Case Reports

Journal of INTERNATIONAL MEDICAL RESEARCH

Journal of International Medical Research
2022, Vol. 50(12) 1–5

DOI: 10.1177/03000605221140688
journals.sagepub.com/home/imr
SAGE

Laparoscopic resection of a rare diaphragmatic haemangioma: a case report

Xiqi Chen[1,2,*], Xiubin Liu[3,*], Guangdong Xie[2], Baohai Rong[2], Meng Wang[2], Jian Ding[2], Yongkun Zhou[2] and Yong Zhu[2]

Abstract

This case report describes the laparoscopic resection of a rare diaphragmatic haemangioma. A 45-year-old male patient was diagnosed incidentally with a left subphrenic mass by computed tomography. Laparoscopic left subphrenic mass excision was performed under general anaesthesia. A phrenic haemangioma was confirmed by postoperative pathology. Tumours originating in the diaphragm are rare, with only approximately 200 cases reported in the past century. The diaphragmatic tumour was determined to be primary because intraoperative imaging showed that the tumour was relatively isolated and had no obvious relationship with the surrounding tissues and organs.

Keywords

Laparoscopic resection, diaphragmatic haemangioma

Date received: 31 August 2022; accepted: 4 November 2022

Introduction

Tumours originating in the diaphragm are rare, with only approximately 200 cases reported in the past century.[1] The most common benign tumours in the diaphragm are diaphragmatic cysts (e.g. mesothelial cysts, bronchogenic cysts, encapsulated cysts) and lipomas; and the most common malignant primary tumours are rhabdomyosarcoma and fibromyosarcoma.[2] Primary haemangiomas of the diaphragm are even rarer.[3] This current case report describes

[1]The First Clinical Medical College, Shandong University of Traditional Chinese Medicine, Jinan, Shandong Province, China
[2]Department of General Surgery, Affiliated Hospital of Shandong University of Traditional Chinese Medicine, Jinan, Shandong Province, China
[3]Shandong Institute of Literature and Culture, Shandong University of Traditional Chinese Medicine, Jinan, Shandong Province, China

*These authors contributed equally to this work.

Corresponding author:
Yongkun Zhou, Department of General Surgery, Affiliated Hospital of Shandong University of Traditional Chinese Medicine, 53 Jingshi Road, Jinan 250014, Shandong Province, China.
Email: zhouyongkun@126.com

a male patient with a diaphragmatic haemangioma that was successfully treated with a laparoscopic lumpectomy.

Case report

On 23 June 2022, a 45-year-old male was admitted to the Department of General Surgery, Affiliated Hospital of Shandong University of Traditional Chinese Medicine, Jinan, Shandong Province, China due to the 'discovery of a left subdiaphragmatic mass'. The patient had undergone cardiac stenting for an 'acute heart attack' on 26 December 2021. The left subdiaphragmatic mass was found incidentally during the preoperative chest computed tomography (CT) examination. The patient had no special symptoms. He denied any history of chronic diseases such as hypertension and diabetes mellitus, He had undergone surgery for 'femoral head necrosis' in 2020. His vital signs on admission were as follows: body temperature 36.5°C; pulse rate 74 beats/min; respiration 17 breaths/min; blood pressure 135/72 mmHg. His abdomen was flat and soft, no abdominal wall veins were revealed, no gastrointestinal pattern or peristaltic waves were seen, his abdomen was soft to palpation, no pressure pain or rebound pain throughout the abdomen were reported, and no abnormal masses were found on palpation. The bowel sounds were normal on auscultation. After admission, preoperative tests were completed and no abnormalities were found in routine blood, liver and kidney function, tumour markers and coagulation function. Enhanced CT of the abdomen suggested that the left subdiaphragmatic occupancy was considered to originate from the stomach and a mesenchymal tumour or haemangioma was possible (Figure 1).

