

Surgical treatment of post-traumatic pseudoaneurysm and arteriovenous fistula due to gunshot injury

Ateşli silahla yaralanma neticesinde oluşan arteriyovenöz fistül ve psödoanevrizma olgusunun cerrahi tedavisi

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Posttraumatic pseudoaneurysm and arteriovenous fistula are rarely observed. Because of the imminent clinical course, early operation is usually indicated. In this study, we present a case of pseudoaneurysm in the left superficial femoral artery and arteriovenous fistula between the left superficial femoral artery and vein in the left thigh, as a result of a gunshot injury. Magnetic resonance angiography and color Doppler ultrasound were used for diagnosis. The patient underwent a successful aneurysmectomy, saphenous vein interposition and venous repair and was discharged on the eighth postoperative day.

Key Words: Arteriovenous fistula; pseudoaneurysm, trauma; vascular surgery.

Posttravmatik psödoanevrizma ve arteriyovenöz fistül oluşumu nadiren gözlenmektedir. Klinik gidiş bakımından erken yapılan cerrahi tedavi tercih edilmektedir. Bu yazıda sol uyluktaki süperfisiyel femoral arter psödoanevrizması ve süperfisiyel femoral arter ve ven arasındaki arteriyovenöz fistül olgusu sunuldu. Ateşli silahla yaralanma sonucunda oluşan bu patolojinin tanısı için manyetik rezonans görüntüleme ve renkli Doppler ultrasonografi yapıldı. Olguya anevrizmektomi, safen ven interpozisyonu ve venöz tamir uygulandı, ameliyat sonrası sekizinci gün taburcu edildi.

Anahtar Sözcükler: Arteriyovenöz fistül; psödoanevrizma, travma; vasküler cerrahi.

Arterial pseudoaneurysm and arteriovenous fistula might occur as a result of trauma in different parts of the body. These two entities can form independently of one another, but even though it is rare they also could be observed simultaneously.^[1] Clinical progress could get serious in this type of occurrences and because of the imminent clinical course early diagnosis and treatment are needed. Surgical treatment is difficult and involves different methods.^[2,3]

In this report, we present our approach to the diagnosis and treatment of a pseudoaneurysm, and arteriovenous fistula due to gunshot injury.

CASE REPORT

A 21-year-old male was admitted to our clinic with pain, swelling in the interior of left thigh, and restricted movement ability in the relevant extremity. In patient's history, there was a gunshot injury in the mid-interior of left thigh, and the formation of progressive swelling started in this region of the body in two weeks after trauma. A local pulsatile mass of approximately 10x10 cm in size, located in the mid-interior of left thigh was detected on the physical examination. There was thrill, systolic murmur and local temperature rise in the swollen

region. Popliteal and pedal pulses were not palpable in the left lower extremity. The diagnosis of a pseudoaneurysm of approximately 10x10 cm in size, located in the left superficial femoral artery, and arteriovenous fistula between the left superficial femoral artery and vein were confirmed by magnetic resonance angiography and color Doppler ultrasound examinations (Fig. 1). A linear incision was done in the Hunter region of the left thigh in the operation. The pseudoaneurysm was measuring about 10x10 cm in diameter, and it was in the shape of a sphere and surrounded by a hard dark colored capsule. Arteriovenous fistula was present in the lower interior of the lesion. It was stuck on to the neighboring tissues. Intravenous heparin sulfate at a dosage of 5.000 units was given to the patient. The proximal and distal parts of the superficial femoral artery were controlled by atraumatic clamps. The aneurismal cavity was opened longitudinally. Thrombus and debris in the aneurismal sac were removed and the aneurysm wall was resected. Interposition was carried out, due to the loss of tissues of length 3-4 cm approximately between proximal and distal of the left superficial artery, with the saphenous vein taken from the opposite leg.

In the management of the arteriovenous fistula: the connection of the artery with the vein was of 0.5 cm in length. The part of the vein was repaired primarily. Following the bleeding control, the layers were closed appropriately. There was no complication either during or after the operation. In the post-operative period, the pulses in the left lower extremity were palpable. The patient was discharged after recovery on the eight day of the post-operative period and remained asymptomatic for two months after operation.

DISCUSSION

Pseudoaneurysms and arteriovenous fistulas usually result from traumas, mostly by the open ones. The causes include penetrating trauma, blunt trauma and iatrogenic injury.^[3,4] As a result of the arterial injury, periarterial hematoma occurs and the hematoma becomes surrounded by the fibrous tissue. Orifice of the pseudoaneurysm is rather small with respect to the aneurysmal diameter. Usually there is only one communication between the artery and vein. This type of cases could be observed in any part of the body and among the extremity ves-

sels, the superficial femoral is the one, which is most frequently affected.^[4,5]

Diagnosis is not difficult in these cases. Color Doppler ultrasound, computed tomography (CT), magnetic resonance angiography are the suggested methods of diagnosis. Additional pathologies can be detected by means of CT and magnetic resonance imaging. Angiography provides complete and accurate detection of the anatomical localization of the lesion and a good vision of the collaterals.

Cases where post-traumatic arteriovenous fistula and pseudoaneurysm coexist are rare and these cases should get immediate treatment in the early phases when detected. Serious complications can frequently occur in such cases. These complications are rupture, neuropathy, distal embolus and thrombosis.^[6] Therefore, many cases should undergo surgery as soon as possible. Early surgery has many advantages; it is easier due to less sticking and vascularization, distal embolus and rupture can be avoided and secondary infection rate resulting from hematoma due to rupture is lower. Arteriovenous fistula affecting the cardiovascular system hemodynamically and damaging the structure of the venous is avoided. Besides, immediate surgical operation prevents the pressure upon the neighboring muscle and nerve tissues by the existing mass.



Fig. 1. Magnetic resonance imaging shows a pseudoaneurysm and arteriovenous fistula in the left lower extremity.

Because of the fast progress of post-traumatic pseudoaneurysm and arteriovenous fistula cases and the resultant serious complications, it is recommended that surgical operation should be done as soon as possible. This point of view is supported by the fact that no problem is encountered in the follow-up period after the operation.^[7] The critical issue in the surgical treatment is the resection of the vascular lesion with restoration of blood flow. The preferred method is the resection of the aneurysm and the primary repair of the pseudoaneurysm entrance. But, if the anastomosis cannot be performed without tension due to the loss of tissues, then autogenous saphenous vein and synthetic graft can be used in vascular reconstruction. As for the arteriovenous fistula, artery and vein are separated from each other and the joint regions are repaired. In our study, we performed resection of the aneurysm and applied saphenous vein interposition on the defective region in the artery. The defect in the vein was repaired primarily. The less preferred surgical methods might be listed as ligation, aneurysmorrhaphy, and aneurysm exclusion with extra-anatomic bypass.

In conclusion, posttraumatic pseudoaneurysms and arteriovenous fistulas are the vascular complications resulting from local traumas. Because of the

high risk of complications, early diagnosis and surgical treatment is the preferred method in this type of cases.

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