

Delayed Hemarthrosis Due to Superior Lateral Genicular Artery Bleeding Following Total Knee Arthroplasty in a Patient with Rheumatoid Arthritis: A Case Report

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[DOI: 10.58542/jbota.v62i1.166](https://doi.org/10.58542/jbota.v62i1.166)

Abstract-- Introduction: Spontaneous non-hemophiliac hemarthrosis is a rare but potentially serious complication following total knee arthroplasty (TKA), with a reported prevalence of 0.3–0.65%. Although its etiology is often multifactorial, patients with rheumatoid arthritis (RA) may be particularly predisposed due to synovial hypervascularization. Timely diagnosis and structured management are critical to avoid prosthetic joint compromise.

Case Presentation: We present a case of a 57-year-old woman with a history of RA who developed recurrent spontaneous hemarthrosis two years after primary TKA. Despite repeated aspirations and normal coagulation parameters, symptoms persisted. CT angiography revealed active extravasation from the superior lateral genicular artery and an organized intracapsular hematoma. The patient underwent successful selective arterial embolization, resulting in complete symptom resolution without recurrence during follow-up.

Discussion: This case underscores the importance of including vascular causes in the differential diagnosis of unexplained hemarthrosis after TKA, particularly in patients with RA. Arteriography serves as a valuable diagnostic and therapeutic tool, allowing for identification and embolization of bleeding sources. Compared to surgical interventions, embolization is less invasive and facilitates faster recovery. In cases with residual organized hematoma, open debridement may still be necessary.

Conclusion: Vascular complications such as genicular artery bleeding, though rare, should be considered in cases of recurrent hemarthrosis post-TKA. A stepwise approach involving joint aspiration, imaging, and embolization can lead to successful outcomes while minimizing surgical morbidity.

Key words: knee arthroplasty, complication, Hemarthrosis Rheumatoid Arthritis;

1. Introduction

The rate of total knee replacement (TKR) utilization has been dramatically increasing since the beginning of the millennium¹. The development of advanced surgical techniques has contributed to improved satisfaction following surgical treatment; however, it is notable that the incidence of complications has also risen in parallel with the increasing frequency of this procedure².

Spontaneous non-hemophilic hemarthrosis is an uncommon complication after TKR, with limited representation in the literature. The reported prevalence ranges from 0.3% to 0.65% of all cases^{3,4}. Symptoms of recurrent bleeding following TKR may include joint stiffness, restricted range of motion, pain, and—in severe cases—deep joint infection⁵. Prompt and appropriate management is essential to preserve the integrity of the prosthetic joint.

Patients with rheumatoid arthritis (RA) frequently exhibit synovial hypertrophy and hypervascularization of affected joints^{6,7}, which may predispose them to postoperative hemarthrosis. Despite this plausible association, only a few cases have been described in the literature linking RA to this rare complication⁸.

This case report describes a delayed hemarthrosis due to superior medial genicular artery bleeding, diagnosed via CTA.

2. Case presentation

A 57-year-old woman with a history of rheumatoid arthritis underwent a primary total knee arthroplasty at our institution. The postoperative period was uneventful, and she regained full mobility. Two years later, she began experiencing spontaneous episodes of knee swelling, pain, and limited range of motion without any history of trauma. Repeated aspirations yielded bloody synovial fluid, but there were no clinical or laboratory signs of infection. Coagulation parameters were within normal limits, and the patient was not on anticoagulant or antiplatelet therapy. Due to the recurrent nature of the hemarthrosis, a CT angiography of the knee was performed. The scan revealed active extravasation from the superior lateral genicular artery and the presence of a well-organized intracapsular hematoma. The hematoma appeared to be causing mechanical symptoms and discomfort.

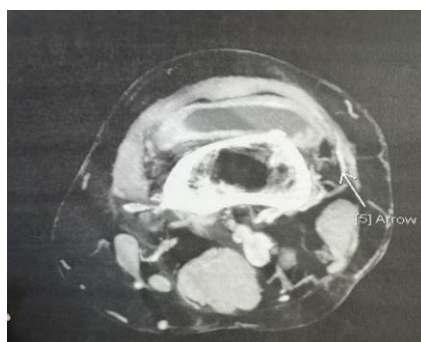


Fig.1: Arrow pointing the artery

The patient underwent selective arterial embolization of the superior lateral genicular artery in another institution. Post-embolization imaging confirmed successful occlusion of the vessel with no further contrast leakage into the hematoma.