Laparoscopic resection of the left subdiaphragmatic mass was performed under general anaesthesia on 28 June 2022. Intraoperatively, the size of the mass was approximately $5 \times 3 \times 2$ cm, with an intact envelope, dark red colour, soft texture, clear border and average mobility. The base was located in the left subdiaphragm with mild adhesion to the left lobe of the liver and no invasion with the stomach wall (Figures 2A). The base of the mass was located on the surface of the diaphragm. Lumpectomy was undertaken using an ultrasonic knife for complete debridement and the diaphragm was not broken after resection. Postoperative dissection of the specimen revealed solid tissue with a spongy appearance (Figure 2B). Postoperative pathological findings suggested that the left subdiaphragmatic mass was a trapezoid haemangioma (Figures 2C and 2D). Immunohistochemistry showed the following staining pattern: cluster of differentiation (CD)31 (+), CD34 (+), podoplanin D2-40 (–) and Ki67 (+0.5%). The patient recovered well after surgery and was in good condition with no significant discomfort at the 1-month follow-up.

All procedures undertaken in this current case were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. The reporting of this case report conforms to CARE guidelines.[4]

Discussion

Primary haemangiomas of the diaphragm were first proposed in 1974.[5] The literature reports that they account for approximately 5% of all diaphragmatic tumours and can develop in infancy, but most of them develop between 40 and 50 years of age with a male to female ratio of 1:1.[6] A search of the PubMed® database identified 10 case reports on diaphragmatic haemangiomas published in English.[3,6–15] A definitive preoperative diagnosis of diaphragmatic

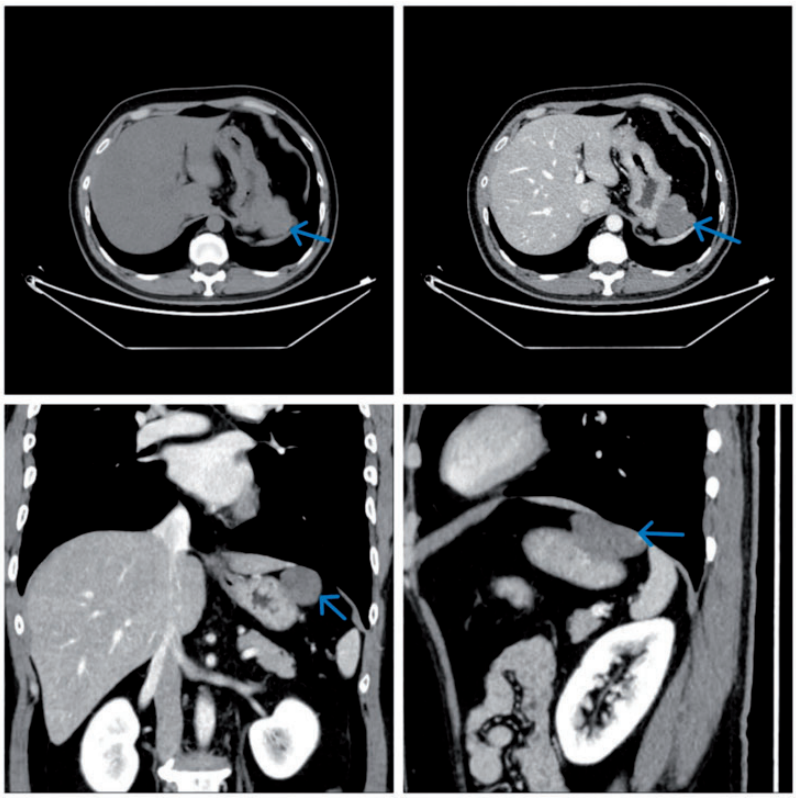

Figure 1. Computed tomography images of a haemangioma of the diaphragm found in a 45-year-old male patient that was admitted to hospital after the incidental identification of a left subdiaphragmatic mass during a preoperative chest computed tomography examination. The arrows show the haemangioma.

