Single-stage endovascular treatment of an infected subclavian arterio-oesophageal fistula

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INTRODUCTION

Arterio-oesophageal fistula (AOF) is a life-threatening complication of oesophageal perforation. Undiagnosed, it will almost always lead to fatal exsanguination. Therapeutic options are limited and show inherent risks, because these fistulas are mostly associated with mediastinitis. We present a case of an infected subclavian AOF that was treated with endovascular covered stent-graft placement. Antibiotics and parenteral feeding were administered till the mediastinitis cleared. To our knowledge, this is the first report of a successful endovascular treatment of an infected subclavian AOF.

CLINICAL SUMMARY

A 45-year old man presented at the emergency department of a community hospital with haematemesis and hypovolemic shock. Additionally, the patient presented with black stools over the previous 5 days. At admission, haemoglobin was 5.5 g/dl (normal value 14–18 g/dl). Furthermore, he was infectious with fever up to 38.7°C and C-reactive protein of 246 mg/l (normal value 14–18 g/dl). Gastroscopy showed an ulcer in the proximal oesophagus with an adjacent blood clot. The patient remembered having a piece of food stuck in his oesophagus during a barbecue meal 5 weeks before. After intentional vomiting, a chicken bone emerged and upon that, he suffered from a sore throat for a few days.

A contrast-enhanced computed tomography (CT) of the chest showed a false aneurysm of the left subclavian artery (Fig. 1A). There was adjacent mediastinitis without evidence of abscess formation (Fig. 1B). These CT findings were very suggestive of an arterio-oesophageal fistula. The patient was urgently directed to the interventional radiology unit of our university hospital. Angiography with digital subtraction angiography confirmed the CT findings (Fig. 1C). A balloon-expandable covered stent-graft with a length of 38 mm and a nominal diameter of 9 mm (Atrium V12—Atrium Medical Corporation, Hudson, NH, USA) was placed in the subclavian artery, excluding the pseudoaneurysm (Fig. 2A). Broad spectrum antibiotics based on a combination of piperacillin and tazobactam were administered intravenously for 3 weeks to treat the mediastinitis. Because of the oesophageal laceration, parenteral feeding was started. Control CT after 3 days shows patent stent-graft with surrounding mediastinitis (Fig. 2B).

After 3 weeks, inflammatory parameters normalized and repeated oesophageal series with soluble peroral contrast agent showed appropriate healing of the oesophageal fistula. Intravenous antibiotics and parenteral feeding were aborted. Control CT after 2 months showed adequate resolution of mediastinitis with a patent subclavian stent-graft (Fig. 2C). A clinical follow-up over 5 years showed no recurrence of fever or dysphagia and normal arterial supply of the left arm.

DISCUSSION

Most AOFs caused by foreign body involve the aorta. As only 3.5% of all upper gastrointestinal bleeding occur from aorto-oesophageal fistula, it is a relatively rare entity [1]. Chiari first described the ‘aorto-oesophageal syndrome’ consisting of a series of symptoms starting with an event causing mid-thoracic pain, a sentinel arterial haemorrhage and a symptom-free period ultimately followed by fatal exsanguination. Later on, this sequence was called the Chiari syndrome.

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Although the subclavian artery is only rarely affected in AOF, it has a high risk of exsanguination, as described in this case.

Untreated subclavian AOFs, as aortic AOF, have a very high mortality. Before the development of adequate endovascular treatment, AOF required extensive surgery with thoracotomy, aortic graft placement, oesophageal surgery and mediastinal drainage. Especially in an infected environment, there was a very high mortality and morbidity due to adhesions and indolent sepsis [2].

Most surviving AOF cases found in more recent literature were treated with a two-step surgical strategy [3]. First of all, endovascular repair allows quick haemodynamic stabilization. Although not curative, it may provide a bridge to more definitive repair at a later time. A minimally invasive endovascular approach offers a good alternative to surgery avoiding tissue damage, bleeding, infectious complications, disability and long recovery time [4].

The unique feature about our case is that we treated the subclavian pseudoaneurysm with a single-stage placement of a covered stent-graft. Additional intravenous antibiotics cured the mediastinitis. Parenteral feeding was administered while the oesophageal laceration healed. There was no recurrence of fever, dysphagia or stent-graft dysfunction during 5 years of follow-up, avoiding the need for a second-stage open surgical repair.

Although there is little enthusiasm to perform extensive open surgery on a patient after having closed a bleeding vessel of an AOF, leaving an endoprosthesis in an infected region is still controversial. The infection can affect the stent-graft fabric, resulting in recurrent mediastinitis, upper gastrointestinal haemorrhage or stent thrombosis. This would compromise subsequent surgery even more. Therefore, definitive open surgical correction of the fistula might be undertaken as soon as possible after successful endovascular repair resulting in lower fistula-related mortality compared with patients who did not receive additional oesophageal surgery \(P = 0.018\) [5].

Considering both risks, we decided to monitor the patient closely with daily check of inflammatory parameters, several oesophagograms and two contrast-enhanced computed tomographies during a 3-week hospital stay. After discharge, there were controls by clinical examination and CT for 2 more years. Later on, the patient was followed up on a clinical basis.

As a conclusion, we can assume that there may be a place for treating a subclavian AOF solely by a stent-graft, even in an infected environment. Extensive clinical and imaging follow-up is necessary to identify potential early or late complications.

**Conflict of interest**: none declared.
REFERENCES


