

Case report

<https://doi.org/10.17816/2311-2905-17588>

Inferior Medial Genicular Artery Pseudoaneurysm After Primary Total Knee Arthroplasty: A Case Report

Ahmed M. Abdelaal¹, Ahmed A. Khalifa^{1,2}¹ Assiut University Hospital, Assiut, Egypt² Qena faculty of medicine and University Hospital, South Valley University, Qena, Egypt

Abstract

Background. Small genicular vessel injuries during primary total knee arthroplasty can pass unnoticed during the surgery and present late postoperatively.

Case description. We present a 65-year-old female patient, who was admitted three weeks after primary total knee arthroplasty with fresh bleeding from the lower end of the surgical wound. CT angiography showed a pseudoaneurysm of the inferior medial genicular artery which was treated at the same session by coil embolization.

Conclusions. A pseudoaneurysm of the inferior medial genicular artery can complicate primary total knee arthroplasty. An interventional radiologist assistance is necessary for diagnosis and management.

Keywords: inferior medial genicular artery, pseudoaneurysm, total knee arthroplasty.

Cite as: Abdelaal A.M., Khalifa A.A. Inferior Medial Genicular Artery Pseudoaneurysm After Primary Total Knee Arthroplasty: A Case Report. *Traumatology and Orthopedics of Russia*. (In Russian). <https://doi.org/10.17816/2311-2905-17588>.

✉ Ahmed A. Khalifa; e-mail: ahmed_adel0391@med.svu.edu.eg

Submitted: 12.07.2024. Accepted: 19.08.2024. Published Online: 14.11.2024.

© Abdelaal A.M., Khalifa A.A., 2024

Клинический случай
УДК 616.728.3-089.844-06
<https://doi.org/10.17816/2311-2905-17588>



Ложная аневризма медиальной нижней коленной артерии после эндопротезирования коленного сустава: клинический случай

А.М. Абделаал¹, А.А. Халифа^{1,2}

¹ Assiut University Hospital, Assiut, Egypt

² Qena faculty of medicine and University Hospital, South Valley University, Qena, Egypt


Реферат

Актуальность. Повреждения мелких сосудов при первичном тотальном эндопротезировании коленного сустава могут остаться незамеченными во время операции и проявиться в послеоперационном периоде.

Описание клинического случая. Пациентка 65 лет поступила в клинику через три недели после эндопротезирования коленного сустава с кровотечением в нижней части послеоперационной раны. КТ-ангиография показала ложную аневризму медиальной нижней коленной артерии, которая была устранена интервенционным рентгенологом при помощи спиральной эмболизации.

Заключение. Ложная аневризма медиальной нижней коленной артерии может осложнить первичное тотальное эндопротезирование коленного сустава. Для ее диагностики и лечения необходима помощь интервенционного рентгенолога.

Ключевые слова: медиальная нижняя коленная артерия, ложная аневризма, тотальное эндопротезирование коленного сустава.

 **Для цитирования:** Абделаал А.М., Халифа А.А. Ложная аневризма медиальной нижней коленной артерии после эндопротезирования коленного сустава: клинический случай. *Травматология и ортопедия России*. (На англ.). <https://doi.org/10.17816/2311-2905-17588>.

 **Ахмед А. Халифа;** e-mail: ahmed_adel0391@med.svu.edu.eg

Рукопись получена: 12.07.2024. Рукопись одобрена: 19.08.2024. Статья опубликована онлайн: 14.11.2024.

© Абделаал А.М., Халифа А.А., 2024

INTRODUCTION

Vascular complications after total knee arthroplasty (TKA) are uncommon, occurring at an incidence of 0.03 to 0.50%, which is higher in revision surgeries [1, 2]. If occurred and diagnosed early, the complication can be managed sufficiently by percutaneous intervention maneuvers. However, if it is severe or missed, it might need vascular surgery intervention and can result in a limb amputation [2, 3].

Pseudoaneurysm formation after TKA most likely results from iatrogenic trauma during tibial cut either by the saw blade or a bluntly placed instrument [4]. The trauma can affect one of the major vessels, such as the popliteal artery, or one of the smaller branches, such as one of the genicular arteries, as reported in the literature [2, 4, 5].

We introduce a case of inferior medial genicular artery (IMGA) injury presented by pseudoaneurysm three weeks after primary TKA, which was performed for primary knee osteoarthritis.

CASE DESCRIPTION

History and patient information

A 65-year-old female complaining of chronic right knee pain was diagnosed with advanced primary knee osteoarthritis (OA). The patient underwent TKA under spinal anesthesia and tourniquet control. The surgery was performed through a medial parapatellar approach, using a manual instrument (an intramedullary rod to guide the distal femoral cuts, while the tibial cuts were performed using an extramedullary guide), and a cemented posterior stabilized prosthesis was implanted. The wound was closed in layers, and a suction drain was inserted.

