Pseudoaneurysm due to gunshot injury in the abdominal aorta treated by endovascular therapy

Case 10846

A 30-year-old man was admitted to our emergency room for a gunshot wound that penetrated the thorax and abdomen through the sternum with a bullet's trajectory downwards without any detectable exit wound. The patient was conscious, haemodynamically unstable (heart rate 100 beats /min; blood pressure 75/40 mm Hg) and anaemic.

Imaging Findings:
CT showed sternal fracture, cardiac tamponade and liver haematoma due to bullet's trauma. The bullet passed close the abdominal aortic under the coeliac trunk and arrested in front of L1.
A surgical treatment of heart and liver injury was performed. Surgeon judged that the removal of the bullet was too dangerous.
A CT control on the third POD showed a 1.5cm false aneurysm in the upper abdominal aorta between coeliac trunk and superior mesenteric artery with a small eccentric neck arising posteriorly from the right side of the abdominal aorta.
An angiography performed through a left trans-femoral retrograde access with a pigtail confirmed the diagnosis. The collateral flow from the mesenteric artery was evaluated with an angiography with an inflated balloon inside the coeliac trunk. Thereafter through a right femoral surgical access a Zenith Flex proximal extension cuff 22x35 mm was used to treat the pseudoaneurym with coeliac artery coverage.

Discussion:
Penetrating lesions due to gunshot incidents are rare events in European countries, representing <1% of all aortic lesions [1]. This is a condition associated to high mortality rates despite recent advances in medical treatment. The retroperitoneal position of the abdominal aorta and the relationship with the surrounding organs may help bleeding tamponade and promote the formation of fibrotic tissue that allows the creation of pseudoaneurysm [2]. On this depends the variable clinical presentation of penetrating aortic trauma from spontaneous rupture, with a hypovolemic shock, to an insidious onset of the disease, with clinical signs that may be detected from few days to many years after the gunshot incident [3]. In literature only few cases and small series of traumatic abdominal aortic pseudo-aneurysm were described [2-5].
Control of blood loss and stabilisation of vital organ function have absolute priority over all other diagnostics and
therapeutic measures in the management of penetrating injuries [6]. Contrast-enhanced CT has an important role in diagnosing and surgical planning because it can reveal where the lesion is, its extension and its relation to adjacent structures. Moreover, it is usually readily available in trauma care centres and is less invasive than aortography [7, 8].

First step of treatment planning frequently involves a surgical intervention, that is necessary to obtain a control of the haemorrhagic site [9]. Once a stable haemodynamic condition is obtained, treatment of stable abdominal aortic pseudoaneurysm could be planned.

Since 1992 endovascular treatment of traumatic aortic injury has been introduced as a valid alternative to surgical treatment [10, 11]. Several authors demonstrated reduced mortality and morbidity rate of this approach compared to surgical one [12]. Percutaneous treatment could be performed using embolisation or stent-graft implantation [5]. The first presents the advantage to exclude the pseudo-aneurysm without need of implantation of permanent device, even if they are necessary anatomic conditions that enable the correct embolisation. Stent-graft implantation may be used easily in the infrarenal aorta, but above the renal artery the risk to cover visceral artery should be considered. Moreover stent graft implantation in the thoracic and diaphragmatic aorta is at risk of paraplegia due to Adamkiewicz artery occlusion. In our case we evaluated the possibility to cover the coeliac trunk evaluating the collateral flow from the mesenteric artery.

Moreover we decided to use a short proximal cuff of an abdominal endograft Zenith Flex in order to cover the minimum surface of the aorta reducing the risk of paraplegia.

**Differential Diagnosis List:** Abdominal aortic pseudoaneurysm treated with endograft implantation, Abdominal aorta rupture, Abdominal aortic pseudo-aneurysm, Lumbar artery haemorrhage

**Final Diagnosis:** Abdominal aortic pseudoaneurysm treated with endograft implantation

**References:**


Description: A) axial, (B-C) multiplanar reconstruction and (D) volume rendering CT image showing the aortic pseudoaneurysm with a small later (small arrow) and big posterior (big arrow) wall tears

Origin: Del Giudice C Department of Diagnostic Imaging, Molecular Imaging, Interventional Radiology, and Radiation Therapy, University Hospital Tor Vergata, Rome, Italy
**Figure 2**

Description: (A) Axial image showing the pericardial effusion (B-C) the liver tear caused by the passage of the projectile. (D) and the bullet position in front of the soma L1. 

**Origin:** Del Giudice C
Department of Diagnostic Imaging, Molecular Imaging, Interventional Radiology, and Radiation Therapy, University Hospital Tor Vergata, Rome, Italy.
Description: (A-B) preprocedural angiographic control and stent graft release just above the superior mesenteric artery covering the coeliac trunk (C-H) Origin: Del Giudice C Department of Diagnostic Imaging, Molecular Imaging, Interventional Radiology, and Radiation Therapy, University Hospital Tor Vergata, Rome, Italy