SPONTANEOUS RESOLUTION OF PSEUDOANEURYSM OF AN ILIAC ARTERY BRANCH IN A MULTIPLE TRAUMA PATIENT WITH PELVIC FRACTURE: CLINICAL CASE

Cristina Maria Varino Sousa[1], Luís Filipe Pires Silva[1], Maria Elisa Rodrigues[1], António Félix[1], Bruno Alpoim[1], Pedro Marques[1], Joana Alexandra Gonçalves Oliveira[2], Carlos Alves[3], Maieiro Costa[3], António Rodrigues[4]

ABSTRACT

In patients who have been the victims of high-energy trauma, severe pelvic injury should always be suspected. Most of these fractures are stable and respond well to conservative treatment. Pelvic fractures constitute 3% of all skeletal fractures and are associated with high-energy trauma. They are potentially serious injuries with significant mortality and large numbers of associated lesions. There are fundamentally three sources of bleeding in pelvic fractures: arterial, venous and through the bone ends of the fracture. Arterial bleeding is more associated with hemodynamic instability. In such cases, both early external fixation of the pelvic fracture and angiography with selective embolization of the bleeding vessels are effective methods for achieving hemostasis. Aneurysms of iliac artery branches are rare and are mostly pseudoaneurysm relating to the traumatic event. The natural history of pseudoaneurysms is unknown because of their rarity, but if they rupture, the mortality rate is high. We report a case of spontaneous thrombosis of a pseudoaneurysm of a branch of the right iliac artery.

Keywords – Hip Fractures; False Aneurysm; Iliac Artery

INTRODUCTION

Severe pelvic injuries have considerable incidence at emergency services in Portugal, particularly among the victims of high-energy trauma. They are more common among men, traffic accident victims and individuals in their third decade of life. Pelvic fractures indicate that high energy was transferred, with severe trauma[1]. It has been estimated that, for the pelvic ring to be ruptured, a frontal collision at a speed of at least 48 km/h or a lateral collision at 24 km/h would be necessary. This great dissipation of energy is responsible for the associated lesions that are frequently present[2].

Significant advances have been achieved over recent decades. On the one hand, there has been progress within surgery, with the use of external fixators to reduce unstable pelvic fractures, thereby making it possible to restore mobility to the patient. On the other hand, diffusion of advanced trauma life support (ATLS) theories has contributed towards diminishing mortality among patients with pelvic fractures[3].

The prognosis for pelvic fracture victims seems mostly to be related to the associated lesions, given that such fractures are often mild and do not give rise to great hemorrhage. However, in some cases, voluminous retroperitoneal hemorrhage may occur, which may sometimes be lethal[2].

At the beginning of the twentieth century, mortality among multiple trauma victims with pelvic fractures reached 80%, especially due to retroperitoneal hemorrhage. Both the fracture surface and the rich vascular network present in this region are important sources of bleeding. Even with the concept of blood volume

1 – Complementary Orthopedics and Traumatology Clinician at Local Healthcare Unit, Alto Minho, SA, Portugal.
2 – Complementary Neurosurgery Clinician at Hospital de São João, EPE
3 – Specialist Orthopedics and Traumatology Clinician at Local Healthcare Unit, Alto Minho, SA, Portugal.
4 – Specialist Physician and Director of Orthopedics and Traumatology Service, Local Healthcare Unit, Alto Minho, SA, Portugal.

Work performed at the Orthopedics and Traumatology Service, Local Healthcare Unit, Hospital de Santa, Alto Minho, SA, Portugal.
Correspondence: Rua da Praia 204m - 3º direito - Aguçadoura - 4495-031 - Póvoa de Varzim, Portugal. E-mail: crisvsousa@yahoo.com

Work received for publication: December 21, 2009; accepted for publication: July 26, 2010.