No intraoperative adverse events were reported. Postoperatively, the patient stayed in the hospital for two days. The drain was removed on the second postoperative day (the draining amount was 400 cm³), and there was no need for a blood transfusion. Before discharge, the wound was checked, and no abnormality was detected. Anticoagulation therapy in the form of aspirin 75 mg tablets twice daily was prescribed for three weeks.

Clinical findings

The patient showed up in the clinic after two weeks for suture removal. She reported committing to the postoperative rehabilitation protocol under the supervision of a physiotherapist, and there was a gradual improvement in pain and knee motion. However, later on, after a week, the patient presented with fresh bleeding from the lower end of the wound. She denied any history of trauma or a change of the anticoagulation medication. The distal pulse was intact. There was a massive knee swelling, no hotness, a positive patellar tap test, and mild tenderness over the knee joint line. The wound was healed except for the lower end, where blood oozing was coming from.

Diagnostic assessment and therapeutic intervention

After consultation, an intervention radiologist advised an immediate CT angiography with contrast. It revealed a contrast-filled lesion near the anteromedial border of the tibial insert, diagnosed as pseudoaneurysm originating from the IMGA and treated at the same session by endovascular coil embolization (Figure 1).

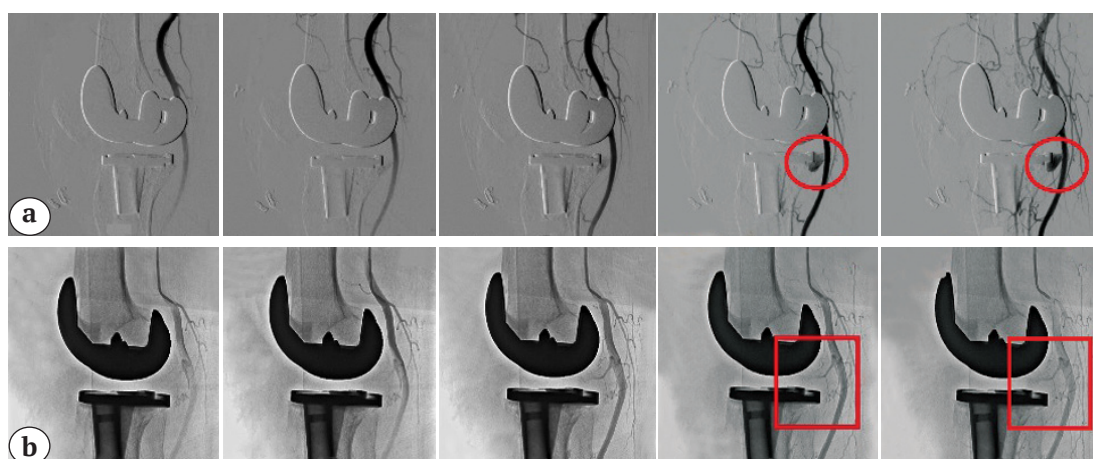


Figure 1. CT angiography with contrast delineates a pseudoaneurysm of the inferior medial genicular artery:

a – pre-embolization CT angiography images showing the knee prosthesis and leakage of the contrast material near the border of the tibial insert (red circle);

b – post-embolization CT angiography images showing sealing and obliteration of the pseudoaneurysm after coil embolization with no leakage of the contrast material (red squares)

Follow-up and outcomes

The patient was advised to continue the rehabilitation protocol. A weekly evaluation of the knee for the first month was performed. The lower end of the wound healed without any further complications, and the knee swelling resolved within the first two weeks. No incidents of bleeding or swelling were reported till the last follow-up.

DISCUSSION

Genicular arteries (lateral and medial, including the IMGa) represent the main blood supply of the knee joints and originate mainly from the popliteal artery (PA) and the superficial femoral artery (SFA) [6].

Vascular injuries during TKA are rare and occur more commonly during revision surgery. These can be a direct injury of one of the major vessels (PA and SFA) or any of the smaller genicular branches, presenting as a pseudoaneurysm [2, 3]. Risk factors for pseudoaneurysm formation are not well documented. However, previous vasculopathy (in patients with diabetes or peripheral vascular disease), atherosclerosis, and female gender were proposed as possible predisposing factors [2, 4].

Clinical presentation can be recurrent knee swelling (hemarthrosis), bruising, pulsatile mass,

or fresh bleeding, which can be acute, subacute, or chronic (commonly occurring if small vessels are involved) [1]. In the current case, we believe that the initial IMGa injury was plugged by a small clot that was dislodged when the patient increased her activities after suture removal, which led to recurrent bleeding.

Proper management involves accurate diagnosis by early suspicion and the help of a vascular surgeon or interventional radiologist. Definitive management relies mainly on the type of the vessel injured. It can range from direct vascular repair or bypass if a major vessel was involved to percutaneous procedures such as cauterization, stenting, and embolization, which was performed in the current case [1, 5, 6].

