

Pulmonary and Renal Thromboembolism Occurring within First Hours after Knee Arthroscopy: A Case Report

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Abstract

Thromboembolism presents a severe medical condition in which blood clots form within blood vessels, dislodge, and travel freely within the bloodstream, sometimes blocking blood flow to vital organs, thus causing life-threatening ischemia, tissue infarction, and end-stage organ malfunction. We present the case of a 36-year-old male patient who underwent knee arthroscopy that, within the first 12 hours post-surgery, was complicated with systemic thromboembolism impacting both his lungs and kidneys. A multidisciplinary approach is crucial to minimize the thromboembolism occurrence risk while maximizing the benefits of knee arthroscopy and promoting better patient health. (**International Journal of Biomedicine. 2023;13(4):371-373.**)

Keywords: systemic thromboembolism • coagulopathy • knee arthroscopy • CT scan • kidney infarction • dialysis

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Introduction

Thromboembolism presents a severe medical condition in which blood clots form within blood vessels, dislodge, and travel freely within the bloodstream, sometimes blocking blood flow to vital organs, thus causing life-threatening ischemia, tissue infarction, and end-stage organ malfunction.^(1,2) Patients undergoing various surgeries, particularly orthopedic procedures requiring prolonged immobility, are at a considerably high risk for postoperative systemic thromboembolism.⁽³⁾

Among frequent orthopedic surgeries is knee arthroscopy, used to diagnose and treat knee injuries such as meniscal tear,

and ligament and cartilage damage. Although knee arthroscopy is considered a generally safe procedure, deep vein thrombosis, followed by systemic thromboembolism in vital organs such as lungs, kidneys, and brain, is a common complication.⁽⁴⁾ Risk assessment, patient education, and prophylactic measurements are used to reduce the incidence of thromboembolic events, morbidity, and mortality.⁽⁵⁾

The medical community continuously strives to further reduce the incidence of postoperative thromboembolism through refining strategies and protocols and advancing preventive measurements and surgical techniques, thus promoting the safety and success of surgical procedures.⁽⁶⁾

This case report discusses the relationship between a thromboembolism after knee arthroscopy and its incidence, clinical management, and prevention measurements.

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Case Presentation

A 36-year-old male patient underwent knee arthroscopy due to a medial meniscal tear and rupture of the anterior cruciate ligament. The procedure was performed early in the morning, under spinal anesthesia, and was considered successful as the patient felt well afterwards.

As the evening approached, the patient started feeling nauseous, had severe back pain, and vomited a few times. The patient's clinical state was initially considered a late side effect of spinal anesthesia, while his blood pressure and pulse remained normal (139/90 mmHg and 77 bpm). In less than 30 minutes, the patient started having severe chest pain and trouble breathing, and blood oxygenation levels dropped to 88%.

Another blood check-up was performed, and D-Dimer values appeared to be 2.1 µg/ml, which increased the suspicion of postoperative thromboembolism. A contrast-enhanced chest and abdominal computed tomography scan was immediately performed, thus revealing both pulmonary and renal thromboembolism (Figures 1-5).

In this case, pulmonary thromboembolism presents clot formation in main pulmonary arteries or veins, or embolus migration from lower body compartments, and it is a common postoperative life-threatening condition. Clots usually form on deep veins in the lower extremities or deep pelvis, usually due to prolonged patient immobility, reduced blood flow, and surgical trauma itself, thus disrupting normal homeostasis and triggering a coagulation cascade, which leads to a clot forming, which later breaks free and travels upward to vital organs. Due to the rapid obstruction of blood flow to the lungs, the patient begins to experience severe chest pain and shortness of breath, and in the worst case, this clinical condition can lead to cardiopulmonary arrest.⁽⁷⁾

Multiple pre- and postoperative measures are taken to prevent pulmonary thromboembolism, such as using intermittent pneumatic compression devices, wearing compressive socks, using anticoagulant therapy, early mobility of the patient, and frequent physical therapy.

