

# Aortic Trauma: A Rare Case Report

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**Abstract:** Blunt aortic trauma (BAT) is a rare but critical condition in emergency medicine, with a high mortality rate ranging from 75% to 90%. This trauma typically results from high-energy impacts, such as car accidents, falls from great heights, or severe chest trauma, causing significant damage to the aorta, including lacerations, dissections, intramural hematomas, or even complete aortic rupture. Advanced imaging technologies, such as computed tomography (CT) and transesophageal echocardiography, have recently improved the accuracy of diagnosing aortic injuries, especially in hemodynamically unstable patients. However, the optimal treatment for BAT remains a topic of debate. While endovascular repair is generally preferred due to lower procedural risks and better long-term outcomes, open surgery is still recommended in specific cases, particularly when the injury is extensive or located in critical areas of the aorta, such as the aortic arch. This case report discusses the clinical decisions for a patient with blunt aortic trauma, detailing the choice of open surgery and exploring the challenges of postoperative treatment. Our aim is to contribute to the existing literature by providing insights and recommendations that may assist healthcare professionals in managing similar cases.

**Keywords:** Aortic; Trauma; Blunt.

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## 1. Introduction

Blunt aortic trauma (BAT) is a critical and relatively rare condition in medical emergencies, with a mortality rate that can range from 75% to 90%, depending on the severity and context of the trauma [1]. This type of injury typically occurs after high-energy impacts, such as car collisions, falls from great heights, or severe trauma to the chest area. These events can cause serious damage to the aorta, including lacerations, dissections, intramural hematomas, and, in extreme cases, even complete rupture of the aortic wall [2, 3].

In recent years, technological advances in imaging exams, such as computed tomography (CT) and transesophageal echocardiography, have enabled more accurate diagnoses of aortic injuries, especially in unstable patients [4, 5]. Nonetheless, the ideal treatment for aortic trauma remains a topic of discussion. Endovascular repair, often preferred due to its lower risks and better long-term outcomes, is not always feasible. In certain circumstances, open surgery remains a necessary indication, especially when there are extensive injuries or those located in complex areas, such as the aortic arch [6, 7].

This report details the clinical management of a patient with blunt aortic trauma, addressing the rationale for choosing open surgery and analyzing postoperative complications. The aim is to contribute to medical literature by providing guidelines and recommendations that may be useful to healthcare professionals in similar cases.

## 2. Case Report

A 28-year-old male patient was admitted to the Trauma Center of Alberto Torres Hospital in São Gonçalo, RJ, following a car collision with a pole. He was in the passenger seat, wearing a seat belt, and arrived at the hospital conscious, reporting chest pain and mild difficulty breathing. The initial examination showed a respiratory rate of 22 breaths per minute and blood pressure of 100/60 mmHg. The contrast-enhanced chest CT scan revealed an aortic arch injury, left-sided hemothorax, and an enlarged cardiac silhouette (Figure 1).

