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CASE REPORT

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Aortoesophageal fistula as a complication of thoracic aorta aneurism stent grafting – a case report and literature review

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Summary

Background: Endovascular stent grafting is performed in patients with aneurysms of aorta or other major vessels. The procedure is considered to be generally safe, with a low risk of complications, the most common of which include endoleaks, stenosis or thrombosis at the stagraft and itsmigration.

Very rare complications include aortoesophageal and aortobronchial fistulas (0.5–1.7% cases).

Case Report: A 64-year-old patient was admitted to our hospital with suspected aortoesophageal fistula. Two years prior, the patient had undergone a stent graft repair of the thoracic aorta at the local vascular surgery clinic. Both laboratory results and CT angiography revealed aortoesophageal fistula, which was also detected in endoscopic examination.

Despite intensive treatment and preparation for surgery, the patient died 6 days after admission.

Conclusions: Aortoesophageal and aortobronchial fistulas are among the most dangerous and difficult-to-treat complications in the treatment of thoracic aortic aneurysms by endovascular stent-grafting. This clearly indicates that preventive care and regular medical examinations are important to prevent their occurrence.

Key words: aortoesophageal fistula • thoracic aortic aneurysm • stent graft

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Background

Endovascular stent graft implantation procedures are performed in patients with aneurysms of the aorta or other large vessels. The goal of the procedure is to preserve or restore vessel patency and to prevent the aneurysm from breaking. Results show that it is a safe and effective method of treatment of aneurysms in patients with high surgical risk [1]. The most common complications of endovascular treatment with stent grafts include: leakage of blood into the aneurysmal sac, stenosis or thrombosis within the stent graft or its migration. Formation of aortoesophageal and aortobronchial fistulas is a rare (0.5–1.7%), but serious complication of stent graft implantation to thoracic aorta. They are most frequently caused by infection of the prosthesis [2], compression, ischemia, local inflammatory reaction and subsequent necrosis. Aortoesophageal fistulas are more common (68%) than aortobronchial (5%) and both types of fistulas coexist in 26% of cases. There are no fundamental differences in the frequency of occurrence of mentioned complications between classical surgery and endovascular methods of management of thoracic aorta aneurysms. The largest risk factor for fistula formation is infection of the prosthesis, which occurs in about 5% of patients independently from surgical technique or antibiotic prophylaxis. Other factors increasing the risk of complications such as fistulas include pseudoaneurysms, emergency surgeries and intraoperative complications.

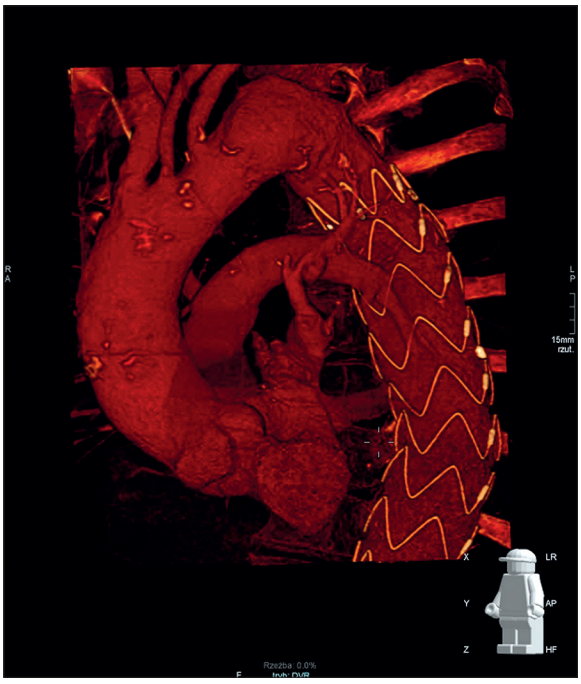

Figure 1. Aortic arch and descending aorta VRT reconstruction. Body of stentgraft localisation.