haemangioma is difficult to obtain on imaging due to its physiological characteristics. A similar situation exists with other haemangiomas.[15,16] Diaphragmatic haemangiomas in children usually have no specific clinical symptoms and are often found incidentally during imaging examinations of the chest and abdomen.[14] The associated symptoms are usually related to the compressive effect of increasing tumour growth, which may present with chest pain, cough, dyspnoea, bleeding and epigastric pain.[7] Diaphragmatic haemangiomas may present as pericardial effusion and pericardial filling in infants and children.[14] It is difficult to obtain a preoperative diagnosis when undergoing general imaging examinations. In the current case, preoperative enhanced CT suggested that the tumour might have been a mesenchymal tumour or a haemangioma. CT does not give a definitive diagnosis but can provide more information about the tumour such as size, location and relationship to surrounding tissues and organs. The only way to confirm the diagnosis is by pathological examination after surgical excision. The possibility that the tumour was a haemangioma was considered preoperatively in the current case. The haemangioma was large and at risk of rupture and bleeding. The current patient had previously had a coronary stent placed for a heart attack and required long-term oral anticoagulant

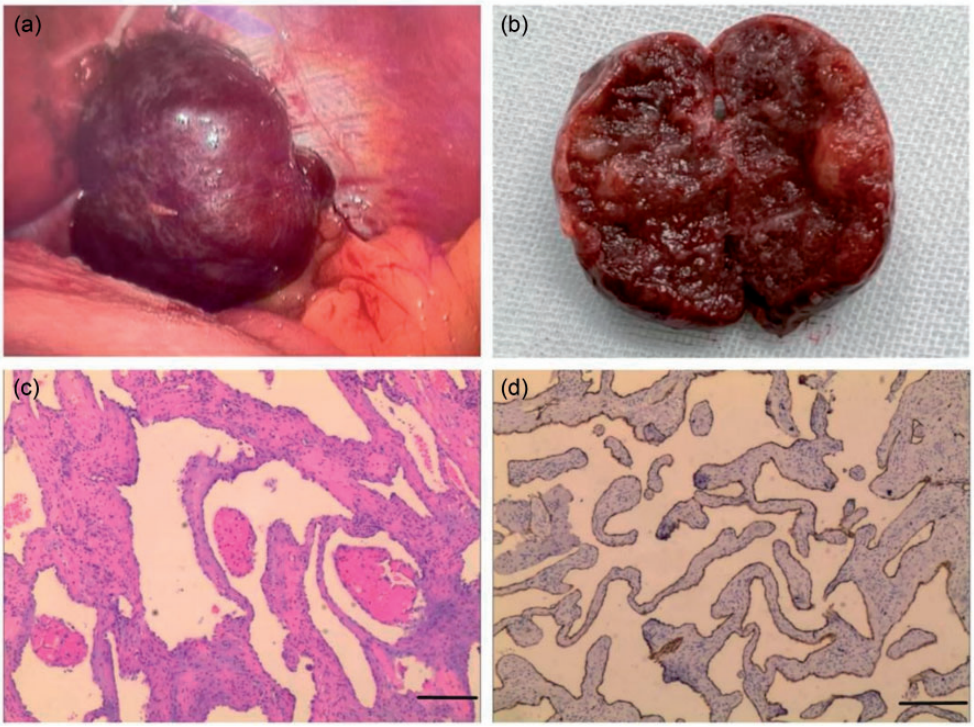

Figure 2. Gross images and photomicrographs of a haemangioma of the diaphragm removed from a 45-year-old male patient that presented with a left subdiaphragmatic mass that was identified during a preoperative chest computed tomography examination: (a) intraoperative view; (b) a cross-sectional view of the resected haemangioma; (c and d) pathology of the resected haemangioma (haematoxylin & eosin; scale bar 50 μm). The colour version of this figure is available at: http://imr.sagepub.com.

medication. Although the haemangioma was asymptomatic, there was a greater risk of bleeding and the patient himself was strongly inclined to have surgery. After comprehensive consideration and full communication, the decision was made to perform surgery. The surgical options for diaphragmatic haemangiomas are open surgery or minimally-invasive laparoscopic surgery. Open surgery requires a large incision and leads to postoperative pain for patients. In this current case, laparoscopic resection was undertaken, which is less traumatic, has a clear intraoperative field of view, allows magnification of the tumour and the operating area, makes the operation more delicate and minimally invasive, and results in faster postoperative recovery. The diaphragmatic tumour was determined to be primary because intraoperative imaging showed that the tumour was relatively isolated and had no obvious relationship with the surrounding tissues and organs.

