

Bull Horn Injuries: Endovascular Repair of an External Iliac Artery Thrombosis

Heridas por asta de toro: reparación endovascular de una trombosis de la arteria ilíaca externa

Every year there are multiple festivities with bull runs in our country that cause injuries and even deaths, especially in amateur bullfights. Wounds caused by bull horns are characterized by presenting important tissue destruction, several trajectories with foreign objects and a high risk of infection. The lesions are variable and the most common location is in the lower extremities, followed by the upper extremities, head and neck, abdomen, perineum, thorax, back and lumbar region (Table 1).¹⁻⁷

The incidence of vascular injury is approximately 7%, but this type of injury is considered more severe, and increases the possibility of serious complications or even death (Table 1). The publication by Utrilla shows us the following data: deaths caused by vascular injuries were 37% and increased to 50% in the last quarter of the XX century; most deaths since 1975 were in the non-professional group and over a third occurred in bull runs; the deaths of runners in popular bull runs were in 82% of cases caused by haemorrhage due to injury of the principal thoraco-abdominal blood vessels and less commonly due to injury in the vessels of the lower extremities.¹

We present the case of a 27-year-old man, who was gored by a bull horn in a non-professional bull run, and presented several wounds with multiple trajectories and muscular lesions in the back of the right thigh, and another wound in the left flank; no femoral pulse was found. He was transferred to our Hospital with a CT scan that revealed a fracture of the 6th rib, without any visible visceral intrathoracic or abdominal

lesions; a haematoma in the left flank that extended to the retroperitoneum; and no contrast was visible in the left external iliac artery for approximately 4 cm with distal repermeabilization due to a probable thrombosis or rupture of the artery (Fig. 1). The patient had received tetanus immune globulin and tetanus vaccination, analgesia and antibiotic therapy.

After evaluating the patient, a diagnostic angiography was performed with the following aims:

1. To confirm the diagnosis and characteristics of the lesion.
2. To perform an endovascular clamping of the iliac artery if necessary.
3. To attempt an endovascular solution if possible.

The patient was transferred to the endovascular operating room and spinal anaesthesia was used. The right femoral artery was accessed percutaneously, the common iliac artery was reached and in the diagnostic angiography a thrombosis of the external iliac artery with repermeabilization in the external iliac artery proximal to the common femoral artery was observed, without lesions in the femoral tripod and with permeable distal vessels. The external iliac artery was recanalized and repaired using two covered endoprothesis (viabahn GORE[®] 8 mm×50 mm and advanta-Atrium[®] 7 mm×38 mm). The control angiography showed permeability without complications of the external iliac artery and

Table 1 – Number of Vascular Lesions and Distribution. Percentage of Deaths due to Vascular Causes.

Author year	Type of wounded	Number of wounded	% of vascular lesions	% of deaths	% of vascular deaths	Location of vascular lesions								
						LE	UE	HN	ABD	PER	TOR	EL		
Utrilla (1999)			9.25		37% total 50% since 1975									
Ríos (2003)	Professionals	15	15.3	0	0	15	1	1	3	5	1	0		
Zamora (2004)	Professionals	223	0.7	2.24	20	211	64	65	31	7	22	3		
Martínez (2006)	Professionals	387	1.03	0.77	33.3	244	19	12	44	41	21	6		
Rudloff (2006)	Professionals	68	5.05	0	0	63	9	10	6	7	3	0		
Miñano (2007)	Professionals	365	–	0	0	199	73	30	15	33	15	0		
Vaquero (2008)	Professionals	656	8.53	0	0									
TOTAL		1.714	6.65 (0.75–15.3)			752	166	118	101	93	62	9		

The number of lesions is higher than the number of wounded because these could present several lesions.

ABD, abdomen; BL, back and lumbar region; HN, head and neck; LE, lower extremities; PER, perineum; TOR, thorax; UE, upper extremities.

* Please cite this article as: Maldonado-Fernández N, Martínez-Gámez FJ, Mata-Campos JE, Galán-Zafra M, Sánchez-Maestre ML. Heridas por asta de toro: reparación endovascular de una trombosis de la arteria ilíaca externa. Cir Esp. 2013;91:340-342.



Figure 1 – CT scan, initial diagnosis: thrombosis of the external iliac artery.

permeability of the femoral tripod and distal vessels. Subsequently, the other wounds were cleansed, examined and treated. Postoperative vascular treatment included subcutaneous 40 mg enoxaparin/24 h until the patient recovered full motility, and permanent antiaggregation with clopidogrel. The postoperative course was uneventful. Follow-up in the outpatient clinic revealed a proper perfusion of the extremity, with pulses in all locations, without thrills or bruits. An angio-CT was performed 5 months later and revealed permeability of the iliac artery and no complications (Fig. 2).