Formation of an aortobronchial or aortoesophageal fistula significantly worsens patient prognosis. Diagnosis and treatment is often difficult.

Case Report

A 62-year-old patient with an aneurysm of descending aorta, up to 6.1 cm in diameter, was admitted to the surgical ward for planned stent graft implantation procedure. On the fourth day of hospitalization, a Medtronic stent graft (Valiant Captiva, 40×167 mm) was implanted endovascularly. It was deployed in the lumen of descending aorta below the aortic arch (Figure 1). Control angiography confirmed proper passage of contrast. Patient was discharged from the hospital in good general condition, with a recommendation for follow-up care in a surgical outpatient clinic. Twenty-one months after the procedure patient presented with massive gastrointestinal bleeding. He was transferred to a surgical ward from another health care facility, where an aorto-esophageal fistula had been diagnosed on the basis of angio-CT study. On admission, patient complained of severe retrosternal pain. During medical history taking, patient did not report any complaints preceding gastrointestinal bleeding. Physical examination was unremarkable and patient was hemodynamically stable. Laboratory studies revealed elevation of acute phase markers: leukocytes – 16 000/mm^3, CRP – 310 mg/l (norm: <5 mg/l), and confirmed massive blood loss: HGB 9.8 g/dl, HCT 24%. Patient was commenced on antibiotic and antifungal treatment – vancomycin, ciprofloxacin and fluconazole. Gastroscopy was performed on admission, revealing esophageal perforation about 30 cm from the incisors. Material for microbiological examination was collected from the lesion. An angio-CT was subsequently repeated, but failed to visualize extravasation of contrast medium (Figures 2, 3). A 3-cm-thick "muff" was visualized

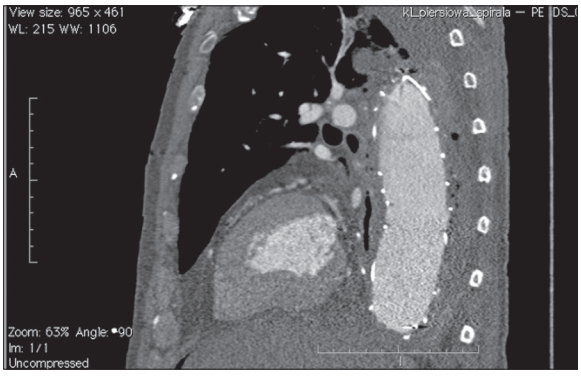

Figure 2. Sagittal contrast-enhanced lumen of aorta with the contrast /stent-graft/, infiltration in vaccinity.

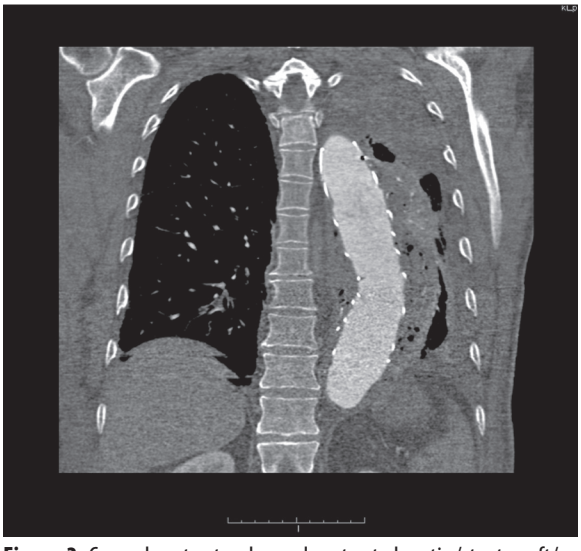

Figure 3. Coronal contrast-enhanced contrasted aortic /stent-graft/ lumen with infiltration. Motional artefact in the right in the projection of right diaphragmatic dome.

