

Glue Embolization of a Traumatic Geniculate Artery Pseudoaneurysm

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Abstract

Geniculate artery pseudoaneurysms are a rare but documented complication of arthroscopic intervention, trauma, or knee arthroplasty. Treatment options include open surgery and endovascular techniques; however, few reports have described the latter. Here, we describe a case of post-traumatic geniculate artery pseudoaneurysm successfully treated with glue embolization without subsequent complications and clinical improvement upon follow-up following operative debridement.

Keywords

Pseudoaneurysm, Geniculate artery, Hemorrhage, NBCA, Embolotherapy, Glue embolization

List of Abbreviations

CTA: Computed Tomography Angiogram; NBCA: N-butyl cyanoacrylate; US: Ultrasound

Introduction

A 45-year-old male with a history of recent right patellar fracture secondary to motor vehicle crash complicated by hardware infection requiring multiple revisions presented to the emergency department with fever to 102° F and rigors five days following hardware removal, debridement, and new hardware placement. He was admitted with concern for persistent infection of the knee as intraoperative cultures ultimately grew *Staphylococcus epidermis*. He was placed on broad-spectrum antibiotics and repeat ultrasound guided aspiration was requested.

Material and Methods

The ultrasound demonstrated a 3.1 cm pseudoaneurysm along the superolateral aspect of the right knee in addition to a large evolving hematoma, thus aspiration was not performed (Figure 1A).

CT angiography (CTA) confirmed pseudoaneurysm (red arrow) arising from right superolateral geniculate artery and a large prepatellar hematoma overlying the pseudoaneurysm (Figure 1B). Interventional radiology was consulted for embolization of the pseudoaneurysm in anticipation of the need for further operative debridement.

The patient was taken to the angiography suite, where right lower extremity

runoff demonstrated the pseudoaneurysm seen on CTA. After gaining vascular access in the contralateral femoral artery, an angled tip catheter and guidewire were advanced up and over the common iliac bifurcation, after which the catheter was removed, and a long vessel sheath was placed.

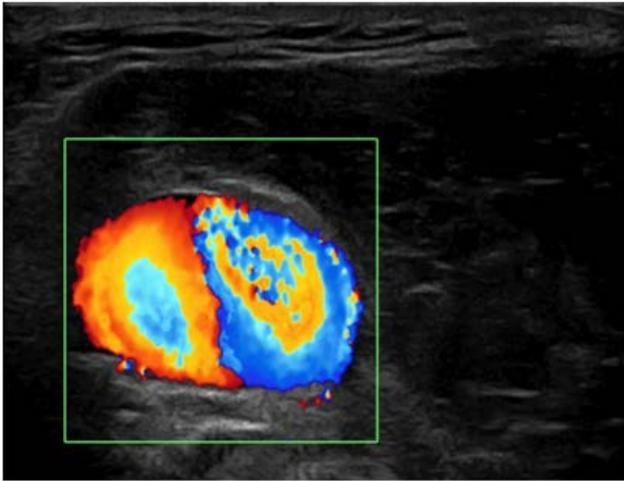


Figure 1A: The ultrasound demonstrated a 3.1 cm pseudoaneurysm along the superolateral aspect of the right knee in addition to a large evolving hematoma.

