

# Aortic false aneurysm at the distal anastomotic suture line after aortic arch replacement; a case report with review of the literature

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**Abstract.** – Anastomotic pseudoaneurysm remains one of the main life-threatening complications after surgery on the thoracic aorta. We report a case with a history of ascending and aortic arch replacement and a false aneurysm creation at the anastomotic line found at the 2-year follow-up computed tomography. Either, due to incidental and asymptomatic finding and patient negation to any kind of intervention, it has been followed the medical treatment with blood pressure and heart rate control. In this, we discuss also the ways of treatment and the indication of any interventional therapy. Endovascular stent-grafting is a minimal invasive treatment for thoracic aortic aneurysm. However, its clinical usefulness for anastomotic false aneurysm following thoracic aortic surgery is unclear.

## Key Words:

False aneurysm, Endovascular stent-grafting, Anastomotic pseudoaneurysm, Aortic surgery, Thoracic aorta surgery, Aortitis, Acute aortic dissection, Acute aortic syndrome, Endovascular surgery, TEVAR, Arteritis.

## Introduction

Anastomotic false aneurysm is a rare but life-threatening complication after thoracic aortic surgery<sup>1,2</sup>. Because of the risk of rupture, cardiac tamponade due to the mass effect and cerebral embolism from thrombus in the aneurysm, surgical repair is mandatory<sup>3</sup>. We present a case with possible false aneurysm in the distal anastomotic line treated medically. We also review the international literature about the postoperative false aneurysm management.

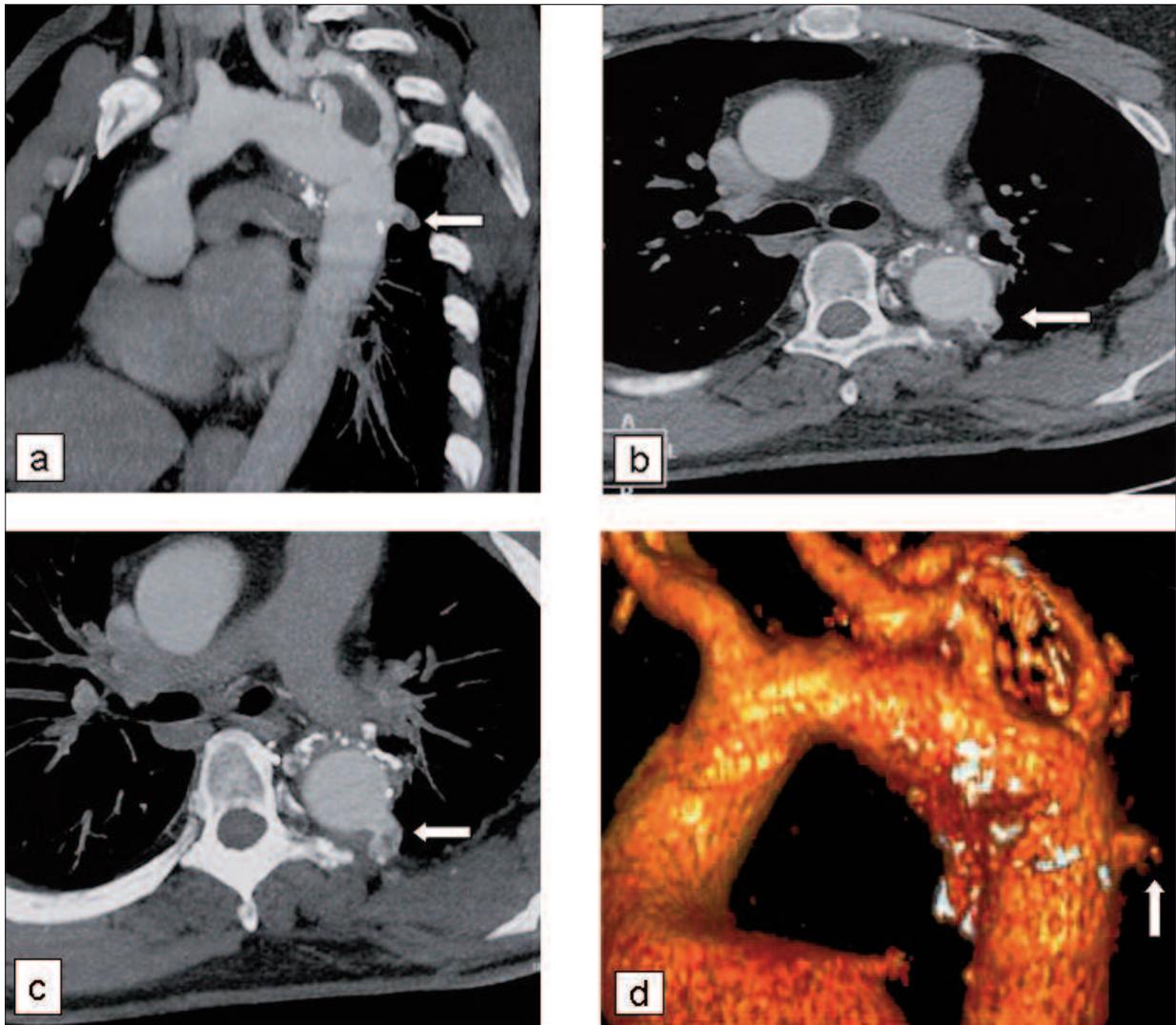
## Case Presentation

We report a 52-year-old man with a history of ascending aorta and aortic arch replacement due to aortic dissection. At the 3-months follow-up by computed tomography (CT) no findings were observed and patient continued the guides given by his doctor. At the following CT 2 years from the intervention a protrusion was observed at the distal suture line of the aorta (Figure 1). This pouch-like sack was diagnosed by the radiologist as false aneurysm, taken under consideration the patient's history. As a routine in our Department, it had been used teflon felt strips inside the intima and outside the adventitia of both aortic cuffs to buttress the aortic wall during the operation. Patient had a routine intraoperative course and an uneventful recovery.