**Figure 1.** Contrast-enhanced chest CT scan showing an aortic arch injury (arrow).

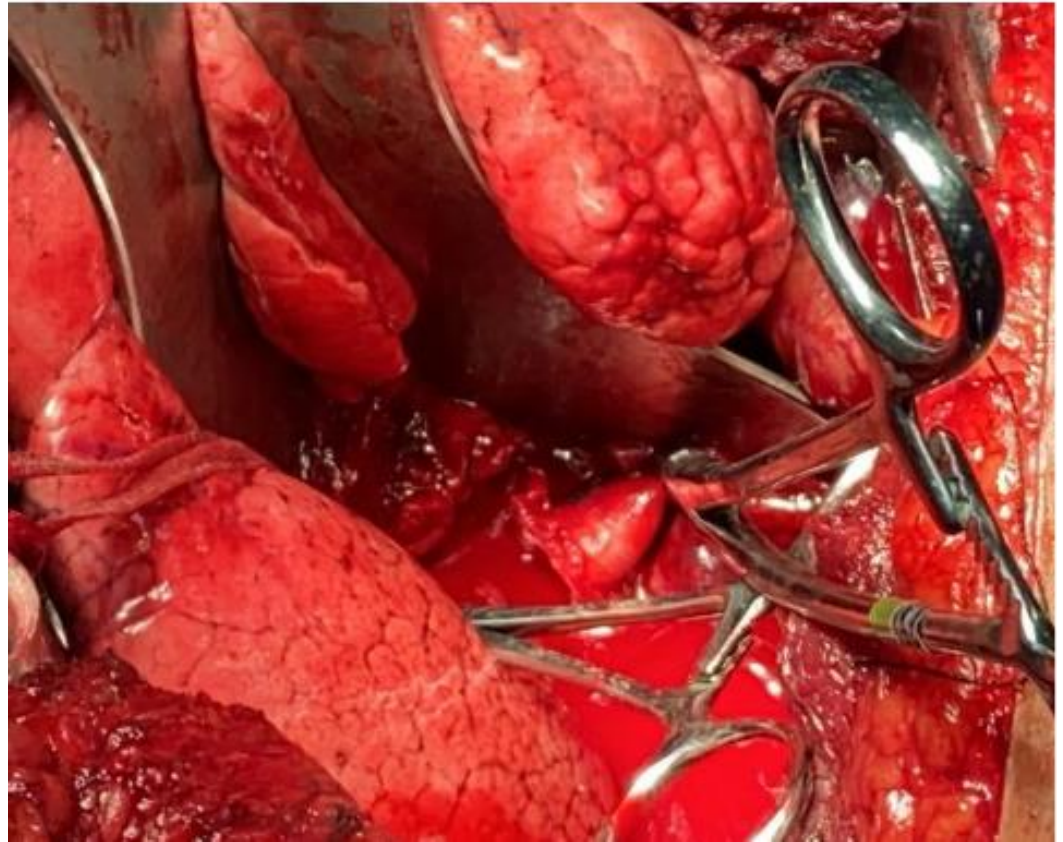


Given these findings, open surgery with prosthesis placement was indicated for direct repair of the aortic injury (Figures 2 and 3). The choice for the open surgical approach was based on the extent and location of the injury, which made the use of an endovascular intervention unfeasible due to anatomical risks and the need for immediate and direct control of the affected site. During the postoperative period, the patient developed ventricular arrhythmia, leading to clinical deterioration and eventual death.

## 3. Discussion

Blunt aortic trauma, particularly at the aortic isthmus, is a condition that often results in rupture of the intimal and medial layers, which can be fatal if not treated promptly and appropriately [4]. In this specific case, the decision for open surgery was driven by the absence of endovascular prostheses at the hospital, limiting therapeutic options. Although endovascular repair is widely preferred in many specialized centers due to lower procedural risk and favorable long-term outcomes [5, 6], the need for immediate intervention, combined with the lack of endovascular resources, justified the open surgical approach [7]. This case highlights that even in hospitals with limited resources, open surgery should be considered a viable and effective option for the treatment of severe aortic trauma. Trauma teams must be prepared to perform this intervention in situations where endovascular repair is not a feasible option [2].

**Figure 2.** Severed aorta.



#### **4. Conclusion**

This case underscores the severity of blunt aortic trauma, especially in extensive or complex injuries of the aortic arch. The decision for open surgery, instead of an endovascular approach, was driven by the need for effective and immediate control of the injury, given the extent and location of the damage, and the unavailability of endovascular prostheses at the hospital. This case reinforces the importance of accurate and early diagnosis, particularly through contrast-enhanced CT, for the identification of aortic injuries in high-energy traumas.

Furthermore, the experience highlights the need for hospitals and trauma teams to be prepared to perform open surgeries in situations where endovascular repair is not feasible, whether due to resource limitations or the complexity of the injury. The open surgical approach, although technically more challenging, remains an essential and life-saving option in scenarios where direct control of the injury is critical.

