



Robotic atrial myxoma resection – papillary subtype

Abraham J. Rizkalla, Tristan D. Yan

Department of Cardiothoracic Surgery, Royal Prince Alfred Hospital, Sydney, Australia

Correspondence to: Abraham J. Rizkalla. Department of Cardiothoracic Surgery, Royal Prince Alfred Hospital, Missenden Road, Camperdown, Sydney, NSW 2050, Australia. Email: abraham.rizkalla@health.nsw.gov.au.



Submitted Nov 17, 2022. Accepted for publication Nov 28, 2022.

doi: 10.21037/acs-2022-rmvs-162

View this article at: <https://dx.doi.org/10.21037/acs-2022-rmvs-162>

Clinical vignette

A 33-year-old woman with no previous medical history presented with increasing dyspnoea on exertion. Transthoracic echocardiography revealed a large left atrial mass anchored to the interatrial septum consistent with a myxoma, with an increased trans-mitral pressure gradient. ECG-gated CT showed a 5.5-cm left atrial mass prolapsing into the left ventricle. The patient was deemed appropriate to undergo excision using the DaVinci © robotic platform.

Surgical techniques

Preparation

After induction with general anaesthesia, a double lumen endotracheal tube, in-dwelling urinary catheter, radial arterial line, and transoesophageal echocardiography (TOE) probes are placed. The right internal jugular vein is cannulated, the patient is positioned with the right chest elevated and the table rotated 20–30 degrees to the left. The right shoulder is fully extended, and elbow flexed at 90 degrees to allow for maximal exposure of the right chest and axilla. The patient is prepped and draped with both groins exposed.

Exposition

The right lung is isolated and a 4-cm access incision made in the inframammary fold to enter the 4th intercostal space. Four 8-mm incisions are made for port placement, one cranial and one caudal to the main incision in the 2nd and 6th spaces, and two ports directly towards the midline

for the camera and left atrial retractor ports. An Alexis soft tissue retractor is used in the access incision without rib spreading. Two 5-mm incisions are made, one in the axilla for the Chitwood clamp, and one inferiorly for CO₂ insufflation and to deliver pericardial or diaphragmatic retraction sutures. The right femoral vessels are exposed and cannulated, and cardiopulmonary bypass (CPB) is established with bicaval access.

Intraoperative technical aspects

Pericardiotomy

The heart must be adequately decompressed on CPB prior to pericardiotomy to ensure safe entry. The pericardium is incised in an inverted U-shape to allow for maximal exposure and optimal placement of superior and inferior retraction sutures, taking care to avoid the right phrenic nerve.

Tumour exposure

The atrial retractor is used to expose Sondergaard's groove, and the left atrium is incised. A pericardial pump sucker is used to empty the left atrium and expose the myxoma. The suction should be placed outside the atrium and within the pericardium, until the atrial blood is sufficiently drained and the myxoma visualized, as introducing the tubing without first visualizing the tumour may lead to tumour disruption and embolization.

Tumour excision

The myxoma is carefully inspected, and the attachment point assessed. The plane between the tumour and the

interatrial septum is developed using sharp dissection, taking care to handle the tumour from its fibrous portion, as direct handling can lead to fragmentation and tumour embolization. After an appropriate plane is developed, a 3-0 Prolene suture can be passed through the fibrous base of the myxoma, to be used for safe manipulation of the tumour to aid with exposure of the dissection plane.

Dissection must continue strictly on the interface between the tumour and the interatrial septum. If the septum is breached, this can precipitate venous air lock. Therefore, we do not apply excessive suction to the venous return, and routine use of caval snares is advised.

After the tumour is fully dissected off the interatrial septum, a Prolene suture with pledgets for increased traction is passed through the fibrous portion and used to extract the myxoma from the atrium. To prevent fragmentation during removal, the tumour should be extracted in an Endocatch bag (Medtronic, Minneapolis, USA).

Closure

The right heart chambers are allowed to fill, and the interatrial septum is inspected for iatrogenic atrial septal defect. If required, the small defects are oversewn with 3-0 Prolene, and larger defects are closed with a bovine pericardial patch. After de-airing, the atriotomy is closed with two double-ended 3-0 Prolene sutures. A soft pledget is tied in the centre of each suture, and closure is initiated from each edge of the atriotomy and tied robotically in the centre. After each throw, the assistant uses a nerve hook to maintain suture tension. The second layer of closure is performed in the same manner.

Post-excision assessment

A bipolar ventricular pacing wire can be sited over the right ventricle and extracted through the axillary incision. The aortic cross-clamp is then released under a low-flow condition. The patient is weaned from CPB, and TOE is used to assess the integrity of the interatrial septum and mitral valve function.

Completion

The patient is weaned off CPB, protamine administered, and the femoral vessels decannulated in standard fashion. The pericardium is left open, and a single drain placed into

the right pleura. A paravertebral catheter is placed, and all incisions are closed in layers using absorbable sutures.

Comments

Natural history

Myxoma is the most common primary cardiac tumour, predominantly presenting in the left atrium and grows slowly (1). Although the tumour is benign, the clinical course can be sinister. Patients can present with obstructive symptoms such as dyspnoea and orthopnoea, more commonly seen with the solid subtype of atrial myxoma. The papillary subtype is prone to fragmentation, and can present with pulmonary embolus, embolic stroke, or systemic embolism (2).

Advantages

The DaVinci Xi © robotic platform provides excellent visualisation using 10× magnification and three-dimensional vision. This allows for accurate delineation of the myxoma pedicle from the interatrial septum and effortless dissection, while leaving the interatrial septum intact. In contrast, we often resect a portion of the interatrial septum and use a bovine pericardial patch in cases of open myxoma excision, as the interface between the septum and tumour is not easily identifiable without the use of the robotic camera.

Additionally, this approach allows for earlier recovery, less pain, and improved quality of life compared with a traditional sternotomy approach (3).

Limitations

The minimally invasive approach requires femoral cannulation and retrograde arterial perfusion. Therefore, the abdominal and descending aorta must be evaluated for atherosclerotic burden pre-operatively. The aortic valve must be carefully assessed, as any more than mild aortic insufficiency may cause ventricular distension during delivery of antegrade cardioplegia and suboptimal myocardial protection. Therefore, we must give particular attention to patient selection before committing to the robotic approach.

Acknowledgments

Funding: None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Open Access Statement: This is an Open Access article distributed in accordance with the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 International License (CC BY-NC-ND 4.0), which permits the non-commercial replication and distribution of the article with the strict proviso that no changes or edits are made and the original work is properly cited (including links to both the formal publication through the relevant DOI and the license). See: <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

Cite this article as: Rizkalla AJ, Yan TD. Robotic atrial myxoma resection—papillary subtype. *Ann Cardiothorac Surg* 2022;11(6):634-636. doi: 10.21037/acs-2022-rmvs-162

References

1. Gupta S, Ayala R, Desai A, et al. Left Atrial Myxoma Presenting as Lateral Medullary (Wallenberg's) Syndrome. *Case Rep Cardiol* 2019;2019:5610213.
2. Pinede L, Duhaut P, Loire R. Clinical presentation of left atrial cardiac myxoma. A series of 112 consecutive cases. *Medicine (Baltimore)* 2001;80:159-72.
3. Yang M, Yao M, Wang G, et al. Comparison of postoperative quality of life for patients who undergo atrial myxoma excision with robotically assisted versus conventional surgery. *J Thorac Cardiovasc Surg* 2015;150:152-7.