Patients with bull horn injuries should be classified as major trauma patients and should be treated at the bull-ring or transferred to hospitals depending on the severity of their injuries. Vascular lesions are defined by Miñano as class D, originating an immediate threat to the life of the patient and indicating that the patient should be stabilized at the site, controlling the haemorrhage, and transfer to a hospital for definitive treatment should not be delayed.⁶

Vascular lesions can be treated using different techniques and depending on the type of injury, including simple ligation,⁴ or a by-pass, usually with the internal saphenous vein.^{5,7} We have not found any publications in the literature that have used endovascular procedures for the treatment of vascular injuries caused by bull horn wounds. This first case shows that their use is possible with good results, and should encourage us to use them in the future in similar circumstances.

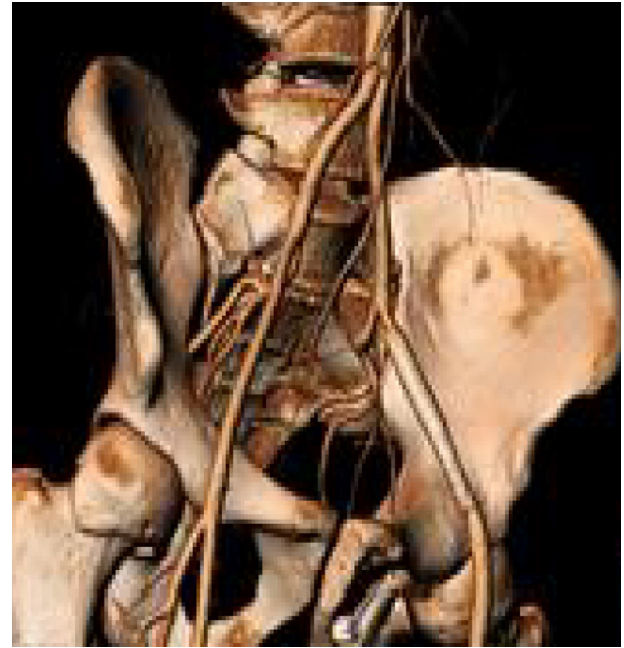


Figure 2 – CT scan, control: permeability of the endoprosthesis and the external iliac artery.

The development and use of covered stents in different locations is common use in vascular surgery departments. Every day more authors believe that the first option for patients with vascular injuries should be endovascular procedures independently of the origin.⁸⁻¹⁰ If we can resolve the lesion successfully, we will also have a very low morbimortality. If the lesion cannot be solved with endovascular techniques, they do not hinder the use of conventional surgical techniques, which can always be used.

Vascular lesions caused by bull horn injuries can be severe, and we recommend on site control of the haemorrhage, and subsequent safe transfer of the patient to a hospital with a vascular surgery department with the necessary endovascular infrastructure in order to offer the amateurs and professionals of our ancient festival all the possible solutions to their problem, using either conventional or endovascular surgery.

REFERENCES

1. Utrilla López A. Significado de las lesiones vasculares en la mortalidad de las heridas por asta de toro. *Arch Cir Vasc.* 1999;8.
2. Ríos-Pacheco M, Pacheco-Guzmán R, Padrón-Arredondo G. Heridas por asta de toro. Experiencia de un año en el Hospital General O'Horán. Mérida, Yucatán. *Cir Ciruj.* 2003;71:55-60.
3. Zamora Lomeli JA. Lesiones por embestida de toro de lidia en eventos civiles. Experiencia de 10 años. *Cirujano Gen.* 2004;26:97-101.
4. Martínez-Ramos D, Miralles-Tena JM, Escrig-Sos J, Traver-Martínez G, Cisneros-Reig I, Salvador-Sanchís JL. Heridas por asta de toro en el Hospital General de Castellón. Estudio de 387 pacientes. *Cir Esp.* 2006;80:16-22.
5. Rudolff U, González V, Fernández E, Holguin E, Rubio G, Lomelín J, et al. Chirurgical taurina: a 10-year experience of bullfight injuries. *J Traum.* 2006;61:970-4.

