Received: 13 November 2021 | Accepted: 14 December 2021

DOI: 10.1002/rcr2.899

CASE REPORT

Respirology Case Reports | WILEY

Resection of a capillary haemangioma using robotic-assisted thoracic surgery: A case report

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Associate Editor: Michael Hsin

Abstract

Capillary haemangioma is a rare condition that is difficult to diagnose preoperatively because of its rarity and nonspecific imaging findings. In this report, we describe a case of capillary haemangioma diagnosed by robot-assisted thoracic surgery (RATS). A 72-year-old man was incidentally found to have an anterior mediastinal tumour on chest computed tomography. The preoperative imaging findings were indicative of thymoma, and surgical treatment by RATS was selected. The intraoperative findings suggested that the tumour was a haemangioma originating from the pericardiophrenic vein. The pathological findings revealed a well-defined tumour with capillaries in a vascular-like structure and some thrombus formation. The pathological diagnosis was capillary haemangioma. The patient was discharged unaided at 7 days postoperatively and no recurrence was observed at 16 months postoperatively.

KEYWORDS
capillary haemangioma, computed tomography, mediastinal tumour, robot-assisted thoracic surgery, thymoma

INTRODUCTION

Capillary haemangioma is difficult to diagnose preoperatively because of its rarity and nonspecific imaging findings.[1] We herein report a case of a vascular tumour originating from the pericardiophrenic vein that could be analogized intraoperatively and safely resected using robot-assisted thoracic surgery (RATS).

CASE REPORT

A 72-year-old man was incidentally found to have an anterior mediastinal tumour on chest computed tomography (CT). His tumour markers (Carcinoembryonic antigen 1.1 ng/mL, cytokeratin 19 fragment 3.7 ng/mL, Progastrin-releasing peptide 15.5 pg/mL) and anti-acetylcholine receptor antibody levels (0.1 nmol/L) were normal. Chest CT showed a well-defined 4.0 × 3.5 cm mass in the anterior mediastinum, caudal to the left brachiocephalic vein and in close contact with the ascending aorta. No apparent calcification was observed. Contrast-enhanced CT revealed a mass with heterogeneous internal contrast and no traffic with the ascending aorta, left brachiocephalic artery, or other large vessels. Magnetic resonance imaging (MRI) showed low intensity on T1-weighted images and high intensity on T2-weighted images. There was no evidence of invasion of other surrounding organs (Figure 1). Based on the tumour localization and imaging findings, thymoma was suspected, and a robot-assisted thymectomy was performed. The intraoperative findings revealed a tumour in the anterior mediastinum covered by the mediastinal pleura. When the mediastinal pleura was dissected, the tumour was not continuous with the thymic tissue, but rather was in close proximity to the phrenic nerve, which was suggestive of a haemangioma originating from the pericardiophrenic vein. The tumour was dissected from

Takuya Ohashi and Mitsumasa Kawago contributed equally for this study.

