35.1 Introduction

The natural history of chronic isthmus and descending aorta posttraumatic false aneurysms has been directly related to the limitations of diagnostic imaging. The considerable progress made in noninvasive angiography during the last 10 years (mainly through the easy access to multislice computed tomography, CT, scanners) will probably contribute to the disappearance of chronic lesions discovered fortuitously by revealing the injuries at the acute stage.

The lesion is often an intimal tear, more or less circumferential, misdiagnosed at the initial stage, which evolves towards a saccular pseudoaneurysm, incidentally demonstrated by a thoracic imaging study performed for another reason (Fig. 35.1). Some become symptomatic by a mechanism of compression (either

![Fig. 35.1. a Angiography during endovascular treatment of a chronic posttraumatic pseudoaneurysm, showing the stent-graft in its sheath. b After deployment, angiographic control shows the complete exclusion of the aneurysm](image-url)
tracheo-bronchial or recurrent nerve) and are discovered by a targeted imaging study.

Today the progress in intensive care and the wide accessibility to efficient vascular imaging studies in emergency situations have allowed better management of polytrauma patients. The advances in intensive care have induced an evolution of therapeutic strategy of acute ruptures of the aortic isthmus towards delayed surgery [1], the imaging advances have contributed to a drastic decrease, nearly disappear of misdiagnosed chronic false aneurysms.

According to the criteria defined by Langanay et al. (Chap. 32), the only remaining surgical indication in an emergency is isolated lesions of less than 24 h, hemodynamically unstable, without associated lesion contraindicating a cardiopulmonary bypass.

It is easy to figure out now, in the precarious context of a polytrauma patient, that an isthmus lesion can be medically controlled and treated after a delay, to limit the inherent morbidity/mortality of the surgical procedure under cardiopulmonary bypass in an emergency. It is now a consciously “delayed acute” surgical management, where the lesion is voluntarily “chronicized.”

In spite of intensive care and careful follow-up, patients have suffered ruptures during these periods of “controlled chronicization.”

Stent-grafts will probably help to prevent these sudden early ruptures while allowing a quick initial treatment of the lesion. This technique does not command systemic anticoagulation during or after the procedure, thus limiting the hemorrhagic complications in polytrauma patients. Encouraging results are currently being published [1, 2]. The challenge of this new management is linked to the midterm and long-term exclusion of the lesion in a definitive way like conventional surgery does.

The nonendothelialization of the stent-graft and the increasing aortic diameter with the patient’s age carries a risk of late type I endoleaks which could potentially activate a degeneration of the initial lesion into a chronic false aneurysm. In this case, the nonendothelialization would be an advantage by facilitating the surgical explantation of the stent-graft and conventional repair of the aorta, even a long time after the endovascular procedure (Fig. 35.2).

The endovascular therapy is a major step in the history of therapeutic management of traumatic injuries of the isthmus and the descending aorta. Because of this trend, it has appeared necessary to us to propose a new classification of these lesions, to better define the management, whichever therapeutic solution is used. The classification must allow us to define stages for the purpose of comparing therapeutic results among homogeneous groups of patients. It must also propose a decision algorithm to better select the most appropriate therapeutic choice with respect to the priorities in patient management.

### 35.2 Classification of Patients with Posttraumatic Injuries of the Aortic Isthmus or the Descending Aorta

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
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<tbody>
<tr>
<td>I: acute (&lt;48 h)</td>
<td>A: Isolated lesion</td>
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<tr>
<td>1: Stable</td>
<td>2: Unstable</td>
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Class I corresponds to a post-traumatic lesion of the isthmus or the descending aorta, with two subclasses:

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Fig. 35.2. a CT angiography. Control 6 months after stent-graft treatment of a chronic posttraumatic pseudoaneurysm, showing a type I endoleak. The endoleak was monitored and spontaneously resolved, but at 3 years the patient suffered bronchial compression due to endotension. Surgical conversion had to be performed (graft interposition and aneurysm thrombus resection). b CT angiography, 3D reconstruction, volume rendering. Control after surgical conversion