6. Miñano A, Jiménez R, Reyes JM, Bastwich B, López-Collado M. Distribución de lesiones traumáticas en los festejos taurinos: hacia una racionalización de la asistencia. *Revista Española de Investigaciones Quirúrgicas*. 2007;10:199-203.
7. Vaquero C, Arce N, González-Fajardo J, Beltrán de Heredia J, Carrera S. A nossa experiência nos traumatismos vasculares causados por cornos de touros. *Revista Portuguesa de Cirurgia Cardio-Torácica e Vascular*. 2008;15:217-20.
8. Piffaretti G, Tozzi M, Lomazzi C, Rivolta N, Caronno R, Lagana D, et al. Endovascular treatment for traumatic injuries of the peripheral arteries following blunt trauma. *J Care Injured*. 2007;38:1091-7.
9. Katsanos K, Sabharwai T, Carrell T, Dourado R, Adam A. Peripheral endografts for the treatment of traumatic arterial injuries. *Emerg Radiol*. 2008;16:175-84.
10. Donas KP, Torsello GF. Endovascular surgery as a bridge solution for selected vascular emergencies. *J Cardiovasc Surg*. 2010;51:337-42.

Nicolás Maldonado-Fernández*,
Francisco Javier Martínez-Gámez, José Enrique Mata-Campos,
Moisés Galán-Zafra, Manuel Luis Sánchez-Maestre

Servicio de Angiología y Cirugía Vascular, Complejo Hospitalario de Jaén, Hospital Universitario Médico-Quirúrgico, Jaén, Spain

*Corresponding author.

E-mail address: nicovasc@hotmail.com

(N. Maldonado-Fernández).

2173-5077/\$ – see front matter

© 2011 AEC. Published by Elsevier España, S.L. All rights reserved.

Rugby Player With an “Elephant’s Foot” in the Chest

El jugador de rugby con una «pata de elefante» en el pecho

Defects in consolidation are one of the local complications of bone fractures. The most common causes are excess motility of the fractured area and poor irrigation. Clinton and Mark¹ report the presence of delayed consolidation and pseudarthrosis in 5%–10% of fractures, and the most common locations are the femur and tibia.

Sternal pseudarthrosis is an uncommon entity, and most cases reported in the literature are longitudinal pseudarthrosis secondary to midline sternotomies.²

We present the first case of sternal pseudarthrosis as a consequence of a transverse sternal fracture after blunt chest trauma reported in the Spanish literature.

Case Report

A 36-year-old man came to the outpatient clinic of the Department of Thoracic surgery with central chest pain of 2 years duration. He needed daily analgesia with NSAIDS, and referred instability and a clicking sound in the upper third of the sternum. He had a prior history of a transverse sternal fracture after blunt chest trauma while playing rugby that was managed conservatively. On physical examination no apparent defects were found, except clicking of the sternum when anterior flexion of the trunk was performed.

A chest CT scan with bone reconstruction confirmed the suspicion of sternal pseudarthrosis at the level of the joining of the third rib (Fig. 1).

Surgery: under general anaesthesia the sternum was exposed using a midline incision and separation of the pectoral muscles. A subperiosteal dissection was performed from the midline to the sternal edges. The edges of the pseudarthrosis were debrided and titanium osteosynthesis material was placed (Titanium Sternal Fixation System, Synthes, USA) (Fig. 2).

The patient had an uneventful recovery and one month after surgery he remains asymptomatic, with no clicking and the instability has disappeared.

Discussion

Sternal fractures represent approximately 8% of admissions due to chest trauma,³ and are more frequent due to the increase in seatbelt use. Traditional management of these lesions is observation, cardiac monitoring and analgesia. The most common associated complications are rib fractures, vertebral injury and cardiac contusion.³

Late complications related to consolidation of the sternal fracture are rare, and there are few references in their physiopathology.⁴ Pseudarthrosis generally affects long bones, specially in the lower extremities and is associated with the following risk factors^{1,2}: The presence of systemic diseases (diabetes, tuberculosis, hypothyroidism, decalcifying osteopathy, etc.), smoking, steroids, factors related to the location and type of fracture (diaphysis and middle third fractures have a higher risk), lack of adequate immobilization and errors in fracture reduction without proper contact of the edges.

Pseudarthrosis can be classified into two large groups¹: (1) atrophic, which present a loss of intermediate fragments and

* Please cite this article as: Zabaleta J, Aguinagalde B, Fuentes MG, Bazterargui N, Izquierdo JM. El jugador de rugby con una «pata de elefante» en el pecho. *Cir Esp*. 2013;91:342-344.