

Acquired arteriovenous fistula and pseudoaneurysm secondary to penetrating inguinal trauma: a case report

Trauma inguinal penetrante com formação de fístula arteriovenosa e pseudoaneurisma: relato de caso

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Abstract

This article describes the case of a work accident victim with a penetrating wound to the right inguinal region caused by a metal spiral. The patient developed an arteriovenous fistula between the deep femoral artery and deep femoral vein, combined with a pseudoaneurysm surrounding these structures and the common femoral vein. Arteriovenous fistulas frequently occur after traumas, but the combination of fistula and pseudoaneurysm is rare. It is recommended that they be treated immediately after diagnosis. Duplex ultrasound is the most widely used method for initial assessment and arteriography is the gold standard for diagnosis of arteriovenous fistulas. Endovascular surgery has recently been used successfully in such cases. However, this patient was treated conventionally using a direct surgical approach, arterial suture and venous ligatures, and the limb was saved. The patient developed no complications and was discharged to outpatients follow-up.

Keywords: arteriovenous fistula; pseudoaneurysm; wounds, penetrating.

Resumo

Os autores apresentam um relato de caso de vítima de acidente de trabalho com ferimento penetrante em região inguinal direita com peça metálica em espiral, que evoluiu com fístula arteriovenosa da artéria femoral profunda com a veia femoral profunda associado a pseudoaneurisma envolvendo essas estruturas e a veia femoral comum. As fístulas arteriovenosas ocorrem frequentemente após traumas e a associação com pseudoaneurisma é fato raro, devendo ser tratadas precocemente após seu diagnóstico. O ultrassom duplex é atualmente o exame mais utilizado para a avaliação inicial e a arteriografia, o padrão ouro para diagnóstico. No paciente em questão foi realizado tratamento convencional com abordagem cirúrgica direta, sutura arterial e ligaduras venosas. Entretanto, nos dias atuais a cirurgia endovascular e a compressão guiada por ultrassom são métodos terapêuticos que têm sido utilizados com sucesso. O paciente evoluiu sem intercorrência, recebendo alta para acompanhamento ambulatorial com preservação do membro.

Palavras-chave: fístula arteriovenosa; pseudoaneurisma; ferimentos penetrantes

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INTRODUCTION

Trauma is the number one cause of death among people up to 44 years of age and the third greatest cause of death in the population in general, according to studies conducted in the 1980s and 1990s.¹ Traumas cause vascular injuries in 3% of the population.² Pseudoaneurysms and arteriovenous fistulas (AVFs) are among the complications caused by vascular traumatism and are associated with high rates of morbidity and mortality.³ Pseudoaneurysms are defined as widening of an artery caused by partial rupture of layers of the walls of blood vessels, with hematoma contained within periarterial tissues.⁴ In turn, an arteriovenous fistula is a communication between an artery and a vein with no communicating capillaries involved.^{5,6} Both conditions can develop complications such as thrombosis, embolism, rupture and high-output heart failure, resulting in high rates of morbidity and mortality.^{3,5,6}

This report describes the case of a man who suffered a penetrating wound to the right groin caused by a piece of metal that resulted in formation of a pseudoaneurysm and an arteriovenous fistula. The study was submitted to and approved by the Research Ethics Committee at the Faculdade de Medicina de Jundiaí.

CASE REPORT

The patient, J. R. S. N., a 28-year-old man, suffered an accident at work causing a wound in which a metal spiral penetrated the right inguinal region (Figure 1). On arrival at hospital, the patient had a patent airway and was breathing spontaneously, with bilateral symmetrical vesicular sounds present, with +2 pallor, heart rate of 60 bpm, blood pressure of 100 × 60 mmHg, without motor or sensory deficits,



Figure 1. Metal object penetrating at the base of the patient's thigh, in the operating theater.

Glasgow Coma Score was 15, pupils were equal and reactive to light, abdomen was painful to deep palpation in right iliac fossa with no pain on quick release of palpation, distal pulses were present and symmetrical and peripheral perfusion was good. An X-ray (Figure 2) showed that the metal spiral had penetrated up to the height of the second lumbar vertebra. The patient was taken to the operating theater for explorative laparotomy and treatment of the injury. Examination of the cavity revealed a stable hematoma in zone III of the retroperitoneal space with no injuries to hollow or parenchymatous viscera. The piece of metal was successfully removed in a retrograde direction via the entry wound, under direct visualization using a rotational movement. Since the hematoma remained stable, the retroperitoneal space was not approached and the operation was terminated. The patient was sent to the intensive care unit and required transfusion of two units of packed red blood cells and two units of fresh frozen plasma. During a physical examination conducted the day after the operation, a thrill was detected in the right inguinal region, prompting further examination with ultrasonography and then digital arteriography, which revealed an AVF between the deep femoral artery and the deep femoral vein, associated with a pseudoaneurysm encompassing these structures and the common femoral vein (Figure 3). Four days after the initial operation, the patient underwent a second surgical intervention to correct these vascular injuries.