near the graft, with numerous gas bubbles around it (Figures 4, 5). Gas bubbles seemed to come from the esophageal lumen (Figure 6). During patient's hospitalization on the ward, we observed episodes of significant reduction of hemoglobin levels (down to 8.0 g/dl) requiring regular PRBC (packed red blood cells) transfusions. On the fifth day of hospitalization, there was a sudden cardiac arrest following massive bleeding from the fistula. Resuscitation was immediately commenced. A gastric tube was inserted, draining about 400 ml of bloody content. Due to the lack of hemodynamic response, despite administration of 3 mg of atropine and 6 mg of adrenaline all together, patient was pronounced dead. During resuscitation, we noted advanced caries involving entire oral cavity, which was most likely the source of stent graft infection. Post-mortem examination revealed presence of aortoesophageal fistula, 2×1 cm in dimensions, and about 1500 ml of blood in the stomach (Figure 7). There was also an aneurysm, 12 cm in length and 15 cm in circumference, present under the distal mounting of a stent graft. It was filled with large, atheromatous, disintegrating lesions (Figures 8, 9). Post-mortem examination also demonstrated presence of a second aneurysm in the abdominal aorta, 3×3 cm in dimensions, beginning with wall dissection.

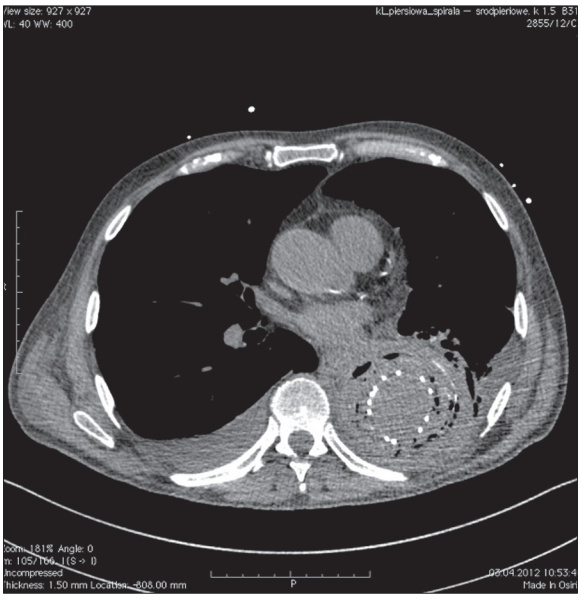

Figure 4. Axial unenhanced mediastinal CT. Around the stent-graft – soft-tissue muff (1.5–3 cm thick) with the presence of air and calcifications in the wall of the descending aorta aneurysm. Fluid in both pleural cavities.

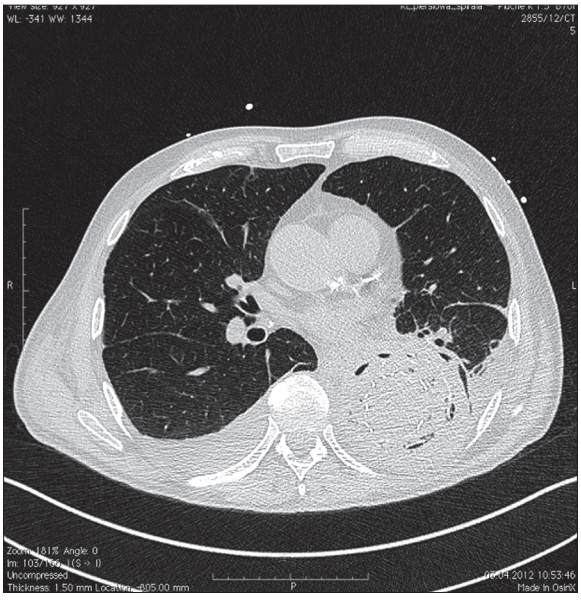

Figure 5. Axial contrast-enhanced – lung view air and infiltration around aorta.