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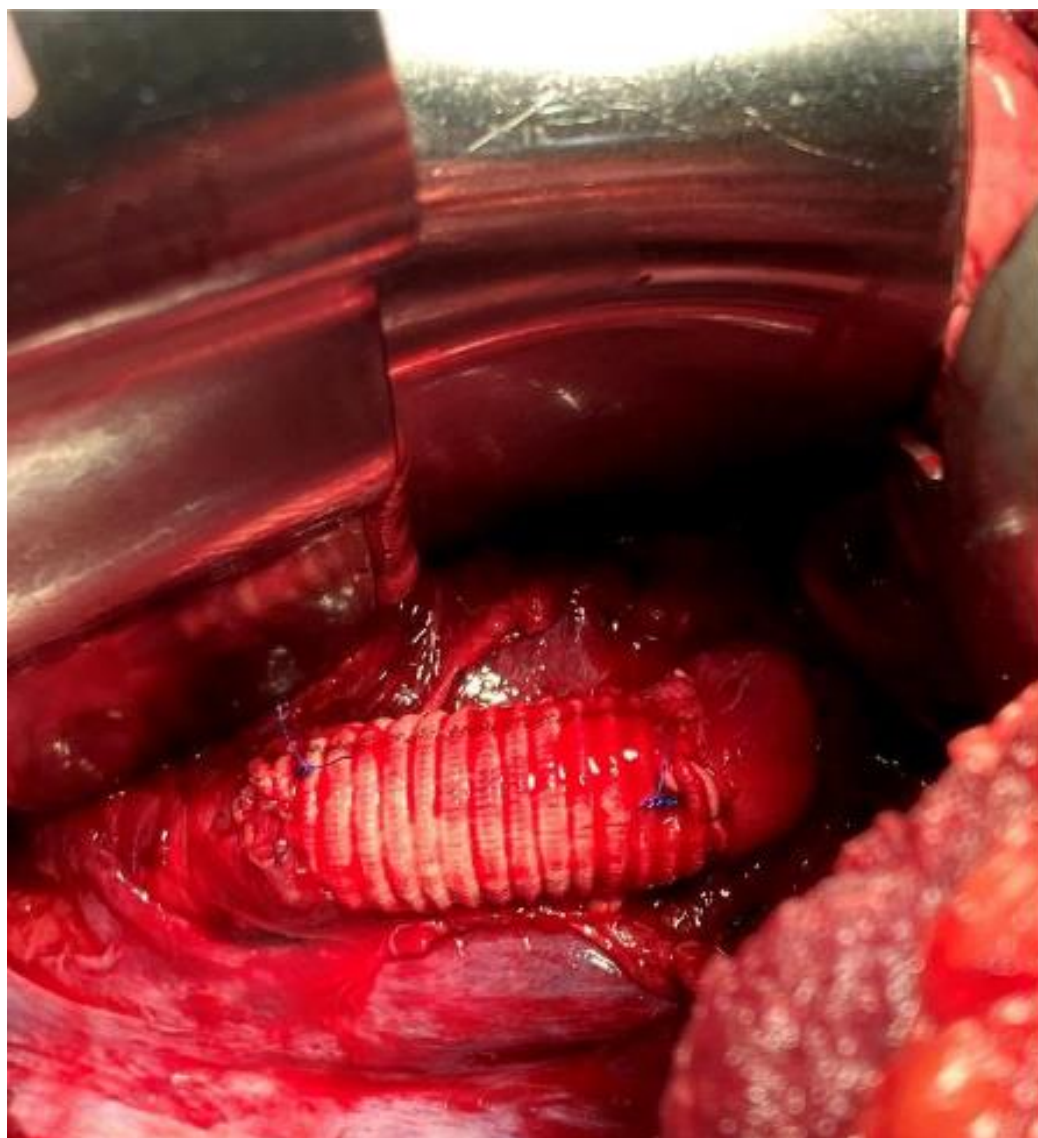
**Research Ethics Committee Approval:** This study received approval from the institutional review board (IRB) of the São Jose do Rio Preto School of Medicine-FAMERP #4.903.458. The term consent for published and included image was signed by patient. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration.

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**Conflicts of Interest:** The authors declare no conflicts of interest.



**Figure 3.** Prosthesis inserted in the thoracic aorta.



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