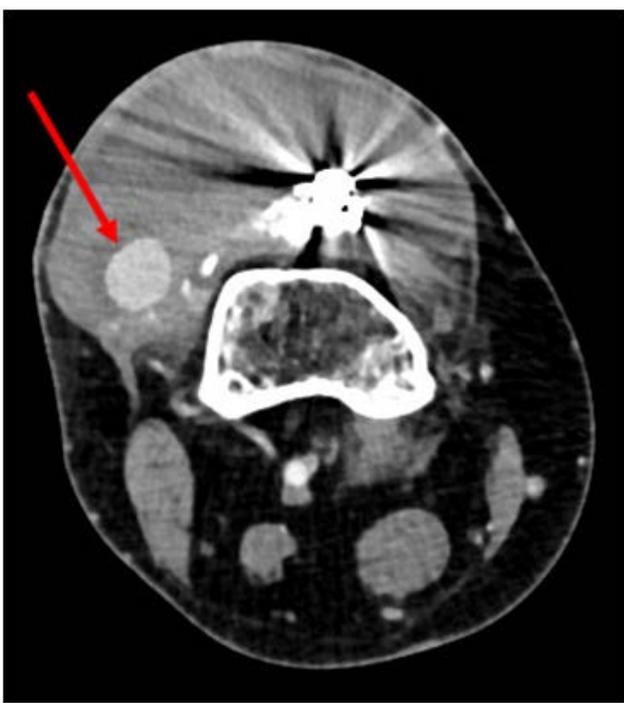


Figure 1B: CT angiography (CTA) confirmed pseudoaneurysm (red arrow) arising from the right superolateral geniculate artery and a large prepatellar hematoma overlying the pseudoaneurysm.

Next, the angled tip catheter was placed into the distal superficial femoral artery and a popliteal arteriogram was performed, confirming the previously seen pseudoaneurysm arising from the right superolateral geniculate artery (Figure 2A, red arrow).

The right superolateral geniculate artery was selected with a Cantata microcatheter and Fathom guidewire (Figure 2B). The

pseudoaneurysm was then embolized using 0.1 mL of NBCA glue (Figure 2C). Post-embolization arteriogram demonstrated cessation of flow into the vessel and pseudoaneurysm (Figure 2D).



Figure 2A: Pseudoaneurysm arising from the right superolateral geniculate artery (red arrow).

Shortly after embolization, the patient underwent uncomplicated operative debridement. He demonstrated clinical improvement and showed no signs of ongoing infection or acute blood loss with a stable hemoglobin. Thus, he was deemed stable for discharge with continuation of antibiotics. At his two weeks postoperative clinic appointment, his knee pain and swelling had resolved, and radiographs demonstrated decreased soft tissue swelling without evidence of hardware complications.

Results and Discussion

Pseudoaneurysms are a common, potentially devastating vascular complication which may result from any cause of arterial



Figure 2B: Pseudoaneurysm arising from the right superolateral geniculate artery (red arrow).

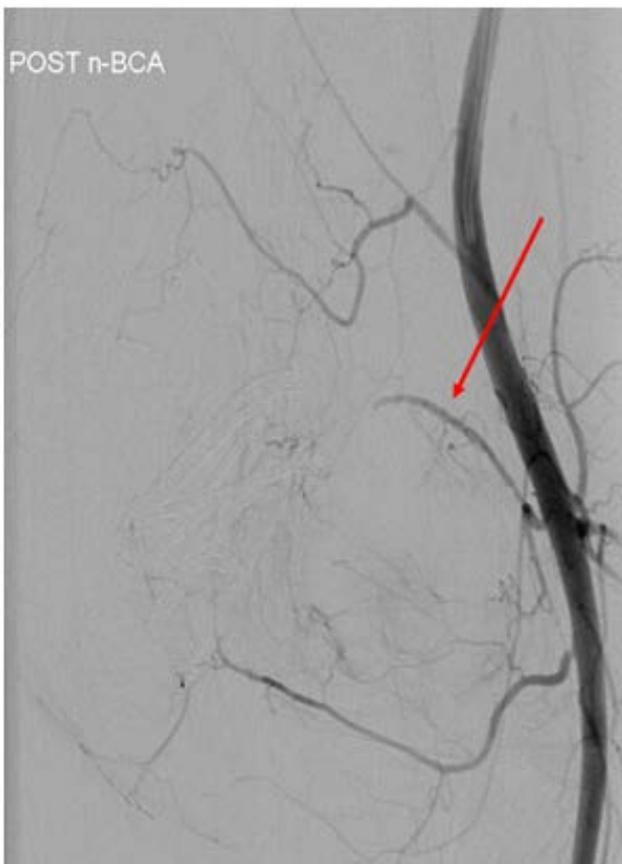


Figure 2C: The pseudoaneurysm embolization using 0.1 mL of NBCA glue.