The authors declare that they did not have any conflict of interests in producing this article

replacement and progress in support measures, mortality persisted at close to 30% in the 1960s. Early external fixation of pelvic fractures, in association with percutaneous angiography with selective embolization of the vessels with active bleeding, was responsible for changing the prognosis for these patients. Flint et al[4] reported that the mortality rate was five times lower when angiography and embolization were used. Riemer et al[5] observed that there was a significant decrease in mortality if early external fixation was implemented for complex pelvic fractures. Currently, the mortality rate ranges from 7 to 23%. Among multiple trauma victims, hemorrhage is the main cause of death (39% of the cases), followed by associated cranioencephalic trauma (35%) and sepsis with multiple organ failure (25%).

At our service, the protocol for dealing with multiple trauma victims with pelvic fractures includes an initial assessment in accordance with the ATLS proposals. After the initial radiological investigation, abdominal and pelvic assessments of hemodynamically stable patients are made using computed tomography.

Vascular lesions of the iliac arteries are more common in cases of penetrating wounds[6]. However, closed pelvic trauma may lead to lesions in several branches of these arteries. Such lesions may result in fatal hemorrhage and should always be taken into consideration in cases of occult major hemorrhage. The vascular surgeon should be promptly consulted if arterial lesions are suspected or present. In cases of severe arterial hemorrhage, the initial treatment includes direct compression of the wound and blood volume resuscitation.

Lesions of the iliac artery caused by pelvic fractures are not common. Hemorrhage in cases of pelvic fracture, resulting from lesions of the internal iliac artery and its branches, is more common in cases of posterior pelvic fracture. Fractures due to lateral compression more often cause hemorrhage of the pudendal and obturator vessels[7].

Vessels with lesions may be extremely difficult to identify, and attempting to do so on the operating table may result in abundant hemorrhage and fatal shock[6]. Arteriography is indicated for hemodynamically stable patients, both for diagnosing and for treating hemorrhage by means of embolization.

The therapeutic options have evolved over recent years and go from traditional surgery to approaches that are less invasive, and they include radiological procedures such as echo-guided compression, echo-guided percutaneous thrombin injection and endovascular procedures (embolization and placement of endoprostheses)[8].

Endovascular approaches are the gold standard for treating deep arterial hemorrhage[9,10].

Intervention radiology enables selective embolization of arteries that external fixation is unable to plug. During angiography, signs of macrovascular lesions that would be sources of extravasation of contrast medium (false aneurysm), arteries with wall irregularities, arteries that are unfilled downstream, or stagnation of contrast medium in veins, are sought[11].

The time at which pseudoaneurysm is presented is variable and can be at any time from the original injury until years later[12].

Damage to the arterial wall and extravasation of blood to the periarterial fascial plane may result in a pseudoaneurysm[13]. Thus, pseudoaneurysms result from transmural rupture of the arterial wall, extravasation of blood and formation of a hematoma that remains in communication with the arterial lumen. Unlike true aneurysms, pseudoaneurysms lack the three layers of the vessel wall (intima, media and adventitia) and are contained by perivascular tissue. Coagulation occurs on the periphery of the hematoma, which on ultrasound examination appears to be hyperechoic, while the center remains anechoic. During the intra-arterial high pressure of the systole, the blood flow is anterograde towards the pseudoaneurysm; during the diastole, the flow direction is retrograde. This phenomenon causes swirling, which is the usual flow pattern seen on Doppler images[14].

Pseudoaneurysms of branches of the iliac arteries account for a tiny percentage of all false aneurysms[15]. They are usually asymptomatic, except when they rupture[16]. Individuals with this disease usually have a previous history of trauma, and this disease can also be diagnosed as a surgical finding[12].

Pseudoaneurysms may undergo spontaneous thrombosis, or may evolve with development of complications such as infections, development of local compression over the neurovascular structures, or rupture.

Dilution coagulopathy may also be a reason for concern with regard to patients who receive large quantities of fluids. Thus, two to three units of frozen fresh plasma and seven to eight units of platelets should be prescribed for every five liters of volume replacement[1].

CLINICAL CASE

The patient was a 22-year-old man who had been the victim of a traffic accident (head-on collision between a two-wheel vehicle that he was controlling and