm on Electrocardiogram (ECG) (Figure 3) and Echocardiography revealed normal biventricular systolic function with no wall motion abnormality and no Pulmonary Artery Hypertension.

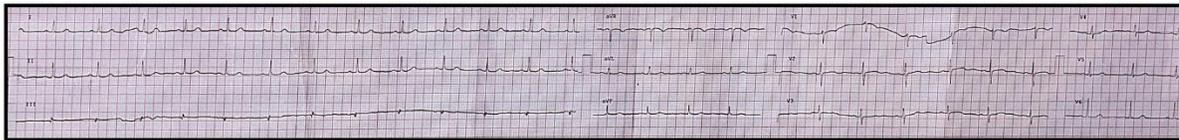


Figure 3: 12 lead ECG (Electrocardiogram) showing normal sinus pattern.

The Computer Tomography (CT) Pulmonary Angiography revealed bilateral Pulmonary Thromboembolism (PTE) (Figure 4A & Figure 4B).

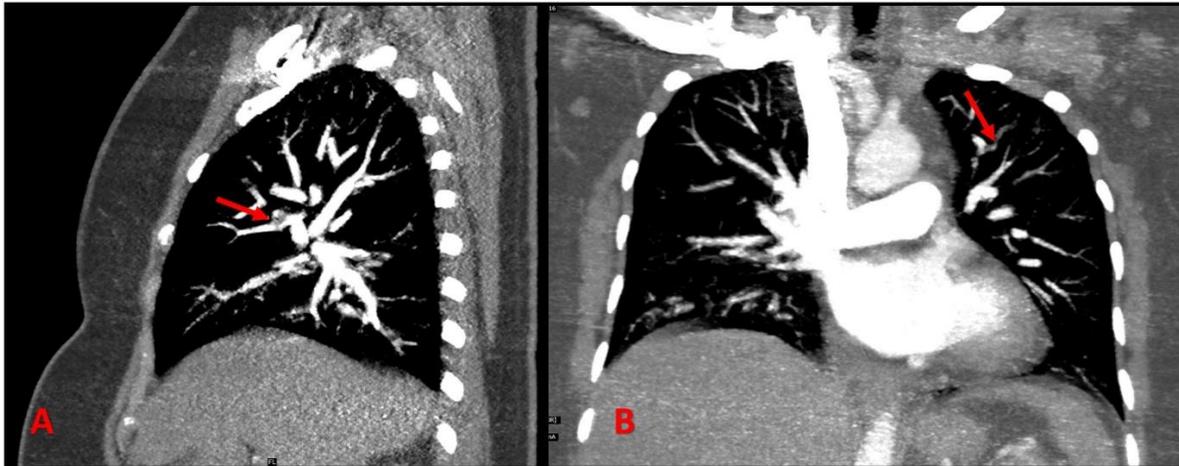


Figure 4A: CT pulmonary Angiography Sagittal cut showing an eccentric filling defect in the right middle lobar artery with contrast opacification of distal segments (red arrow)

Figure 4B: CT pulmonary Angiography coronal cut showing a hypodense filling defect in the subsegmental branch of the anterior segment of the left upper lobe with attenuated calibre (red arrow)

Clinically, there was no oedema or tenderness over the calf region and the bilateral lower limb venous Doppler did not reveal any Deep Vein Thrombosis (DVT). The anticoagulation therapy subcutaneous injection of Fondaparinux sodium 2.5mg once daily for seven days and Tablet Rivaroxaban (20mg) was initiated, and gradually her condition improved. The anticoagulant therapy was continued for six months with close monitoring of Prothrombin Time (PT) and International Normalised Ratio (INR). At the final follow-up of Fourteen months, the International Knee Documentation Committee score of her right knee was 81.6 and no recurrence of thromboembolism.

DISCUSSION

Currently, there is no consensus for anticoagulant therapy following arthroscopic knee surgery. Among the arthroscopic surgeons, there is an ambiguity regarding the duration, type, dose, and frequency of the anticoagulant used following arthroscopic knee surgeries. There are several international bodies which have formulated guidelines for thromboprophylaxis in knee Arthroscopy. One of the objectives is to ensure uniformity in the treatment and monitor the outcomes. Some of the popular and recent guidelines include American Academy of Orthopedic Surgeons (AAOS 2011) [7], American College of Chest Physicians (ACCP 2012) [8] and National Institute for Health and Care Excellence (NICE 2018) [9]. For a knee arthroscopy procedure, the ACCP recommends no prophylaxis if there is no history of thromboembolism. The NICE recommendation is to consider Low Molecular Weight Heparin for 14 days for patients undergoing arthroscopic knee surgery if total anaesthesia time is more than 90 minutes or if the patient's thromboembolism risk outweighs the risk of bleeding. Another recent case-control study by Krych and co-workers concluded that patients with a history of VTEs, a history of malignancy, or two or more classic risk factors are at increased risk of VTEs after knee arthroscopy, and chemoprophylaxis should be considered in these select patients [4]. Furthermore, a recent Cochrane review on the benefit of anticoagulants in knee arthroscopy found only limited evidence in reducing this small risk of PTE or symptomatic DVT [10]. Based on these studies and recommendations, selective thromboprophylaxis approach appears to be prudent; however, future studies need to refine these risk factors and analyse the outcomes. It can sometimes be challenging for the clinicians to take the call on prophylactic anticoagulant therapy and in the current scenario of ambiguous evidence, a shared decision with the patient should be followed.

In the index case, the Homan sign and the calf oedema were conspicuously absent. As the PTE was small, the ECG and Echocardiography were essentially normal. The diagnosis of PTE could only be confirmed on CT Pulmonary Angiography. Another interesting observation was that the venous Doppler of the lower limb could not find any evidence of DVT. A possible explanation could be that the entire thrombus got dislodged, formed the emboli and the veins recanalized. Alternately, the thrombus could have originated from the pelvis veins which were not screened in this case. As the PTE was small and involved subsegmental branches, thrombolysis was not warranted, and it was managed effectively with anticoagulation therapy. Thus, a high index of suspicion and prompt management could be potentially lifesaving.

Pulmonary Thromboembolism risks following elective arthroscopic knee surgery are very low; however, it can lead to potentially life-threatening consequences. A case to case-based screening - The duration of surgery, tourniquet use, patients' demographics, pre-existing illness & post-operative immobilisation/rehabilitation protocols are some of the factors to be considered in deciding the thrombo-prophylaxis in Arthroscopic surgery. Arthroscopic surgeons need to be vigilant in assessing the risks and consider prophylactic anticoagulant therapy in such selective cases.

Conflict of interest

No conflict of interest was declared by the authors.

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