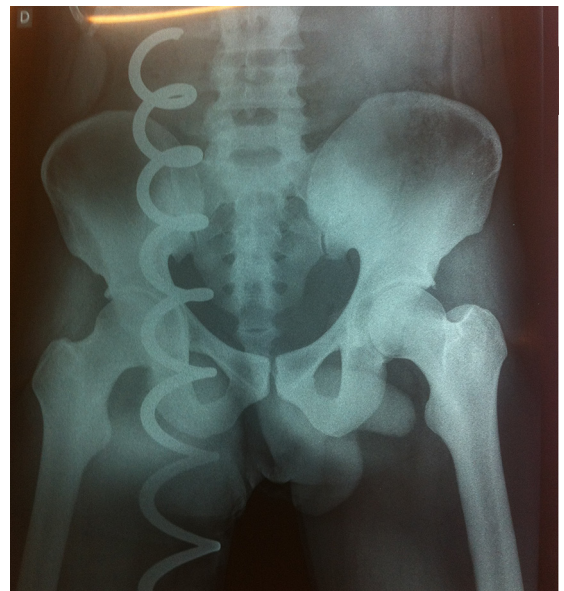


Figure 2. X-ray of the patient's right thigh and hips, showing the metal object penetrating the right abdomen up to the level of the second lumbar vertebra.

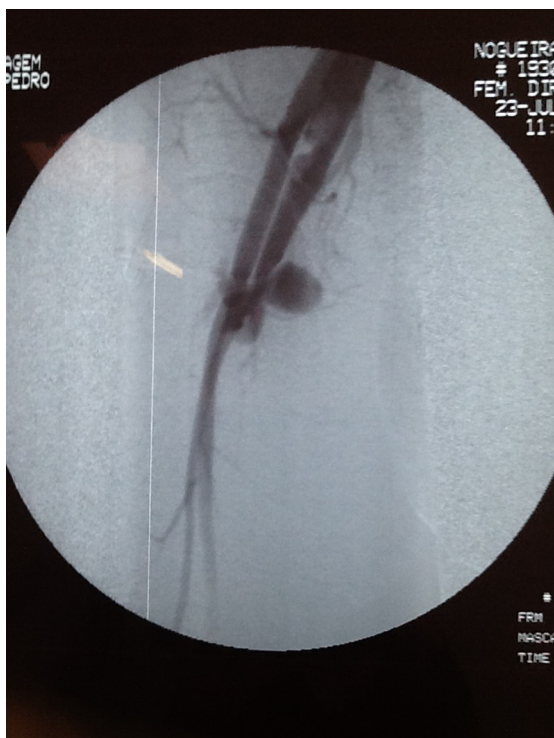


Figure 3. Arteriography of right lower limb showing image compatible with pseudoaneurysm and arteriovenous fistula of the common femoral vein.

This surgical procedure began with an oblique incision at the base of the right thigh, opening the femoral sheath to expose the structures and confirm the damage seen on arteriography. The fistula was repaired by ligation of the deep femoral vein, arteriorrhaphy of the posterior wall of the deep femoral artery and venorrhaphy of the common femoral vein. The patient recovered well and was discharged to outpatients follow-up on the third day after the second intervention. Some time later, the patient presented once more at the same service with acute appendicitis, which was successfully managed surgically. The patient did not suffer from any complications related to the limb that had suffered the arteriovenous fistula and pseudoaneurysm.

DISCUSSION

Historically, traumatism of extremities are associated with high rates of amputation, especially so during times of conflict, and these rates can exceed 15%.^{7,8} Amputation rates are higher among patients with traumas associated with fractures, torsions, complex damage to soft tissues and nerve damage.⁹ In the case described here, the patient did not have any other injuries associated with the vascular trauma and it was possible to avoid amputation of the limb.

Arteriovenous fistulas frequently occur in penetrating wounds caused by firearms, cold weapons or other sharp objects and in blunt injuries.^{10,11} The most frequent sites are the common femoral artery, the deep femoral artery (as in the patient described here) and the popliteal artery.¹² They are most common in men (87.5%) and at a mean age of 36 years.¹³ The combination of arteriovenous fistula and pseudoaneurysm is rare and should be treated as soon as possible after diagnosis,¹⁴ in order to avoid complications such as high-output heart failure, rupture of the pseudoaneurysm, embolism, thrombosis and neurological damage.^{15,16} Clinical diagnosis of AVF is made by palpation and auscultation of the affected vessels, which may exhibit heave, murmur, hematoma or pulsating mass. In this case, the clinical findings that prompted the diagnostic hypothesis of an AVF were thrill and murmur in the right thigh. Duplex ultrasound (USD) is currently the examination of choice for initial assessment of patients with suspected AVF. Ultrasound findings of high frequency, low resistance and low flow are typical of AVF, and duplex shows a mosaic of colors. In this case a USD examination was conducted soon after clinical suspicion was aroused and findings were suggestive of AVF. Arteriography then confirmed the diagnosis, showing the AVF between the deep femoral artery and the deep femoral vein and the pseudoaneurysm surrounding these structures and the common femoral vein. The open surgery approach with suture of the artery and ligation of the vein, as employed here, is the most widely used treatment in our setting, but endovascular surgery and ultrasound-guided compression are treatment methods that have been successfully employed in recent years, with the proviso that they are used for AVFs diagnosed early and generally for those caused by punctures.¹⁷ Observational studies recently showed that more than a third of AVF patients treated with ultrasound-guided compression did not need any other form of treatment subsequently.^{18,19} Placement of covered stents is a new approach to this type of injury, but there are not yet any long-term studies.²⁰ In the case described here, the direct surgical approach was chosen because it is an effective and safe technique for use with trauma injuries.²¹ The patient recovered with no complications during the postoperative period, was discharged from hospital and the limb was saved.

CONCLUSIONS

Peripheral vascular traumas are associated with serious complications and if these are to be avoided they must be treated as quickly as possible. This report describes

the case of a patient with a traumatic arteriovenous fistula combined with a pseudoaneurysm, in which the patient profile, the characteristics of the injury, the treatment employed and the results achieved can be considered typical of what is seen currently.

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