

Robotic mediastinal cyst resection and complete vascular ring division



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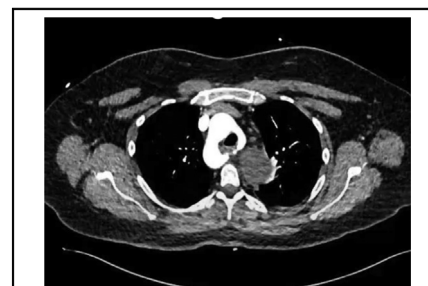
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Computed tomography angiograph demonstrating a vascular ring and mediastinal mass.

CENTRAL MESSAGE

Simultaneous robotic surgical management of a vascular ring and mediastinal mass has not been previously described. Herein, we present a robotic mediastinal mass resection and vascular ring division.

▶ Video clip is available online.

A double aortic arch (DAA) and mediastinal duplication cyst are both rare lesions that typically present with signs of tracheal and esophageal compression in childhood.^{1,2} We present a case of the simultaneous diagnosis of a mediastinal duplication cyst and a right dominant DAA in an adult (Video 1).

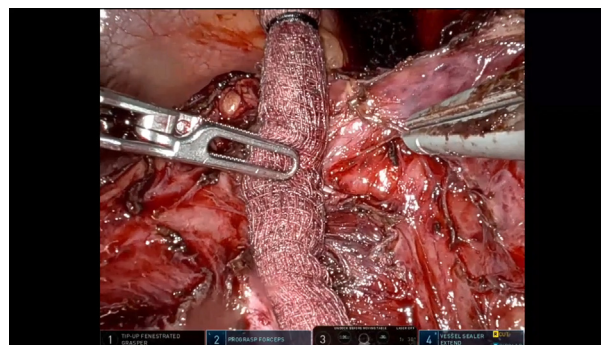
METHODS

Because this report provides no identified information, the Medical University of South Carolina Institutional Review Board deemed publication of the study exempt from review with a waiver of consent (Pro000135899; approved April 2, 2024).

A 38-year-old woman with a past medical history of chronic gastroesophageal reflux disease presented to the emergency department with chest pain and dysphagia. A computed tomography angiography (CTA) scan was performed demonstrating a 5.6-cm middle mediastinal cystic mass posterior to the left hilum and a right dominant DAA with complete vascular ring around the esophagus and trachea (Figure 1). Her preoperative workup included esophagogastroduodenoscopy, bronchoscopy, and a fluoroscopic esophagogram, which showed mild posterior compression of the trachea and esophagus but was otherwise unremarkable. Because her symptoms could be attributed to either pathology, she was taken to the operating room for combined robotic mediastinal cyst resection and vascular ring division.

The patient underwent general anesthesia with a double-lumen endotracheal tube. Femoral arterial and venous access sheaths were placed in case of need for emergency extracorporeal support. The patient was positioned in the right lateral decubitus position. Robotic port placement included 3 ports along the eighth intercostal space (ICS), 1 anterior retractor port

(fourth ICS) and a 12-mm assistant port (ninth ICS). Reflection of the lung anteriorly brought the mediastinal mass into view (Figure 2). The mass was circumferentially dissected off the lung and the spine posteriorly using a combination of the vessel sealant for more dense adhesions, and the bipolar cautery dissector for dissections requiring more precision (eg, when approaching the recurrent laryngeal nerve). The cyst was partially within the esophageal muscle fibers and adherent to the vagus nerve, each of



VIDEO 1. Robotic mediastinal cyst resection and vascular ring division. Video available at: [https://www.jtcvs.org/article/S2666-2507\(24\)00354-7/fulltext](https://www.jtcvs.org/article/S2666-2507(24)00354-7/fulltext).



FIGURE 1. Computed tomography angiograph demonstrating a vascular ring and mediastinal mass.

which was carefully dissected from the cyst. Once the dissection was completed, the specimen was collected.

The nondominant left aortic arch was identified passing over the esophagus joining the descending aorta posteriorly, and the right aortic arch anteriorly. The vascular ring was circumferentially dissected, and a vessel loop was used for temporarily occlusion while confirming no change to left radial Doppler signals (Figure 3). A test occlusion was performed again using the robotic stapler and then divided using a white (vascular) load robotic stapler without incident. An intraoperative esophagogastroduodenoscopy and leak test was performed showing no evidence of esophageal injury. A 28 Fr chest tube was placed, and the lung was reinflated appropriately.

Postoperatively, the patient was extubated and had an uneventful recovery with a normal neurovascular exam. On postoperative day 1, a CTesophagogram was performed given the degree of periesophageal dissection, which showed no evidence of esophageal injury. A CTA of the chest was also performed to confirm successful vascular ring division and to establish a baseline for future aneurysm surveillance. The patient was then discharged to home on postoperative day 1. Her surgical pathology resulted as a benign respiratory epithelium-lined cyst.

DISCUSSION

To our knowledge, this is the first reported simultaneous vascular ring division and mediastinal mass resection. Although robotic duplication cyst resection in adults is a common approach, robotic vascular ring division is seldom performed.^{3,4} This is likely attributable to most diagnoses occurring during childhood, where robotics has yet to become a commonly utilized modality in cardiothoracic surgery.⁵ In appropriately sized patients, the robotic approach provides optimal exposure and articulating instruments to facilitate safe mediastinal dissection.⁶⁻⁸ The risk of great vessels injury during these operations should be considered. In the above case, arterial and venous femoral access was obtained before the operation with a perfusion team on standby.