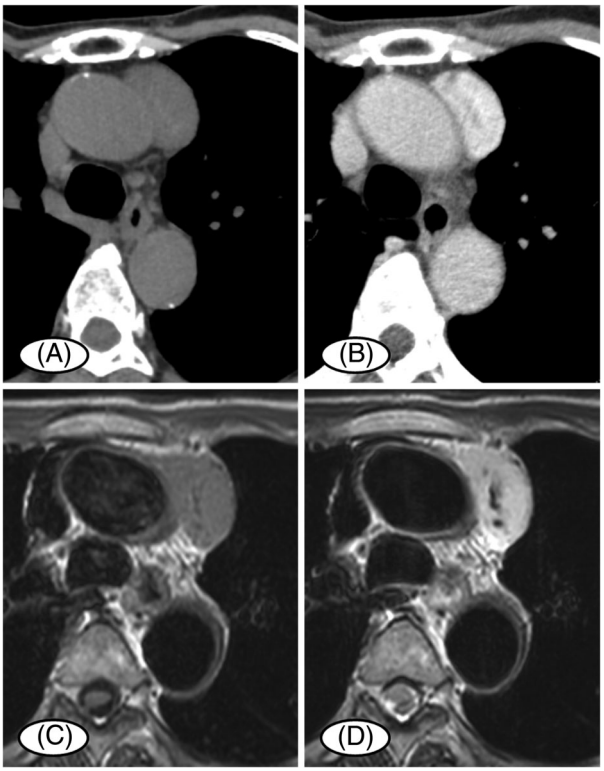

FIGURE 1 Imaging findings. (A) Simple CT showing a 4.0 × 3.5 cm tumour in the anterior mediastinum. (B) Contrast-enhanced CT shows no traffic with surrounding vessels. (C), (D) MRI showed low intensity on T1-weighted images and high intensity on T2-weighted images

the phrenic nerve, and the cephalic and caudal sides were dissected using an energy device (Figure 2). The operation time was 3 h and 35 min, the console time was 2 h, and the blood loss was 130 mL. Pathological evaluation revealed a well-defined tumour with capillaries in a vascular-like structure and thrombus formation. The pathological diagnosis was capillary haemangioma (Figure 3). The patient was discharged unaided at 7 days postoperatively. No recurrence was observed at 16 months postoperatively.

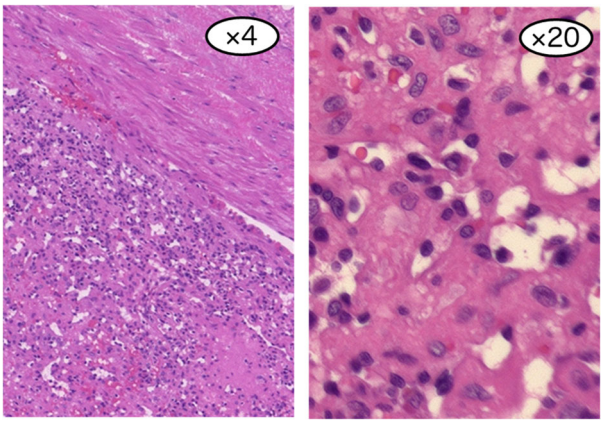

FIGURE 3 Pathological findings showed a well-defined tumour with capillaries in a vascular-like structure and some thrombus formation

DISCUSSION

Lobular capillary haemangioma is a rapidly progressing benign vascular neoplasm that typically affects the skin and mucous membranes and presents as a compressible painless solitary red to purple cutaneous mass or swelling.[2] Capillary haemangioma in the mediastinum accounts for <0.5% of mediastinal tumours.[3] Capillary haemangioma is oncologically a non-invasive lesion but may cause symptoms associated with compression of the surrounding organs as the disease progresses.[4] There are case reports of superior vena cava syndrome and recurrent nerve palsy due to compression by the tumour.[5] Therefore, surgical treatment is the first treatment choice.

One of the characteristic imaging findings of capillary haemangioma is the presence of venous stones on chest radiography or CT. These are called phleboliths, small blood clots in a vein that harden over time due to calcification. However, the frequency is not high (10%–29%).[6,7] Contrast-enhanced CT of the chest often shows a contrast effect from a relatively early stage. On dynamic CT, strong punctate enhancement at the margins of the nodule in the aortic phase (peripheral puddles)