CONCLUSIONS

Although vascular injuries during total knee arthroplasty are rare, if passed unnoticed, they can be devastating, leading up to limb amputation. Injury of the smaller branches, including the inferior medial genicular artery, can occur, which might present with knee swelling and fresh bleeding. Minimally invasive management techniques such as percutaneous embolization in collaboration with the interventional radiology team are safe and effective.

DISCLAIMERS

Acknowledgments

We would like to thank Prof. Dr. Mostafa Hashim (intervention radiologist) for his guidance and effort.

Author contribution

Ahmed M. Abdelaal — study concept, drafting the manuscript, editing the manuscript.

Ahmed A. Khalifa — data acquisition, analysis and interpretation, literature search and review, drafting the manuscript.

All authors have read and approved the final version of the manuscript of the article. All authors agree to bear responsibility for all aspects of the study to ensure proper consideration and resolution of all possible issues related to the correctness and reliability of any part of the work.

Funding source. This study was not supported by any external sources of funding.

Disclosure competing interests. The authors declare that they have no competing interests.

Ethics approval. Not applicable.

Consent for publication. Written consent was obtained from the patient for publication of relevant medical information and all of accompanying images within the manuscript.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Благодарность

Мы благодарим профессора д-ра Мустафу Хашима (рентгенолога) за его помощь в исследовании.

Заявленный вклад авторов

Ахмед М. Абделаал — концепция исследования, написание текста рукописи, редактирование текста рукописи.

Ахмед А. Халифа — сбор данных, анализ и интерпретация данных, поиск и анализ публикаций, написание текста рукописи.

Все авторы прочли и одобрили финальную версию рукописи статьи. Все авторы согласны нести ответственность за все аспекты работы, чтобы обеспечить надлежащее рассмотрение и решение всех возможных вопросов, связанных с корректностью и надежностью любой части работы.

Источник финансирования. Авторы заявляют об отсутствии внешнего финансирования при проведении исследования.

Возможный конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

Этическая экспертиза. Не применима.

Информированное согласие на публикацию. Авторы получили письменное согласие пациента на публикацию медицинских данных и изображений.

REFERENCES

1. Nicolino T.I., Costantini J., Astore I., Yacuzzi C.H., Astoul Bonorino J., Costa Paz M. et al. Incidence of vascular injury associated with knee arthroplasty: series of cases. *Eur J Orthop Surg Traumatol.* 2024;34(7):3735-3742. doi: 10.1007/s00590-023-03814-5.
2. Sundaram K., Udo-Inyang I., Mont M.A., Molloy R., Higuera-Rueda C., Piuze N.S. Vascular Injuries Total Knee Arthroplasty: A Systematic Review and Meta-Analysis. *JBJS Rev.* 2020;8(1):e0051. doi: 10.2106/JBJS.RVW.19.00051.
3. Petis S.M., Johnson J.D., Brown T.S., Trousdale R.T., Berry D.J., Abdel M.P. Catastrophic Vascular Injury After Total Knee Arthroplasty. *Orthopedics.* 2022;45(6): 340-344. doi: 10.3928/01477447-20220907-02.
4. Puijk R., Rassir R., Kaufmann L.W., Nolte P.A. A Pseudoaneurysm of the Inferior Lateral Geniculate Artery Following Total Knee Arthroplasty. *Arthroplast Today.* 2022;15(9):120-124. doi: 10.1016/j.artd.2022.03.017.
5. Daniels S.P., Sneag D.B., Berkowitz J.L., Trost D., Endo Y. Pseudoaneurysm after total knee arthroplasty: imaging findings in 7 patients. *Skeletal Radiol.* 2019;48(5): 699-706. doi: 10.1007/s00256-018-3084-4.
6. Liu S., Swilling D., Morris E.M., Macaulay W., Goltzarian J., Hickey R. et al. Genicular Artery Embolization: A Review of Essential Anatomic Considerations. *J Vasc Interv Radiol.* 2024;35(4):487-496. doi: 10.1016/j.jvir.2023.12.010.

Authors' information

✉ Ahmed A. Khalifa, MD — Assistant professor
Address: Kilo 6 Qena-Safaga highway, Qena, Egypt (83523)
<https://orcid.org/0000-0002-0710-6487>
e-mail: ahmed_adel0391@med.svu.edu.eg

Ahmed M. Abdelaal, MD
<https://orcid.org/0000-0002-2573-1681>
e-mail: aabdelaal61@yahoo.com

Сведения об авторах

✉ Ахмед А. Халифа — доцент
Адрес: Kilo 6 Qena-Safaga highway, Qena, Egypt (83523)
<https://orcid.org/0000-0002-0710-6487>
e-mail: ahmed_adel0391@med.svu.edu.eg

Ахмед М. Абделаал
<https://orcid.org/0000-0002-2573-1681>
e-mail: aabdelaal61@yahoo.com