Acknowledgements

The authors would like to thank the patient and his family for providing consent to use his data in this case report.

Author contributions

Xiqi Chen, Guangdong Xie and Yong Zhu were the patient's attending physicians. Xiubin Liu, Baohai Rong, Jian Ding and Meng Wang reviewed the literature and contributed to

manuscript drafting. Yongkun Zhou was responsible for the revision of the manuscript for important intellectual content. All authors provided final approval for the version to be submitted.

Declaration of conflicting interests

The authors declare that there are no conflicts of interest.

Funding

The authors disclose receipt of the following financial support for the research, authorship, and/or publication of this article: This research received funding from the Shandong Province Traditional Chinese Medicine Science and Technology Project (no. 2021Q108 and no. 2020M010).

ORCID iD

Xiqi Chen https://orcid.org/0000-0003-3926-1665

References

1. Mordant P, Le Pimpec-Barthes F, Gangi A, et al. Tumours of the diaphragm. In: Kuzdzal J (ed) *ESTS Textbook of Thoracic Surgery*. Cracow, Poland: Medycyna Praktyczna, 2015, pp.199–208.
2. Baldes N and Schirren J. Primary and Secondary Tumors of the Diaphragm. *Thorac Cardiovasc Surg* 2016; 64: 641–646.
3. Kono R, Terasaki H, Fujimoto K, et al. Venous hemangioma arising from the diaphragm: a case report of computed tomography and magnetic resonance imaging findings. *J Thorac Imaging* 2006; 21: 231–234.
4. Gagnier JJ, Kienle G, Altman DG, et al. The CARE guidelines: consensus-based clinical case reporting guideline development. *Headache* 2013; 53: 1541–1547.
5. Burcharth F and Agger P. Singultus: a case of hiccup with diaphragmatic tumour. *Acta Chir Scand* 1974; 140: 340–341.
6. Cacciaguerra S, Vasta G, Benedetto AG, et al. Neonatal diaphragmatic hemangioma. *J Pediatr Surg* 2001; 36: E21.
7. Kaniklides C and Dimopoulos PA. Diaphragmatic haemangioma. A case report. *Acta Radiol* 1999; 40: 329–332.
8. Ohsaki Y, Morimoto H, Osanai S, et al. Extensively calcified hemangioma of the diaphragm with increased 99mTc-hydroxymethylene diphosphonate uptake. *Intern Med* 2000; 39: 576–578.
9. Ino H, Naitou M, Hato S, et al. A rare primary diaphragmatic hemangioma successfully treated by laparoscopic surgery: report of a case. *Surg Today* 2010; 40: 654–657.
10. Ueno K, Takeuchi E, Hino H, et al. Cavernous hemangioma arising from the diaphragm. *Asian Cardiovasc Thorac Ann* 2013; 21: 735–738.
11. Yao Q, Hu X, Huang G, et al. A case of diaphragmatic infantile hemangioma. *J Perinatol* 2013; 33: 576–577.
12. Tsang FH, Lun KS and Cheng LC. Hemangioma of the diaphragm presenting with cardiac tamponade. *J Card Surg* 2011; 26: 620–623.
13. Wu L, Wang JM, Qiao ZW, et al. Successful embolization and long-term follow-up of a rare neonatal diaphragmatic hemangioma. *SAGE Open Med Case Rep* 2015; 3: 2050313X15615471.
14. Chu PY, Lin KH, Kao HL, et al. Three-dimensional image simulation of primary diaphragmatic hemangioma: A case report. *World J Clin Cases* 2019; 7: 4307–4313.
15. Chou WY and Chang HW. Uterine hemangioma: a rare pathologic entity. *Arch Pathol Lab Med* 2012; 136: 567–571.
16. Mazzon I, Favilli A, Grasso M, et al. Intramural uterine hemangioma: an insidious trap of a rare pathology. A case report. *Clin Exp Obstet Gynecol* 2017; 44: 624–626.