

A case of a highly tortuous descending thoracic aortic aneurysm treated by surgical exclusion

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Abstract

The patient was a 76-year-old woman with an atypical descending thoracic aortic aneurysm due to a highly tortuous descending aorta. The surgical approach in this case required special consideration because of the aneurysm's location. The main body of the aneurysm was in the right thoracic cavity. Descending thoracic aorta replacement with a prosthetic graft and aneurysmal total exclusion were performed through a left curvilinear thoracoabdominal incision. The patient's postoperative course was uneventful. Surgical exclusion of a thoracic aortic aneurysm may be a useful technique in this special situation. Postoperative follow-up is needed to prevent early and late complications.

Keywords

Descending aortic aneurysm, right thoracic cavity, exclusion

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Introduction

In case with a highly tortuous descending aorta, a special type of descending aortic aneurysm may occasionally develop.¹ In this report, an unusual type of descending aortic aneurysm is presented. The aneurysm's main body was in the right thoracic cavity. Because the main body of the aneurysm was not visible through the surgical field, difficulty in the management of the intercostal arteries that originated from the aneurysm during the operation was anticipated. Endovascular repair was initially considered, but Chen et al.² reported that endovascular repair for atherosclerotic aneurysms with highly tortuosity was associated with higher rates of endoleaks and lower survival. Therefore, simultaneous descending aortic graft replacement and total exclusion of the aneurysm were planned.

Case report

A 76-year-old woman with progressive dilatation of a descending thoracic aortic aneurysm was referred to our department. Contrast-enhanced computed tomography (CT) demonstrated that the descending aorta was flexed to almost a right angle at the seventh costal level, and just distal at the curved portion, an aneurysm emerged with a maximum diameter of 70 mm and calcified intima (Figure 1). The main body of the aneurysm was in the right thoracic cavity. The

aneurysm extended to the abdominal aorta 10 mm above the origin of the celiac artery. The esophagus, right bronchus, left atrium, and right pulmonary vein were compressed by the aneurysm from behind, but the patient had no symptoms related to compression syndrome, such as progressive dyspnea, chest pain, back pain, esophageal obstruction, or dysphagia. Echocardiography was normal. The electrocardiogram showed sinus rhythm, but there were severe ischemic ST-T changes on exercise. Coronary artery angiography showed 99% stenosis at the left main trunk. Therefore, on-pump beating coronary artery bypass grafting for left antero-descending artery and circumflex artery was performed using the left mammary artery and a saphenous vein, respectively, before surgery for the descending aortic aneurysm.

Operative technique

Three months after coronary artery bypass grafting, surgery for the descending aortic aneurysm was performed via a left

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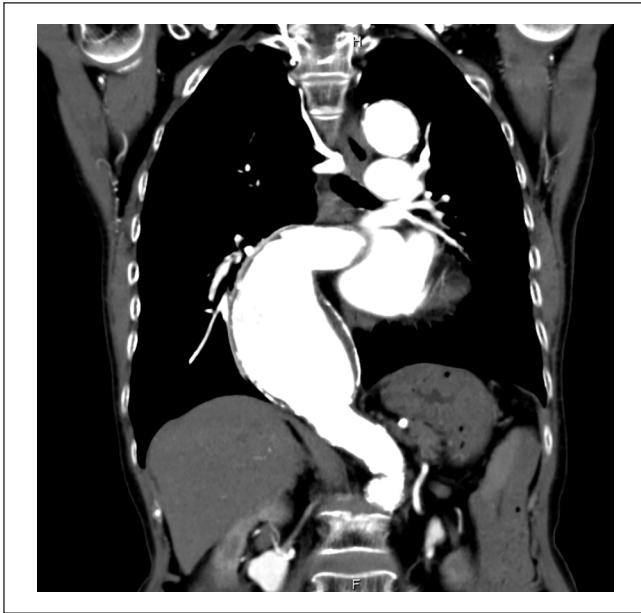


Figure 1. The frontal sectional view of reconstructed contrast-enhanced computed tomography shows that the descending aorta is flexed to almost a right angle at the seventh costal level, and an aneurysm emerges just distal at the curved portion. The main body of the aneurysm is in the right thoracic cavity, and its maximum diameter is 70 mm, with calcified intima.

curvilinear thoracoabdominal incision. The left posterolateral thoracotomy was made at the seventh intercostal space. The diaphragm was divided in a circumferential fashion, and the abdominal aorta was exposed via a retroperitoneal approach. Superficially, the aneurysm could not be identified through the operative field. First, the descending aorta was dissected just proximal to the tortuous aortic portion. Next, the abdominal aorta was carefully dissected just proximal to the origin of the celiac artery. Normothermic half-flow bypass (1.2L/m²/min) via the right femoral artery and vein was used for distal perfusion. The proximal and distal dissected aorta sections were then double-clamped. Both sides of the clamped aorta were transected between each of two vascular forceps. The proximal and distal cut ends of the aorta were reconstructed using a 22-mm J-graft vascular prosthesis (Japan Lifeline, Inc., Tokyo, Japan) in an end-to-end fashion (Figure 2). The proximal and distal cut ends of the aneurysmal neck were then doubly sutured closed. Postoperatively, the patient had an uneventful recovery without paraplegia. Enhanced CT performed 1 month after the surgery showed a patent graft, and the excluded native aorta was completely thrombosed without any intercostal inflow. The patient is doing well and is being followed-up regularly at our outpatient clinic.

