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Case report - Vascular thoracic

Aortic bullet embolization revealed by peripheral ischemia after a thoracic gunshot wound

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Abstract

We present the case of a 21-year-old male who came to the emergency ward for a thorax bullet wound. At our first check-up, the computed tomography (CT)-scan showed a pulmonary contusion, a hemothorax and a suspicious image of a thoracic aortic wound. The patient was stable, but soon after admission a distal ischemic syndrome appeared which revealed the emboli of the projectile. We removed it and a stent graft was implanted into the thoracic aorta. We report our experience of the treatment and the mechanisms that explain how such a wound did not kill the patient.

Keywords: Thoracic aorta; Gunshot wound; Distal embolic ischemia

1. Introduction

The Caribbean is a region where violence is high and gunshot wounds are not that exceptional. Limb wounds are more frequent but not life-threatening, whereas thoracic and abdominal wounds are life-threatening, an aortic injury is much more likely to be mortal. We report the case of a thoracic aortic gunshot wound which was well-tolerated hemodynamically with a distal emboli of the projectile in the left limb. We discuss our patient management and the reason that can explain such a good hemodynamic tolerance of an aortic injury.

2. Case report

A 21-year-old male was admitted to the emergency for a thoracic gunshot wound. The initial exam revealed a hemorrhagic gunshot wound on the left thoracic area with no evidence of any bullet exit wound. The patient was very agitated and was under both alcoholic and drug intoxication but was hemodynamically stable. The computed tomography (CT)-scan showed a mild left hemothorax which was subsequently drained, a linear-lung contusion toward the descending thoracic aorta, which appeared damaged, a fracture of the fifth rib and what appeared to be an image of a bone or a metal fragment in the lingula (Fig. 1). After initial medical care, the patient remained hemodynamically stable without any further bleeding from the thorax.

On day 2, the patient complained of an unexpected left leg pain. Acute ischemia was confirmed by a clinical examination and ultrasounds. A leg X-ray showed a bullet behind the knee, suggesting a popliteal artery embolism (Fig. 2). Surgery, consisting of the extraction of the bullet from the popliteal artery, restored the left leg perfusion. The thoracic aortic wound was subsequently, treated by stent-graft implantation. The patient was discharged without follow-up.

3. Comment

Thoracic aortic wounds are mostly fatal [1]. In our case, the patient was remarkably stable without any hemorrhagic complication. All of these elements made us choose an endovascular treatment instead of open surgery. The mechanism of the lesion may explain how the patient was able to remain stable. Indeed the weapon involved was an .22-long rifle. The caliber of the bullet was small (5.5 mm) and by chance caused less harm. In the review of the literature, the only satisfactory outcome reported was with this type of bullet [2]. Moreover, the bullet, before penetrating the thorax hit the fifth rib slowing down the velocity of the projectile to a great extent and also changing its trajectory. The bullet can injure the tissue directly but its blast wave propagation could damage the tissues with different density, such as the lung (air/tissue) and the vessels (liquid/tissue) and be responsible for a pneumothorax and/or a hemothorax [3]. The faster the speed of penetration of the bullet the more energy it has and therefore, the more it can severely damage the tissues. On

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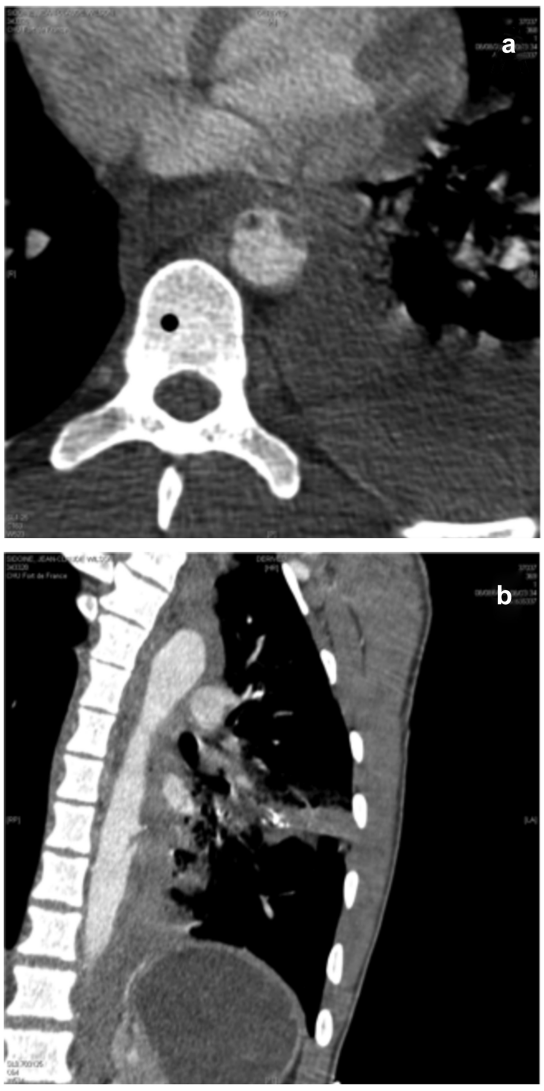

Fig. 1. Chest computed tomography scans of the patient. (a) Transversal slice, (b) vertical slice.

impact the bullet changed its trajectory and its residual kinetic energy diminished, and given the way the blood runs into the thoracic aorta, it closed the very small hole [3]. This probably explains why the aortic wound was not transfixing. Also the tissues of the aorta of the young patient were healthy without any atherosclerotic change, which contributed to the small diameter of the hole.

Furthermore, the CT-scan showed an image on the aorta that led us to believe that this phenomenon happened. It showed that the trajectory appeared to be tangential to the wall of the aorta and so it hit the first wall thereby making a flap that closed under pressure. Finally, the hole was close to many tissues, such as the pleural symphysis and others that could have swabbed the lesion and limited the hemorrhage.

In our case, the patient was stable so we did not choose to do open surgery. But with the image on the CT-scan, it was not permissible to discharge the patient without treatment. So the patient received an endovascular graft to close the hole and to prevent any further bleeding that could be caused by various events (high blood pressure, another thoracic trauma). The endovascular stent graft is a less-invasive procedure versus open surgery [4]. It allows for a smaller cut and less loss of blood. Most of the studies are confident about this new procedure in acute thoracic aorta trauma despite the lack of long-term insight outcome.

Fig. 2. X-rays of the left knee, showing the bullet.

According to our experience gunshot bullet wounds are not that exceptional because of a high level of violence and delinquency in the Caribbean where weapons and bullets are handcrafted and have less power. Many cases of embolization of a projectile in the peripheral arteries after a gunshot wound in the thorax have been reported in the literature [5]. The left inferior limb seems to be more commonly concerned than the right inferior limb because of the angulations of the left common iliac artery and because the aorta is smaller (30° average) [6].

In our case, acute ischemic pain appeared rapidly, avoiding any possibility for a misdiagnosis. But in the review of the literature some distal emboli have been revealed much later (80 days) [7]. This should remind us to be very careful, check every entry and exit wound and try to find the projectile in the case of gunshot injury.

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