

## Blunt Trauma of the Thoracic-Abdominal Aorta: A Rare Case of Double Focal Rupture

Yassine Meghraoui<sup>1,2\*</sup>, Aicha Driouich<sup>1,2</sup>, Fouzia Douirek<sup>1,2</sup>, Abdenasser Samkaoui<sup>1,2</sup>, Amra Ziadi<sup>1,2</sup>

<sup>1</sup>Anesthesia and Intensive care unit, University Hospital Mohammed VI of Marrakech, Morocco

<sup>2</sup>Faculty of Medicine and Pharmacy of Marrakech, Cadi Ayyad University, Morocco

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\*Corresponding author: Yassine Meghraoui

Anesthesia and Intensive care unit, University Hospital Mohammed VI of Marrakech, Morocco

### Abstract

### Case Report

**Background:** acute trauma of the aorta by blunt trauma in a high-energy mechanism is rare, and constitutes a cause of death not negligible, their diagnosis must use different radiological means to properly characterize the localization of injuries that may be multiple in a rare case. The progress of interventional radiology has made it possible to start endovascular minima therapies that have contributed to improve the prognosis of patients. **Case Presentation:** A man, aged 64-year-old, victim of a high kinetic public road accident following a collision between motorcyclist and car causing to him a polytrauma with cranial and thoracic blunt impact. A thoraco-abdominal computed tomography was performed showing an appearance compatible with a rupture of the aortic isthmus with dissection of the thoraco-abdominal aorta type B of Standford. The flap intimal extends from the descending aorta to the end of the abdominal aorta. **Conclusions:** Post traumatic rupture of the aorta in double localization are rare and should not be ignored in view of their severity and must be researched.

**Keywords:** Traumatic aortic dissection, isthmus rupture, high-energy trauma, computed tomography scan, double localization.

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## INTRODUCTION

Acute post-traumatic rupture of the thoracic aorta is a medico-surgical emergency with still high morbidity and mortality [1].

It's usually described in a single focus in 90% of cases, but it can interest the whole aorta or 2 parts. Analysis of the entire aortic is necessary to ensure that double lesions are not missed [1].

Traumatic ruptures of the aorta are rare in the literature, but they are a very common cause of death in public road accidents [2].

Blunt aortic trauma is all-time secondary to high-speed vehicle collisions and is very frequent in both adults and children [3].

## CASE PRESENTATION

Reporting the case of a 64-year-old male with no associated comorbidity who was involved in a high kinetic public highway accident following a collision between a motorcyclist and a car that resulted in a blunt cranial and thoracic trauma.

Upon admission, the patient was unconscious with a Glasgow score of 7/15 myosis pupils, respiratory stable, hemodynamic stable.

The clinical examination resulted in bruising of the face, and the thoracic examination did not show any major abnormalities outside the abrasions of the left chest wall. The rest of the clinical examination such cardiovascular, peripheral pulse as well as abdomen were without abnormalities.

A brain scan was performed showing a meningeal hemorrhage with cerebral edema and right mandibular fracture.

The chest x-ray and the initial abdominal ultrasound were without abnormalities.

The patient was intubated, sedated and conditioned. The evolution was marked by a respiratory complication with desaturation and high respiratory pressure and hemodynamic instability where a thoracic-abdominal scanner was performed showing an aspect compatible with a rupture of the aortic isthmus with dissection of the thoracic abdominal aorta type B of

Standford. The flap intimal extends from the descending aorta to the end of the abdominal aorta with celiac trunk and left mesenteric and renal artery are born from the false channel. The computed tomography also showed bilateral pleural effusion which is more pronounced on the left with lung condensation.

## DISCUSSION

Eighty per cent of fatalities due to post-traumatic acute rupture of the thoracic aorta occur at the scene of accidents, which remains the second leading cause of death among road accidents. The damage of the descending portion away from the isthmus is rarely estimated to be less than 3% [4].

This leaves it to be said that it constitutes a true medical and surgical emergency whose diagnostic and therapeutic management must be early and rapid in order to improve the vital prognosis involved of the victims [4].

The notion of sudden deceleration is the essential element in the genesis of traumatic lesions of the aorta. So car accidents have high kinetics: as was the case of our patient; and falls of a higher places are the main cause incriminated. Some authors find a proportion of lateral shocks (42% in the Feczko series) while frontal shocks are the most described [1].

During acceleration, traumatic lesions of the aorta occur by shearing the wall, causing it to be lacerated at the transition areas. These two mechanisms mentioned above are so-called indirect mechanisms [4].

Traditionally, the sites described in the literature of the aortic isthmus and the proximal part of the descending thoracic aorta are largely predominant (90-98%) while the ascending aorta and the aortic arch are less important (8 and 2% respectively). Damaged ascending aorta can be complicated by tamponade causing immediate death at the accident site or during transport, which may explain why it is rarely described in surgical series [1].

The distal descending thoracic aorta represents an even less frequent entity (7-12%), thus a multiple localization associating the isthmus + descending thoracic aorta (which is the case for our patient) or isthmus + aortic arc are also possible and less frequent [1].

Another major challenge that underlines this case, is not only not to ignore the aortic lesions that can lead to the death of the patient immediately outside of a specific possible management, but to miss other associated lesion of the aorta. This requires in-depth investigations if there is any doubt or suspicion of aortic trauma [2].

Radiological evaluation of aortic trauma was based on arteriography as a gold standard [5], however, given the considerable development in ultrasound, the diagnosis of aortic dissection may be suspected or even made by visualizing the flap intimal by ultrasound with a very promising sensitivity and specificity of 67%-80% and 99%-100% respectively [6].

However, computed tomography scans are still the primary choice for trauma injury assessment and for detecting aortic lesions and their extent [7]. Thus it makes it possible to provide a positive diagnosis and to shorten the time of support.

Treatment currently relies on stent or replacement surgery in cases, but endovascular treatment will be more effective and safer for aortic trauma, in the absence of other serious lesions that require urgent surgery as reported in the literature [8, 9].

## CONCLUSION

Multiple traumatic lesions of the aorta are a rarer entity, and their diagnosis should not be misunderstood. Advances in radiology in terms of diagnosis have enabled accurate diagnosis and guided therapeutic management in interventional radiology.

### Declaration Section:

#### Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Ethics Approval and consent to participate:** Not applicable.

#### Consent for Publication

Written informed consent was obtained from the family patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

#### Availability of supporting data

All clinical finding and radiological results included in this case report can be found in the archived medical file of the patient.

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**Authors' Contributions:**

All authors have contributed to this work since conception, reading and endorsing the final version of the manuscript.

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