Discussion

Aneurysmal exclusion removes the stress of the systemic arterial pressure from the aneurysm and results in complete

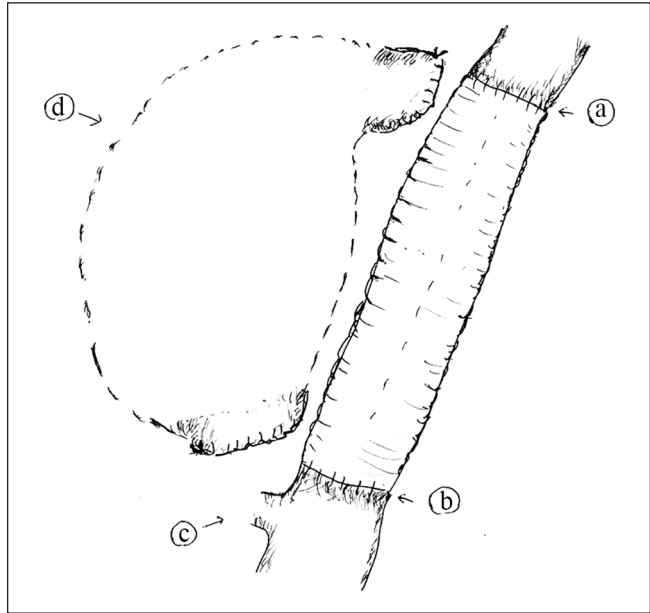


Figure 2. Diagrammatic representation of the operation showing the excluded segment of the descending aorta and the graft in situ: (a) proximal anastomosis, (b) distal anastomosis, (c) celiac artery, and (d) excluded segment of the descending aorta.

intra-aneurysmal thrombosis, which prevents rupture.¹⁻⁴ However, complete thrombosis does not always develop in the aneurysm after total exclusion, because of anticoagulant therapy or patent branching arteries. Therefore, the excluded aneurysm could sometimes develop progressive dilatation or rupture, which requires re-operation, during long-term follow-up period after the surgery.³⁻⁶ Resnikoff et al.⁵ reported that 2% of patients who underwent abdominal aortic aneurysmal exclusion were found to have a patent aneurysmal sac, and most of them required surgical intervention. In the present patient, it was anticipated that the control of blood flow from the intercostal arteries originating from the aneurysm would be difficult because the main body of the aneurysm was not directly visible through the surgical field. Moreover, preoperative CT predicted that the patient's arteria radicularis magna originated from the second lumbar artery which originated more peripherally from the distal aneurysmal neck. This finding suggested that the risk of paraplegia during the operation might be very low. Compression of esophagus due to large descending aortic aneurysm is well known as dysphagia aorta.⁷ Although, the present patient had no symptoms related to compression syndrome, her esophagus and right bronchus were compressed by the aneurysm. It is important to consider the possibility of compression syndrome in cases such as the present one. In the present case, endovascular repair was initially considered, but the patient's proximal aortic neck was highly tortuous, and the distal landing zone was too short for endovascular therapy. Therefore, total exclusion of the aneurysm was planned for this patient. According to the National Clinical Database

2015 and 2016 in Japan, there were 6044 cases of non-dissecting descending aortic aneurysm, and the number of non-dissecting aortic aneurysm appeared to be increasing in recent years.⁸ Of these 6044 cases, 3861 patients (63.9%) were treated by endovascular therapy. Endovascular repair for non-dissecting descending aortic aneurysms has recently increased markedly, and this procedure is becoming the first choice for non-dissecting descending aortic aneurysms in Japan. In the present case, if the excluded aneurysm was to develop progressive dilation after the surgery, we would schedule closure of the patent feeding arteries that originate from the aneurysm through a right thoracotomy. Regular long-term follow-up is needed for the present patient. Surgical exclusion of a thoracic descending aneurysm is a useful technique in some situations, as in the present case. It is also necessary to become familiar with the early and late complications related to the surgical exclusion.

Conclusion

In the present case, a surgical exclusion technique was used for a patient with a special type of descending thoracic aortic aneurysm. This technique was very useful, but we must also be aware of the possibility that this technique may cause late complications. Therefore, postoperative follow-up is necessary.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

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Informed consent

Written informed consent was obtained from a legally authorized representative(s) for anonymized patient information to be published in this article.

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References

1. Ciuricǎ S, Lopez-Sublet M, Loeys BL, et al. Arterial tortuosity. *Hypertension* 2019; 73: 951–960.
2. Chen CK, Liang IP, Chang HT, et al. Impact on outcomes by measuring tortuosity with reporting standards for thoracic endovascular aortic repair. *J Vasc Surg* 2014; 60: 937–944.
3. Kanki Y, Okumura S, Ikeda N, et al. A case report of dilatation of staple-excluded descending aortic aneurysm after an interval of ten years. *Jpn J Vasc Surg* 1998; 7: 851–856.
4. Gontijo B, Fantini FA and Vrandecic M. Late complications after surgical exclusion of the thoracic aorta. *Eur J Cardiothorac Surg* 1996; 10: 590–592.
5. Resnikoff M, Darling RC III, Chang BB, et al. Fate of the excluded abdominal aortic aneurysm sac: long-term follow-up of 831 patients. *J Vasc Surg* 1996; 24: 851–855.
6. Bhan A, Agarwal S, Sharma R, et al. Juxtaductal coarctation with type B dissection of the aorta: a new operative technique. *J Thorac Cardiovasc Surg* 2002; 123(2): 365–367.
7. Liao CY, Huang SC, Wang YC, et al. Dysphagia aortica: a fatal delay in diagnosis. *Am J Emerg Med* 2015; 33: 1117.e3–e5.
8. Shimizu H, Hirahara N, Motomura N, et al. Current status of cardiovascular surgery in Japan, 2015 and 2016: analysis of data from Japan Cardiovascular Surgery Database. 4-Thoracic surgery. *Gen Thorac and Cardiovasc Surg* 2019; 67: 751–757.