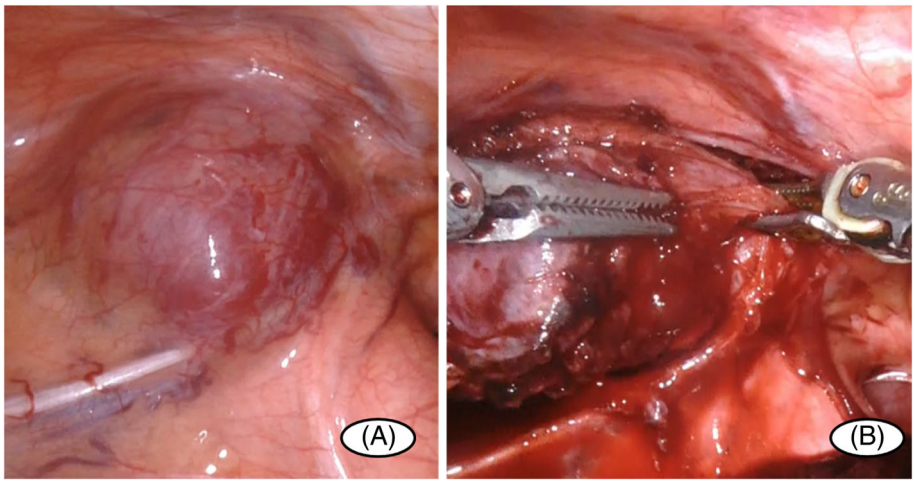

FIGURE 2 Surgical findings. (A) Tumour covered by mediastinal pleura. (B) Tumour is continuous with pericardiophrenic vein and dissected with energy device

and extension of the contrast effect into the nodule in the equilibrium phase are highly indicative of capillary haemangioma. However, the frequency of this finding is also low (10%–20%).[7,8] The internal contrast effect varies according to the intratumoral thrombus and may not be contrast-enhancing.

Various chest MRI findings of capillary haemangioma have been reported. In most cases, chest MRI shows a low signal on T1-weighted images and a high signal on T2-weighted images.[9–11] However, it is difficult to differentiate mediastinal tumours from other mediastinal tumours on chest MRI because many present with similar MRI findings.

Thus, capillary haemangioma is difficult to diagnose preoperatively; Yamazaki et al.[1] reported that only 3.3% of capillary haemangioma cases could be diagnosed preoperatively. The imaging findings of capillary haemangiomas vary depending on the internal structure of the haemangioma, particularly the degree of internal thrombosis and the presence of intratumoral haemorrhage. Additionally, the infrequency of characteristic findings such as phleboliths and peripheral puddles on CT further complicates the preoperative diagnosis.[6]

In RATS and video-assisted thoracoscopic surgery, the field of view is enlarged relative to that of open thoracotomy; thus, the area of visibility is narrower, and care must be taken not to misread the entire anatomy.[12] Moreover, it is necessary to confirm the anatomy in more detail on preoperative images. Since the tissues and layers to be dissected vary depending on the tumour site, it is beneficial to predict the tumour site preoperatively in order to perform a safe and appropriate surgery.

However, in rare cases, such as in our case, wherein the imaging findings are nonspecific, preoperative diagnosis may be limited. In such cases, the magnification and 3D views provided by RATS are particularly useful for obtaining detailed anatomical information intraoperatively. RATS can supplement the limited preoperative imaging findings with extreme detail in real time. In our case, RATS magnification indicated that the tumour was not contiguous with the thymus but was contiguous with the caudal tissue accompanying the phrenic nerve, which allowed us to consider a haemangioma originating from the pericardiophrenic vein. This unique advantage of RATS allowed us to grasp the anatomy intraoperatively. Notably, we confirmed a lack of traffic with the major vessels using preoperative CT. Capillary haemangioma is a bleeding disorder, and some reports suggest that open thoracotomy should be considered,[13] but RATS is safe if the relationship with surrounding vessels is confirmed on preoperative imaging.

ACKNOWLEDGMENTS

The authors would like to thank Fumiyoshi Kojima for the pathological diagnosis.

CONFLICT OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

Takuya Ohashi and Mitsumasa Kawago were involved in study design and data interpretation. Yoshimitsu Hirai, Megumi Kiyoi, Miwako Miyasaka, Yumi Yata, Mari Kawaji, Aya Fusamoto, Hideto Iguchi, Hitomi Nakanishi and Yoshiharu Nishimura were involved in the data analysis. All authors critically revised the report, commented on drafts of the manuscript, and approved the final report.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The authors declare that appropriate written informed consent was obtained for the publication of this manuscript and accompanying images.

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How to cite this article: Ohashi T, Kawago M, Hirai Y, Kiyoi M, Miyasaka M, Yata Y, et al. Resection of a capillary haemangioma using robotic-assisted thoracic surgery: A case report. Respirology Case Reports. 2022;10:e0899. https://doi.org/10.1002/rcr2.899