wall disruption [1]. Their typical doppler ultrasonographic appearance of a cystic swirling structure is described by the “yin-yang sign” and CTA demonstrates a contrast-filled sac,



Figure 2D: Post-embolization arteriogram demonstrated cessation of flow into the vessel and pseudoaneurysm.

occasionally with peri-pseudoaneurysmal high attenuation suggestive of hemorrhage [1]. The decision regarding surgical or endovascular management versus observation alone depends on the presence of symptoms and morphological features (neck, accessibility, collateralization) [1].

Geniculate artery pseudoaneurysms are rare, with fewer than 20 cases documented to date. The majority of these arose after arthroscopic intervention, trauma, or knee arthroplasty [2]. However, vascular injury associated with these phenomena are exceedingly rare and have a predilection for the popliteal artery [2]. Surgical repair with vessel ligation, US-guided thrombin injection, and embolization have all been described as management for geniculate artery pseudoaneurysms, though surgery was performed in 75% of cases with primary embolization in 21% [1, 2]. Embolic agents previously used with reported success include coils and gelfoam [3, 4]. However, there remains a paucity of data on the relative efficacy of each agent and no prior direct comparisons with other forms of intervention.

Here, we report technically successful embolization of a post-traumatic superolateral geniculate artery pseudoaneurysm with the goal of reducing the risk of hemorrhage during anticipated debridement for post-operative hardware infection. Pseudoaneurysm infection, a known complication with sequelae including rupture and distal septic embolization, was

certainly of clinical concern in the setting of positive operative cultures and persistent symptoms [5]. However, the benefits of source control as well as hemorrhage prophylaxis were deemed to outweigh these risks and has been described by others as an effective management in comparable clinical situations. This technique likely represents a safe and efficacious method for the management of geniculate artery pseudoaneurysm. However, this patient will require follow-up to surveil for further orthopedic and vascular complications.

Conflict of Interest Statement

The authors whose names are listed above certify that they have no affiliations with/or involvement in any organization or entity with any financial interest (such as honoraria, educational grants, participation in speakers' bureaus, membership, employment, consultancies, stock ownership, or other equity interest and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

References

1. Saad NE, Saad WE, Davies MG, Waldman DL, Fultz PJ, et al. 2005. Pseudoaneurysms and the role of minimally invasive techniques in their management. *Radiographics* 25(Suppl 1): S173-S189. <https://doi.org/10.1148/rg.25si055503>
2. Filho ES, Isolani GR, Baracho FR, de Oliveira Franco AP, Ridder Bauer LA, et al. 2015. Pseudoaneurysm after arthroscopic procedure in the knee. *Rev Bras Ortop* 50(2): 131-135. <https://doi.org/10.1016/j.rboe.2015.03.001>
3. Shaw A, Stephen A, Lund J, Bungay P, Denunzio M. 2009. Geniculate arterial pseudoaneurysm formation following trauma and elective orthopaedic surgery to the knee: 2 case reports and a review of the literature. *J Radiol Case Rep* 3(3): 12-16. <https://doi.org/10.3941/jrcr.v3i3.42>
4. Saini P, Meena S, Malhotra R, Gamanagatti S, Kumar V, et al. 2013. Pseudoaneurysm of the superior lateral genicular artery: case report of a rare complication after total knee arthroplasty. *Patient Saf Surg* 7: 15. <https://doi.org/10.1186/1754-9493-7-15>
5. Matic P, Babic S, Tanaskovic S, Jovic D, Radak D. 2012. Treatment of infected pseudoaneurysm of femoral artery after vascular closure device deployment: a practical solution. *Case Rep Vasc Med* 2012: 292945. <https://doi.org/10.1155/2012/292945>