Due to patient's negation of further exams and the lack of symptomatology, no treatment was done taken under consideration that while surgical treatment is mandatory. The individual approach varies according to the type of pathologic process, infection status, and site of origin of the aneurysm<sup>3</sup>. Now, 7 years from the intervention and 5 years from the pseudoaneurysm diagnosis, in a recent CT angiography with image reconstruction a similar picture was seen. Medical therapy with heart rate and blood pressure control is following without any event.

## Discussion

Although advances in surgical techniques and perioperative management have improved the results of surgery for acute aortic dissection, the



**Figure 1.** The computed tomography (angio-CT) of the patient with reconstruction of the image showing the false aortic aneurysm (arrows).

frequency of reoperation has risen. Anastomotic false aneurysm is a rare but life-threatening complication after thoracic aortic surgery<sup>1,2</sup>. The mode of presentation may be insidious while intermittent or persistent low-grade pyrexia may be the only symptom<sup>2</sup>. Massive bleeding, haemoptysis and haematemesis may also manifest in presence of fistula<sup>1,2</sup>. Consequently, pain becomes a symptom during expansion of the cavity<sup>3</sup>. Cerebral and/or peripheral embolism from thrombus created in the false aneurysm may complicate this issue<sup>3</sup>. The pathogenesis of the false aneurysm creation is not totally clear. A possible mechanism is the progressive thinning of the edematous and swollen aortic wall over the years, causing the sutures to loosen<sup>4</sup>. Leakage

from the graft is usually controlled by tightening the suture slack, indicating that suture loosening may be the cause of the aneurysm. Once false aneurysm is diagnosed, it should be repaired before it enlarges, adheres to the parasternum, or erodes into the cardiac chambers<sup>5</sup>. Possible causes of the false aneurysm are the graft infection and the laceration of the native aortic wall<sup>1</sup>. The latter is due to suture line tension and persistent bleeding into the space between the graft and the wrapped aortic wall<sup>4</sup>. Blood accumulation within the aneurysmal wrap of the graft creates tension in the suture line<sup>6</sup>. Large bites may probably reduce the tension, but complete surgical hemostasis at the suture line is the most important measure to prevent the false aneurysm creation<sup>4</sup>. Oth-

er predisposing factors include dissected native aorta and possibly tissue necrosis after the excessive use of biologic glue<sup>3</sup>. Nakamura et al<sup>7</sup> reported a case of a man with multiple and repetitive anastomotic pseudoaneurysms associated with polyarteritis nodosa, a type of arteritis of the medium- and small-sized arteries without involvement of smaller vessels.

Without an operation, aortic false aneurysms progressively expand, compress and erode the surrounding structures, or are a source of persistent infection and systemic embolism<sup>3</sup>. Caution must be taken in case of postoperative false aneurysm formation after aortic dissection or aortitis<sup>3</sup>. It has been reported the recurrence of false aneurysm formation and fatal aortic rupture in patients who underwent conservative local repair<sup>3</sup>. In these patients, the suture-holding capacity of the native aorta was insufficient to prevent an adverse outcome<sup>3</sup>.

In differential diagnosis should take under consideration some rare entities like the remnant of a non patent ductus arteriosus, the presence of aneurysm of a non-patent ductus arteriosus and the false aneurysm formation after aortic trauma<sup>8</sup>.

The conventional surgical repair is fraught with a risk of complications and even death. In order to avoid the morbidity and mortality associated with redo thoracic surgery, endovascular stent-grafting, which is a less invasive procedure, has been introduced<sup>2</sup>. In the era of minimally invasive and endovascular surgery a series of aortic diseases, like traumatic rupture, penetrating atherosclerotic ulcer, intramural hematoma and acute type B aortic dissection are treated in this way<sup>9-11</sup>. Experience acquired, more and more aortic pathologies can be treated by stenting especially in old patient with the presence of co morbidities or in redo cases witch are high risk for conventional open surgery<sup>9,11,12</sup>. In a series of 12 cases with an anastomotic pseudoaneurysm treated by endovascular stent-grafting of the thoracic aorta, no postoperative severe complications were encountered, and the midterm result was satisfactory<sup>2</sup>. Schwill et al<sup>13</sup>, conclude that endovascular repair appears to be well suited for treating selected patch aneurysms or pseudoaneurysms. Wheatley et al<sup>14</sup> described three cases of successful endovascular repair of anastomotic false aneurysms after thoracic aortic surgery. Technically, there is no major difference in treating anastomotic pseudoaneurysm and the usual thoracic aortic aneurysm through endovascular

stent-grafting<sup>2</sup>. Kan et al<sup>15</sup> concluded that persistent infection after endovascular stent-grafting was closely associated with a poor prognosis and that rupture of the aneurysm and fever at the time of the operation were identified as the most significant variables associated with persistent infection. Finally, patients with anastomotic pseudoaneurysms caused by infection should be excluded as candidates for endovascular stent-grafting<sup>2</sup>.

## Conclusion

Once a postoperative false aneurysm is diagnosed, an intervention is mandatory due to risk of bleeding, embolic events and rupture or fistula formation. The conventional surgical repair is fraught with a risk of complications and even death. It is thought that endovascular stent-grafting is the optimal treatment for patients with anastomotic pseudoaneurysms of the thoracic aorta following thoracic aortic surgery.

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