After surgery, early patient monitoring is essential, such as frequently monitoring vital signs and oxygen saturation levels and recognizing early signs of chest pain or increased respiratory rate.⁽⁸⁾ If pulmonary thromboembolism has already occurred post-operatively, as in our case, the treatment usually involves anticoagulant or thrombolytic therapy, oxygen therapy, and hemodynamic patient support. To reduce the risk and minimize the impact of postoperative pulmonary thromboembolism, it is crucial to take proper prophylactic measurements, monitor the patient closely, and treat them accurately.^(9,10)

Unfortunately, our patient also experienced renal thromboembolism and infarction, concomitantly with pulmonary embolism, thus requiring an immediate patient transfer to the intensive care unit (Figures 4 and 5).

With kidney thromboembolism, blood clots block blood vessels supplying the kidneys, leading to severe impairment of renal function (BUN=73mmol/L, Cr= 6.3mg/dL). Our patient had an acute kidney injury that required immediate dialysis, which helped maintain proper electrolyte and fluid balance.



Fig. 1. Contrast-enhanced axial chest CT scans: a. Left pulmonary artery embolism, b. Right pulmonary artery embolism (as indicated by the arrow line).

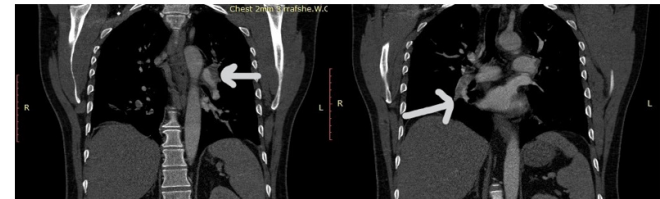


Fig. 2. Contrast-enhanced sagittal chest CT scans: a. Left pulmonary artery embolism, b. Right pulmonary artery embolism (as indicated by the arrow line).



Fig. 3. A minimal pulmonary effusion on both sides of the lungs.

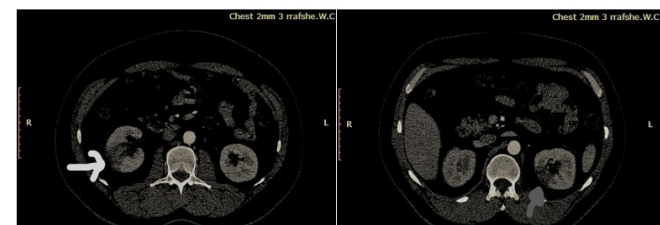


Fig. 4. Axial abdominal CT scans: a. Right kidney infarction, b. Left kidney infarction (as indicated by the arrow line).

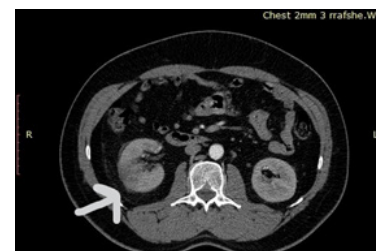


Fig. 5. Contrast-enhanced axial abdominal CT scans: Right kidney cortical infarction

Discussion

Various factors, such as type of surgery, prophylactic measurements, and patient's general health, define the incidence and severity of systemic thromboembolism. Overall, systemic thromboembolism is considered a very rare event after knee arthroscopy, but it can be very debilitating once it occurs.⁽¹¹⁾

The most frequent cause of systemic thromboembolism after knee arthroscopy is the patient's prolonged immobility, leading to venous stasis and hypercoagulability, which triggers the coagulation cascade and leads to clot formation. In addition, one should consider patient-specific risk factors such as obesity, advanced age, smoking, and cardiovascular or oncologic events, which would add to this equation.⁽¹²⁾

To significantly reduce the risk of thromboembolism, physicians should offer proper prophylactic measurements to the patients at risk, such as the use of anticoagulant therapy such as aspirin or heparin, which can significantly reduce the risk, and make sure that patients understand the importance of their compliance with therapy, which plays a crucial role in the treatment's success.⁽¹³⁾

Preventing systemic thromboembolism after knee surgery is essential to ensure patient safety and optimize postoperative outcomes. Physicians should evaluate the patient's risk factors, such as advanced age, medical history, and comorbidities. Furthermore, it is critical to maintain proper hydration of the patient after surgery, educate the patient about the importance of anticoagulant compliance, and offer mechanical compression devices as integral components of a comprehensive approach to preventing systemic thromboembolism.⁽¹⁴⁾

In conclusion, a multidisciplinary approach is crucial to minimize the thromboembolism occurrence risk while maximizing the benefits of knee arthroscopy and promoting better patient health.

Competing Interests

The authors declare that they have no competing interests.

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