

Treatment of an infected giant brachial artery pseudoaneurysm: a case report

Enfekte dev brakiyal arter psödoanevrizmasının tedavisi: Olgu sunumu

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Peripheral artery aneurysms are much less frequent in the upper extremities than in the lower extremities. Giant brachial artery pseudoaneurysms secondary to inadvertent puncture of the brachial artery during venous cannulation for hemodialysis are rare. These pseudoaneurysms may result in serious complications such as life-threatening hemorrhage and severe decreases in extremity function and also lead to loss of arms or fingers and even death. In this article, we present a case of infected giant brachial artery pseudoaneurysm secondary to brachial artery puncture for hemodialysis and successfully treated with aneurysmectomy and a short saphenous vein interposition graft.

Key words: Brachial artery; infected pseudoaneurysm; saphenous graft; upper extremity.

Pseudoaneurysms can be due to an accidental puncture of a native brachial artery instead of the venous side of an arteriovenous fistula during hemodialysis. At present, they have become more likely to appear since interventions on the upper extremities, such as coronary artery angiographies and stent insertions as well as interventions on the patients dependent on hemodialysis, have become widespread. Patients undergoing dialysis are at a high risk for arterial complications because of the use of large caliber needles, systemic heparinization, and repeated cannulations of a surgically created arteriovenous fistula.^[1] Care must be taken not to damage the nerves and veins adjacent to a pseudocapsule or scar tissue during surgical procedures.^[2]

CASE REPORT

A 47-year-old female presented with a six-month history of progressive swelling and pain in her left antecubital fossa and exercise-induced ischemia of the forearm

Periferik arter anevrizmaları, üst ekstremitelerde alt ekstremitelerden çok daha az görülür. Hemodiyaliz için yapılan venöz kateterizasyon esnasında istenmeden meydana gelen brakiyal arter delinmesine sekonder dev brakiyal arter psödoanevrizma oluşumu nadirdir. Bu psödoanevrizmalar; yaşamı tehdit eden kanama, ekstremitte fonksiyonlarında ciddi azalma, kol ya da parmakların kaybı ve hatta ölüm gibi ciddi komplikasyonlara neden olabilir. Bu yazıda, hemodiyaliz için yapılan kateterizasyon esnasında brakiyal arter delinmesine sekonder ortaya çıkan enfekte brakiyal arter psödoanevrizmasının, anevrizmektomi ve safen ven grefti interpozisyonu ile başarılı bir şekilde tedavisi sunulmuştur.

Anahtar sözcükler: Brakiyal arter; enfekte psödoanevrizma; safen greft; üst ekstremitte.

and hand. She had been on chronic hemodialysis for a total of 12 years and hemodialysis via a left brachiocephalic arteriovenous fistula at the antecubital region for two years. After a hemodialysis session, there was a progressive worsening of symptoms, with local erythema and marked pain on palpation with a pulsating mass (Figure 1). An angiogram of the left upper extremity showed a large, 13x7 cm pseudoaneurysm communicating with the distal portion of the brachial artery (Figure 2).

The pseudoaneurysm was treated with surgery. Operative findings revealed an infected pseudoaneurysm surrounded by a smooth, but extremely thin and fragile capsule. First, the proximal and then the distal part of the brachial artery were retracted with nylon tape for exploration. Next, 1 cc heparin (5.000 IU) was administered intravenously, the proximal and distal vascular structures were clamped, and a direct incision was made to open the capsule of the pseudoaneurysm.

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Figure 1. Infected pseudoaneurysm (white arrow).

An organized thrombus in the aneurysm was then removed. Subsequently, retrograde flow was restored, and a 4 cm arterial segment located in the pseudoaneurysmal region was resected. Finally, a short saphenous vein interposition graft was performed.

Pulsation was positive upon digital examination of the radial and ulnar arteries during the early postoperative period. Intraoperative cultures were positive for methicillin-sensitive *Staphylococcus aureus*, for which the patient was treated. Her postoperative course was uneventful, and her hand remained well perfused in the two-month follow-up. She died from a condition unrelated to surgery within three months postoperatively.

DISCUSSION

Aneurysms of the brachial artery due to catheterization rarely occur in patients under hemodialysis. Pseudoaneurysms should be treated since they may rupture and cause compression on the nerves, infection, and loss of function in the arm.^[3,4]

In the case presented here, we assumed that multiple direct arterial punctures led to the giant pseudoaneurysm.

A pseudoaneurysm of the brachial artery can be treated with brachial artery ligation, aneurysmectomy, surgical repair, endovascular covered stent exclusion, percutaneous injection of thrombin, and ultrasound-guided compression.

Excision and ligation as a definitive surgical therapy are more appropriate for pseudoaneurysms of the brachial artery than those elsewhere due to the rich collateral supply of the upper limbs. When performed, surgical therapy is associated



Figure 2. Completion angiogram of the left arm demonstrated the brachial artery pseudoaneurysm (white arrow).

with favorable outcomes.^[5] Behera et al.^[6] noted that none of the patients with a pseudoaneurysm of the brachial artery underwent reconstruction. However, most of the patients in Behera's series were young males and drug addicts, which means they had not yet developed atherosclerosis. In the case presented here, preoperative Doppler ultrasonography did not show a flow in the brachial artery when clamped. This might have been due to atherosclerosis and/or hypotension at the time. We did not perform excision and ligation due to the patient's age and uncertain vessel structures.

In this case, we discovered an arterial pathology when we accessed the pseudoaneurysm. In fact, there was a brachial artery defect where the pseudoaneurysm merged with the brachial artery. This defect was 4 cm in length. Saphenous vein graft interpositioning was then performed because the patient did not have a vascular structure that was conducive to end-to-end anastomosis.

Anatomical bypass can be used if a successful outcome after antimicrobial treatment with an appropriate agent is likely. Autogenous bypass materials can be used, including the greater or lesser saphenous veins.^[7] In fact, native vessels used for reconstruction have been reported to be more resistant against infection compared with prosthetic grafts.^[3]

Stents can be used in cases of an infected pseudoaneurysm when surgery was planned but could

not immediately be performed.^[4] Although stents have not been reported to be a permanent treatment for infected patients, they can be used with success in cases of pseudoaneurysms without infection.^[8]

Endoluminal placement of a stented graft effectively excludes pseudoaneurysms and maximizes the functional life span of the access while also maintaining other sites as future access options.^[8] Stent-grafting might have to be limited to cases in which, for some reason, standard operations cannot be performed.^[9] The patient reported here was well enough to undergo surgery. However, since local erythema and marked pain on palpation with a pulsating mass suggested a possible infection, we used autogenous bypass tissue instead of stenting. In fact, culture specimens obtained during surgery revealed methicillin-sensitive *Staphylococcus aureus* which justified our decision. Ultrasonography-guided compression can be acceptable in cases of small pseudoaneurysms. However, as in the case presented here, it is not a good alternative for giant pseudoaneurysms.^[10] This type of compression has been shown to be successful in 78.5% of the cases. When it fails, injection of thrombin is recommended.^[11]

Intervention radiology has increasingly become popular. In fact, it is the only alternative used to surgery for pseudoaneurysms. However, at present, most of the cases of pseudoaneurysms can be treated by interventional radiology with great success, but in rare cases, surgery is preferable because of a large infected pseudoaneurysm like the one reported here.

There are a variety of solutions to this very difficult problem; therefore, it is important that treatment should be individualized for each patient to achieve the optimum outcome.

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