CASE REPORT

Endovascular Treatment of Repeated Multilevel Spontaneous Aortic Ruptures: A Case Report

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Introduction: Approximately 40 cases of spontaneous rupture of the aorta have been described in the literature. Diagnosis can be challenging, and a high index of clinical suspicion enabling prompt treatment can be lifesaving.

Report: This report presents the case of a 73 year old man who had three multilevel ruptures of the aorta at different times, all treated endovascularly. The patient had a good post-operative course, with no complaints during regular follow up.

Discussion: Clinical presentation was non-specific because the ruptures were contained, but spontaneous rupture of the aorta can manifest with a catastrophic presentation and hypovolaemic shock, requiring immediate treatment. The endovascular technique used was safe and resolved the patient’s symptoms.

INTRODUCTION

Spontaneous aortic rupture unrelated to aneurysms, trauma, dissections, and inflammatory or infectious diseases is an extremely rare, potentially fatal event, which rarely manifests alone. This is a report of a case of repeated multilevel spontaneous ruptures of the aorta in the same patient, all treated with endovascular techniques. Treatment and follow up are discussed.

CASE REPORT

In November 2016, a 73 year old man with hypertension, cardiac dysrythmia, and motor sequelae from a stroke 10 years earlier, presented with atypical lumbar pain starting one week previously and no other complaints. Abdominal computed tomography (CT) angiography showed blurring in the right, posterolateral, juxtarenal area compatible with peri-aortic haematoma, suggestive of a ruptured aorta. Other tomographic findings were areas of calcification of the aorta suggestive of atherosclerotic disease with no aneurysm or dissection (Fig. 1). The vascular surgery team assessed the patient, who was awake, responsive, and haemodynamically stable. There was no history of trauma and he tested negative for inflammatory, connective tissue, and infectious diseases related to impaired vessel wall integrity. Urgent endovascular aortic repair with a bifurcated endoprosthesis was performed (main body: 36×16×145 mm, extensions: 16×13×124 mm and 16×16×80 mm), with juxtarenal proximal anchoring and distal anchoring in the common iliac arteries (Fig. 2). There were no complications related to the endovascular treatment, however, the patient contracted a pulmonary infection and was discharged 10 days later.

In February 2017, the patient complained of posterior chest pain. CT angiography revealed a second spontaneous rupture, this time of a descending thoracic segment, with a 7.3 cm diameter peri-aortic haematoma (Fig. 3). A second endovascular procedure was performed, this time to implant a straight thoracic endoprosthesis (34×34×150 mm) which sealed the tear and improved symptoms (Fig. 4). The patient again recovered well and was discharged after seven days.

In March 2017, during an outpatient follow up appointment, the patient complained of mild chest pain. Laboratory tests revealed a five point drop in haematocrit. CT angiography of the thoracic and abdominal aorta showed another spontaneous rupture, in a segment of the aorta close to the coeliac trunk (Fig. 5). He was treated endovascularly for a
**Figure 1.** CT angiogram images of the abdominal aorta in the juxtarenal area (A) showing right side, posterolateral blurring compatible with peri-aortic haematoma, probably from rupture of the aorta (red arrows) (B).

**Figure 2.** Angiographic images of endovascular treatment to place a bifurcated endoprosthesis with juxtarenal proximal anchoring (A and B).

**Figure 3.** CT angiogram of the thorax, showing spontaneous rupture of a descending thoracic segment of the aorta, with peri-aortic haematoma (red arrows) (A) with a diameter of 7.3 cm (B).
third time, implanting a 34 x 34 x 150 mm straight thoracic endoprosthesis, anchored via a catheter positioned within the coeliac trunk to protect it, with good results (Fig. 6). The patient was discharged five days later with no complications. A new CT angiogram was only requested 60 days later, because of a change in urea level. On that occasion, a type 1B endoleak was found at the distal segment of the straight thoracic endoprosthesis implanted in the third procedure. Because the leak was minor and the haematoma smaller (Fig. 7), no further intervention was planned. A follow up CT angiogram six months later showed complete resolution of the endoleak (Fig. 8). At the time of writing, the patient was well, with no complaints during routine follow up.

**DISCUSSION**

Spontaneous aortic rupture is extremely rare, with fewer than 40 cases reported. Because pre-operative clinical diagnosis is seldom made, a high index of clinical suspicion is important for prompt diagnosis and treatment. In the case reported here, endovascular treatment successfully sealed the rupture site and resolved the symptoms in all instances. This technique is capable of rapidly accessing the aorta via the femoral artery and controlling bleeding by deployment of the endoprosthesis. Additionally, if the bleeding site cannot be clearly identified, the endoprosthesis is capable of sealing a long segment of the aorta, extending distally if necessary. The proximal portion is more challenging because it requires branches, fenestrations, or
hybrid procedures in some cases. Recently, endovascular repair has even been applied to a case of spontaneous early postpartum distal aortic arch rupture (with no dissection), which was successfully treated with a good mid term result. Open surgery can therefore be reserved for cases in which haemodynamic stability is not achieved or when endovascular treatment is not immediately available.

Imaging tests are key in the follow up of patients treated with endovascular techniques, who may develop complications such as endoleaks and recurrent ruptures. Contained ruptures may cause drawn out symptoms such as diffuse abdominal pain, nausea, anorexia, and anaemia, in contrast to open ruptures, which usually result in catastrophic presentations. An absence of dissections or
aneurysms is not sufficient to rule out aortic disease in these patients. It is essential to investigate areas of wall thinning or penetrating ulcers. There are no established guidelines for the follow up of spontaneous ruptures, but recommendations include CT assessment of the aorta at one, three, six, and 12 months, and annually thereafter to detect new complications or recurrence as well as to monitor risk factors, such as atherosclerosis and hypertension. This follow up strategy may be used in spontaneous rupture cases until new studies indicate the best option.

CONCLUSION
Endovascular treatment is an effective strategy in cases of spontaneous aortic rupture, controlling both the site of rupture and symptoms. Although rare, recurrence of multilevel rupture of the aorta should draw attention to the need for regular follow up of these patients.

CONFLICT OF INTEREST
None.

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