Saccular aortic aneurysm that resembled a mediastinal neoplasm

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A B S T R A C T

INTRODUCTION: Saccular aortic arch aneurysms in unusual sites may be misdiagnosed as a neoplasm. We present the case of a rare saccular aortic arch aneurysm between trachea and esophagus that resembled a mediastinal neoplasm in the preoperative findings.

PRESENTATION OF CASE: A 63-year-old male with an abnormal mediastinal shadow on chest X-ray was referred to the hospital. An axial plain computed tomogram of the chest revealed mediastinal soft tissue next to the right side of the aortic arch resembling a neoplasm originating from the gap between the trachea and the esophagus. The coronal view constructed by enhanced 64-row multi detector computed tomography revealed the soft tissue was an aneurysm arising from the inner side of the aortic arch. An aortic arch replacement was performed via a median sternotomy.

DISCUSSION: A thoracic aortic aneurysm sometimes behaves like a mediastinal neoplasm. The multiple cross-sectional image from multidetector computed tomography was useful for the correct diagnosis of such an aneurysm.

CONCLUSION: The possibility of an aneurysm should be considered whenever a mass in contact with the aortic wall is identified.

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1. Introduction

The most common site of saccular aortic arch aneurysms is the lesser curvature of the arterial ligament.1 Those occurring in unusual sites may be misdiagnosed as a neoplasm.1,2–6 This report presents the case of a rare saccular aortic arch aneurysm between the trachea and esophagus that resembled a neoplasm in the preoperative findings.

2. Case

A 63-year-old male undergoing treatment for hypertension was referred due to an abnormal mediastinal shadow on chest X-ray. He had been admitted to the hospital for abdominal pain four years earlier. Although a detailed examination had been performed, the cause of abdominal pain could not be found and the symptoms had disappeared. The patient was aware of slight dysphagia for 3 months. His blood pressure was 156/107 mmHg under medication. Physical examination and routine bloods tests were otherwise normal. Plain computed tomography (CT) of the chest was performed. It revealed a mediastinal soft tissue mass measuring 75 mm × 60 mm next to the right side of aortic arch with an irregular border (Fig. 1A). A review of enhanced CT scans taken 4 years earlier showed no abnormal shadow in this area retrospectively (Fig. 1B). The possibility of a mediastinal neoplasm was considered and a contrast enhanced 64-row multi-detector CT was performed. The mass did not enhance with intravenous contrast. The axial views revealed that the mass was compressing the trachea and esophagus, embedded in the immediate right side of the aortic arch (Fig. 1C). Coronal views revealed thinning of the right wall of the aortic arch, continuous with the mass, suggesting the mass had arisen from the inner side of the aortic arch (Fig. 1D). This finding indicated that the mass was an aneurysm that had developed from the aortic arch in the potential space between esophagus and trachea. The patient underwent aortic arch replacement. The procedure was performed via a median sternotomy with selective cerebral perfusion under deep hypothermic circulatory arrest. The left wall of the aortic arch was released from the surrounding tissue, including the left phrenic and recurrent nerve to expose the distal side, which was opposite the aneurysm. Opening the left side exposed the wall of the aortic arch, revealing the 6 cm-diameter ostium of the aneurysm filled with atherothrombus in the inner side of aortic arch. The atherothrombus was removed from the aneurismatic ostium, revealing that the aneurysm was developing into the posterior mediastinal direction. The aorta was replaced by
a synthetic branched graft leaving the most of the wall of aneurysm and aortic arch. Palsy of the left phrenic nerve was detected by postoperative chest X-ray. The patient was discharged with slight dyspnea that had little effect upon his activity of daily life 21 days after the operation. The pathological findings of the excisional wall of the aneurysm showed it was composed of tunica intima, media and adventitia with calcification, forming a true atherosclerotic aneurysm.

3. Discussion

A thoracic aortic aneurysm sometimes behaves like a mediastinal neoplasm. Thus the possibility of an aneurysm and neoplasm should be considered whenever a mass in contact with the aortic arch is identified. The plain CT of the current case definitely suggested the possibility of a neoplasm for two reasons.

The first reason is that it was in a location where aortic aneurysms are rare. Aneurysms may develop in an area with little structure, thus the common site of a saccular aortic arch aneurysm is the lesser curvature of the arterial ligament. An aneurysm developing into the side of the mediastinum is very rare, and may affect the clinical diagnosis and the outcome. Taguchi reported a similar aneurysm that could not be differentiated from a mediastinal neoplasm in the preoperative workup including conventional enhanced axial CT. They performed total replacement of the aortic arch via a median sternotomy after aneurysmal diagnosis with needle biopsy via a right thoracotomy. The patient died due to hemodynamic instability on the day of surgery. They thought that the delay in the diagnosis caused by the synchoniomity via the right thoracotomy may have been responsible for the poor result. It was difficult to identify the connection between the mass and the aortic arch with the axial CT image in the current patient. However, the mass was clearly identified as an aneurysm originating from the right wall of aortic arch in the coronal view with multidetector CT. Construction of multiple cross-sectional images is useful for the correct discrimination between a neoplasm and aneurysm.

The second reason for suspecting a neoplasm was the rapid expansion. Masuda reported the mean expansion rate of a thoracic aneurysm in 40 patients was 1.3 ± 1.2 mm/year. The maximum diameter of the current aneurysm was 75 mm at the diagnosis. Enhanced CT performed 4 years earlier demonstrated no signs of aneurysmal disease. That means the expansion rate of the current aneurysm was more than 18.75 mm/year. Such a rapid expansive rate is not rare in a malignant neoplasm such as a thymoma, thymic cancer and metastatic lymph nodes, however, it is rare in an unruptured aneurysm. Masuda found that high diastolic blood pressure, renal failure and the large diameter of the aneurysm at diagnosis are factors that accelerate the expansion rate of an aneurysm. These clinical findings can be additional clues to suggest that the growing mediastinal mass may be an aneurysm. Indeed, the blood pressure was poorly controlled in the current patient, in spite of medical therapy.

When operating on usual aortic aneurysms, we normally strip only the right surface of the aortic arch in the exteriorization of the distal aortic arch, to avoid damaging the phrenic and recurrent nerve. However, in the current case we stripped the left side of aortic arch because the aneurysm was located on the right side of aortic arch. Although those nerves were preserved, phrenic nerve palsy due to surgical injury was identified after the operation. The more superior side of the aortic arch should have been stripped to reduce the chances of nerve injury.

4. Conclusion

This report presented a rare case of a saccular aneurysm that developed into the mediastinal side of the aortic arch. A multiple cross-sectional image constructed by multi-detector CT was useful for discriminating the lesion from a mediastinal neoplasm.

Conflict of interest statement

None.
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None.

Ethical approval

Written informed consent was obtained from the patient for the publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Authors’ contributions

Naohiro Nose MD, PhD and Hiroumi Kataoka MD contributed to data collection, data analysis, and writing; Masakatsu Hamada MD, Yukio Kosako MD, Yasuji Matsuno MD and Takahiro Ishii MD, PhD contributed to data analysis.

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