Discussion

Aortoesophageal and aortobronchial fistulas pose some of the most serious diagnostic and therapeutic challenges as complications of management of thoracic aortic aneurisms through stent graft implantation. The process of fistula formation consists of many stages and is usually prolonged. The mechanism of fistula formation proceeds in the following way:

1. Large aneurism of descending aorta,
2. Compression of adjacent mediastinal organs (esophagus, trachea),

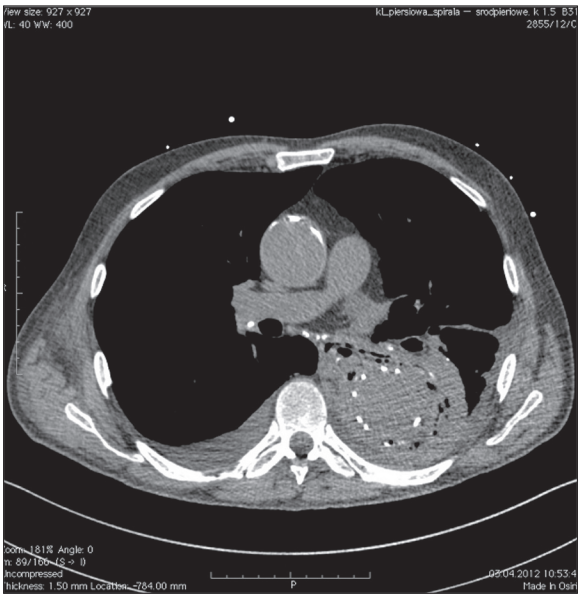

Figure 6. Axial unenhanced mediastinal CT. Air propageting towards esophagus.

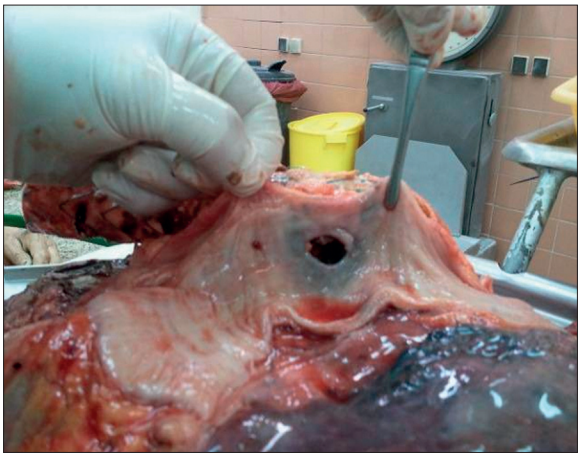

Figure 7. Image from autopsy lumen of aortoesophageal fistula.

3. Poor blood perfusion of the adjacent tissues (wall of esophagus or trachea),
4. Pressure sore formation and subsequent necrosis,
5. Superinfection by endogenous sources of infection (active?) – caries, paradontosis,
6. Inflammation and extending the area of necrosis.

Clinical symptoms include: hemoptysis, bloody vomiting, signs of hemorrhagic or septic shock, fever, chest pain, dysphagia, dyspnea. Renal failure and respiratory failure may suggest fistula formation and aid in quicker diagnosis. Endoscopy is the most sensitive diagnostic method. However, it is associated with elevated risk of breaking the clot and massive hemorrhage. Because of it, most clinicians choose angio-CT, associated with significantly lower risk, as first-line study. Although fistula is rarely visualized, but there are usually indirect signs suggesting its presence such as: air bubbles, collection of fluid around the aorta, thinning of esophageal or bronchial walls. Coexistence of both aortoesophageal and aortobronchial fistulas significantly worsens prognosis in a patient after successful surgical