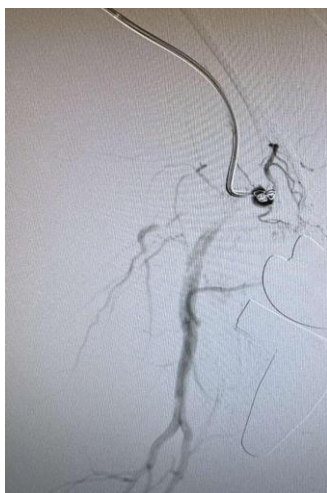


Fig.2: intraoperative photo of the embolization

The joint was monitored clinically, and the patient reported significant symptom relief with no recurrence of swelling or pain during follow-up.

3. Discussion

This case highlights the potential role of arteriography in diagnosing the underlying cause of hemarthrosis and supports the consideration of a structured treatment approach for unexplained bleeding episodes following total knee arthroplasty.

This complication represents a significant clinical concern. Although uncommon, vascular complications following knee surgery are associated with higher 90-day mortality, elevated risk of postoperative infection, prolonged hospitalization, and ultimately may negatively impact both clinical outcomes and prosthesis longevity⁹.

A thorough understanding of the vascular anatomy is essential for preventing vascular injuries. Tomaszewski et al. classified the popliteal artery branching patterns based on the level of bifurcation: Type I occurs proximal to the knee joint, Type II at the joint level, and Type III distal to the joint. Among these, Type I is the most frequently observed, with a reported prevalence of approximately 95%¹⁰.

The etiology of delayed hemarthrosis after TKR is multifactorial and includes repetitive trauma to a hypervascular hypertrophied synovium¹¹, impingement of the hypertrophic synovium between the femoral and tibial components¹², pigmented villonodular synovitis¹³, anticoagulant therapy¹², bleeding from genicular arterial branches¹³, and congenital bleeding disorders such as hemophilia¹⁵.

On the other hand, rheumatoid arthritis involves chronic synovial inflammation accompanied by tissue hyperplasia. This process is driven in part by endothelial activation within synovial microvasculature, resulting in increased vascular density. Even after total joint arthroplasty, persistent inflammatory activity and microvascular proliferation may continue within the synovium. However, the contribution of these preoperative changes to postoperative hemarthrosis remains underexplored¹⁶.

While additional studies are warranted, this case underlines the potential value of thorough preoperative evaluation in clarifying the etiology of such vascular complications.

Management of recurrent hemarthrosis of unknown origin following total knee arthroplasty should follow a stepwise approach. Initial needle aspiration is recommended in all cases to alleviate pain and joint stiffness, as well as to support diagnostic clarification. In most instances, aspiration combined with conservative measures—such as limb elevation, cryotherapy, and rest—can effectively prevent further bleeding episodes¹⁷. Moreover, joint aspiration plays a crucial role in excluding periprosthetic joint infection, particularly in cases where inflammatory markers are elevated¹⁷. If conservative management fails to resolve the symptoms, femoral arteriography should be considered as the next diagnostic step. This imaging modality is highly effective in identifying the source of bleeding, such as arteriovenous fistulae or aneurysms, and offers the advantage of enabling immediate therapeutic embolization if indicated⁸.

Embolization of the bleeding source through the in situ catheter represents a minimally invasive and efficient therapeutic option. Compared to arthroscopic or open surgical revision, it offers several advantages, including the use of local anesthesia, reduced risk of infection, and expedited postoperative mobilization—an essential factor for optimal functional recovery¹⁸. In the present case, symptoms resolved following embolization; however, open debridement may be warranted in the presence of an organized hematoma and early interventions.

5. Conclusion

Recurrent hemarthrosis following total knee arthroplasty, though rare, poses a significant diagnostic and therapeutic challenge, particularly in patients with underlying rheumatoid arthritis. This case emphasizes the need for a structured, stepwise approach to evaluation and management. When conservative treatment fails, vascular imaging—particularly CT angiography or femoral arteriography—can play a pivotal role in identifying the source of bleeding. Selective arterial embolization offers a minimally invasive, effective solution with rapid recovery and low complication risk. Awareness of this potential complication and early intervention are essential for preserving prosthesis function and optimizing clinical outcomes.

6. References

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