CONCLUSIONS

This is the first report of a combined vascular ring division and mediastinal mass resection. With appropriate pre- and intraoperative precautions, this technique is feasible in appropriately sized patients.

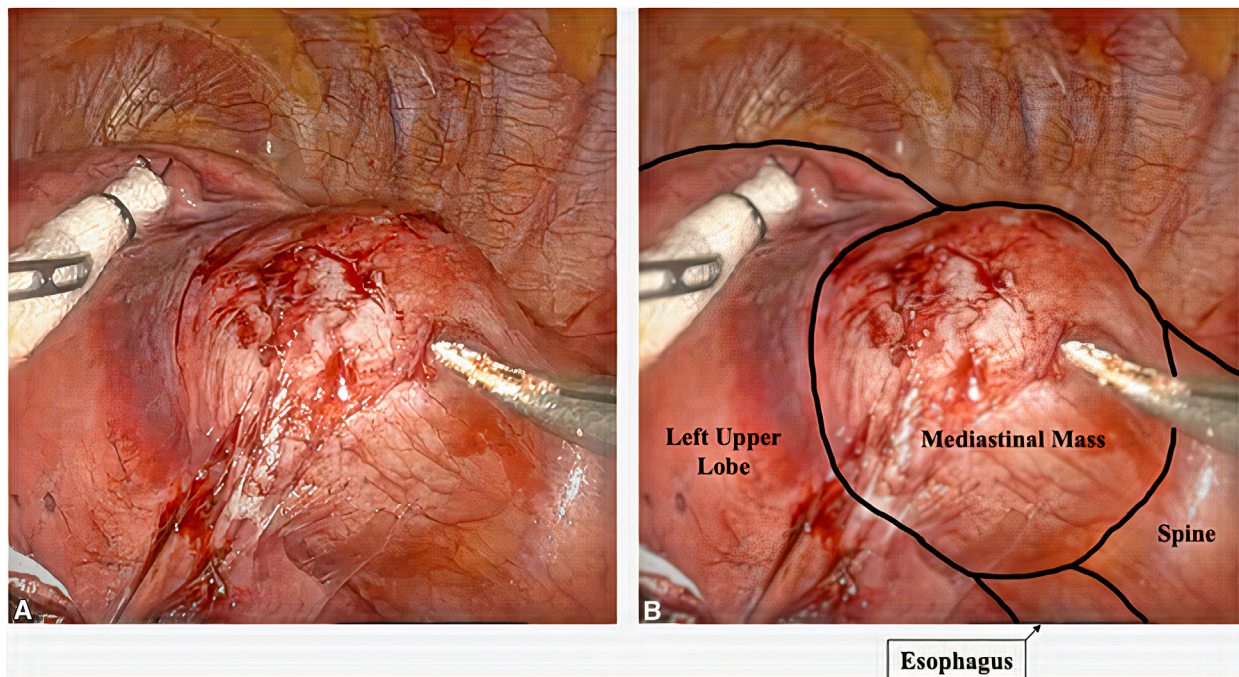


FIGURE 2. A, The mediastinal cyst is adherent to the left upper lobe anteriorly and esophagus and spine posteriorly. B, Labeled figure.

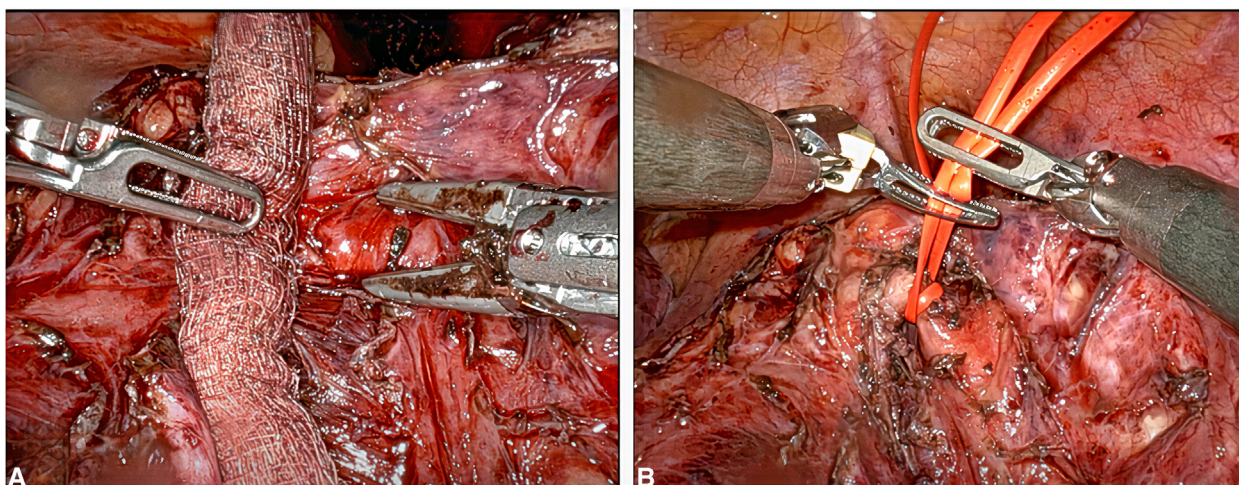


FIGURE 3. The vascular ring is appreciated after resection of the mediastinal mass (A), circumferentially dissected, and then a test occlusion is performed (B).

Conflict of Interest Statement

The authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

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