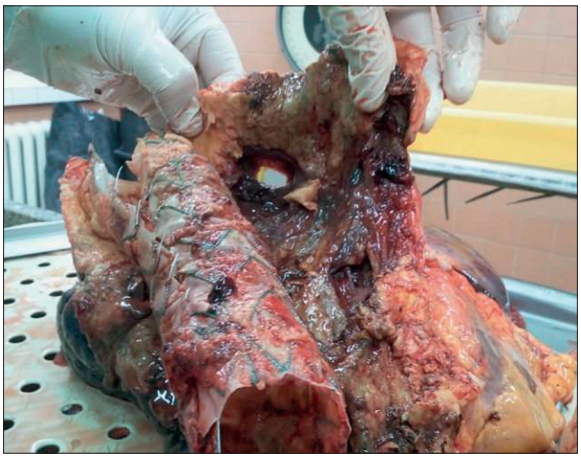

Figure 8. Image from autopsy. Sebaceus masses in atheromatous changes. Dissected stengraft.

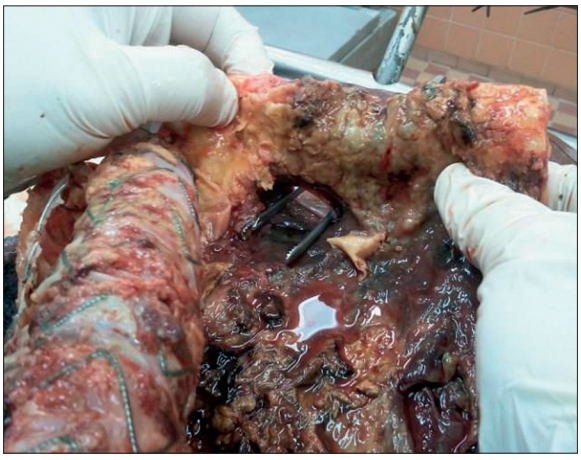

Figure 9. Image from autopsy. Sebaceus masses in atheromatous changes. Dissected stengraft.

management of one of the canals. Treatment of choice of aortoesophageal and aortobronchial fistulas is an open surgical procedure involving reconstruction of the walls of aorta, esophagus or bronchus. One may also attempt to close the fistula through another endovascular procedure [3,4]. Unfortunately, such operations, due to difficult access, are very complicated [5] and associated with high mortality, reaching 78%. Yearly survival of patients with diagnosis of one of the two types of fistulas is 13% in case of aortobronchial fistula and 100% in case of aortoesophageal fistula [6]. Therefore, follow-up examinations, dental care and patient lifestyle education play an important role in patients after stent graft implantation.

Conclusions

Stent graft implantation is currently the method of choice for management of aneurisms of thoracic aorta. However, in a small percentage of patients, it does not prevent development of long-term complications. Occult and chronic sources of infections, repeatedly ignored by the patient, became a possible cause of the described complications.

References:

1. Eggebrecht H, Baumgart D, Radecke K et al: Aortoesophageal Fistula Secondary to Stent-Graft Repair of the Thoracic Aorta. J Endovasc Ther, 2004; 11(2): 161–67
2. Milnerowicz A, Milnerowicz A, Pawłowski S et al: Zaopatrzenie przetoki aortalno-dwunastniczej z użyciem protezy wewnątrznaczyniowej – opis przypadku. *http://polimery.am.wroc.pl/pdf/179.pdf* [in Polish]
3. Jonker FH, Schlösser FJ, Moll FL et al: Outcomes of Thoracic Endovascular Aortic Repair for Aortobronchial and Aortoesophageal Fistulas. J Endovasc Ther, 2009; 16(4): 428–40
4. De Rango P, Estrera AL, Azizzadeh A et al: Stent-Graft Repair of Aortobronchial Fistula: A Review. J Endovasc Ther, 2009; 16(6): 721–32
5. Diethrich EB: Endovascular Thoracic Aortic Repairs: Greater Experience Brings Rewards and New Problems to Challenge Us. J Endovasc Ther, 2004; 11(2): 168–69
6. von Segesser LK, Tkebuchava T, Niederhäuser U et al: Aortobronchial and aortoesophageal fistulae as risk factors in surgery of descending thoracic aortic aneurysms. Eur J Cardiothorac Surg, 1997; 12(2): 195–201