Endovascular stent grafting for contained rupture of the descending thoracic aorta

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Abstract
We report three cases of contained rupture of the descending thoracic aorta managed by endovascular stent grafting and discuss the possibility of managing this life-threatening complication in emergency, by endoluminal devices. Further experience is needed to specify the indications for aortic stenting in descendant thoracic aortic ruptures.

Keywords: Aortic rupture; Endoprosthesis; Aortic salmonellosis; Aortic hematoma; Aorto-esophageal fistula

1. Introduction
The use of endoluminal devices in the treatment of aortic diseases is progressing [1,2]. We describe three cases of contained aortic ruptures treated by endovascular stent grafting. These cases represent our initial experience and are described in chronological order. At the time, we had to order the prostheses. We now have a readily available supply of 10-cm prostheses for emergency use, in the following diameters: 24, 28, 32,38 and 42 mm.

2. Case reports

2.1. Case 1
A 77-year-old man with a history of smoking and prostate adenoma presented in February 2000 with acute dorsal pain with lumbar irradiation, dyspnea and left limb paresthesia. Trans-esophageal echography revealed a post-subclavian aortic rupture with a small pleural effusion confirmed by contrast computer tomography (CT) scan. The patient was managed medically with anti-hypertensive treatment and drainage of a 1.1-l left hemothorax. One week later, the left hemothorax reappeared. Angiography showed three aortic fissure lesions at different levels of the descending thoracic aorta. CT scan confirmed the rupture (Fig. 1). A 30-mm diameter, 101-mm long Talent type endoprosthesis (World Medical Corp., Sunrise, FL) was deployed 1 cm from the origin of the left subclavian artery. After the procedure, thoracic drainage eliminated a 1.8-l left hemothorax. The hemothorax did not reappear and the control CT scan showed no leak. The patient’s recovery was uneventful and he is doing well 34 months after the procedure. Contrast thoraco-abdominal control CT scans done every 6 months have shown no leak, stent migration or other complication.

2.2. Case 2
A 78-year-old woman with a history of arterial hypertension, appendectomy, salmonellosis and polyarthritis was examined in January 2001 for acute left basithoracic pain, dyspnea and fever. Thoracic radiography showed a left pleural effusion. A contrast thoracic CT scan revealed an aortic hematoma with a contrast leak at the level of the ninth dorsal (D9) vertebra and the angiography also showed the level of the rupture (Fig. 2). The zone was covered using two 31-mm long Talent type endoprostheses. Control arteriography during the procedure showed a persistent leak between the two stents, so a third one was deployed. A contrast thoracic CT scan done 3 days later revealed no contrast leak and a regression of the aortic hematoma. At postoperative day 8, the patient had a high fever with...
shivering and a positive hemoculture for *Salmonella enteridis*. Antibiotics were given and the fever and inflammatory markers regressed; treatment was stopped 18 months ago and the patient is doing well. Due to the risk of graft infection, this patient requires close supervision.

2.3. Case 3

A 59-year-old woman with a medical history of arterial hypertension, morbid obesity and smoking presented in December 2001 with a left pleural effusion after 3 weeks of persistent undiagnosed fever, asthenia, and progressive dysphagia. A contrast CT scan revealed a spontaneous aortic rupture with a peri-aortic hematoma compressing the esophagus and the left atrium (Fig. 3).

A 25-mm diameter Talent type endoprosthesis was deployed to cover and exclude the aortic rupture area. There were no procedural complications. On the 7th postoperative day, the patient had a moderate hematemesis. An upper fibroscopy revealed an aorto-esophageal fistula 30 cm from the dental arcades and an esophageal ulcer covered with clots. Thoracic CT scan excluded migration or stent kinking. The aorto-esophageal fistula was managed surgically by esophageal resection with bilateral exclusion by right thoracotomy, cervical esophagostomy and gastrostomy. The patient recovered well in the early postoperative period but developed sepsis and died 2 months later.

3. Discussion

These cases show that acute contained rupture of the
Thoracic aorta can be treated by endovascular stenting. As this technique is new, each team’s experience is needed in order to determine the right indication. In our experience, as described in another paper [3], the compression of the esophagus at the time of diagnosis is a contraindication for an endoluminal procedure. In such cases, conventional treatment is preferable as it treats not only the rupture, but also relieves the esophageal compression caused by the periaortic hematoma and the intra-aneurysmal thrombosis, which are, in our opinion, responsible for the further aortoesophageal fistula. Moreover, the fragile ischemic esophageal area may be subject to mechanical aggression caused by the retraction of the aneurysm or the hematoma after stenting.

In the second case, the rupture is likely to have been caused by infection (salmonella). The risk of sepsis is identical with both surgical and endoluminal techniques in our opinion. We show that endoluminal treatment is possible in such cases, associated with antibiotherapy which should be initiated immediately before the endovascular treatment.

With experience, the endoluminal technique is being used for more and more patients. In our initial experience we limited the use of this technique to fragile patients. We now propose this kind of treatment to a wider population, i.e. to patients who could undergo a thoracotomy. As always with new techniques, the initial enthusiasm is tempered by complications which allow to define the right indications. Endoluminal treatment of contained aortic rupture is not the standard treatment. Even if this technique may be successful in some cases, more data are needed to determine the safety of this approach. In the case of aortic contained rupture, esophageal compression by the hematoma is a contra-indication for endoluminal treatment.

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References