



Minimally invasive resection of ectopic mediastinal parathyroid adenoma with use of the Da Vinci Xi robot

Senne Van Donink, Patrick Lauwers, Paul Van Schil, Jeroen Hendriks, Suresh Krishan Yogeswaran

Antwerp University Hospital, Edegem, Belgium

Correspondence to: Senne Van Donink. Antwerp University Hospital, Edegem, Belgium. Email: senne.vandonink@student.uantwerpen.be.

Abstract: An 83-year-old woman was referred for treatment of an ectopic parathyroid adenoma. She suffered from neuromuscular symptoms due to hypercalcaemia. A chest X-ray followed by a thoracic CT revealed a mass of 4.9 by 5.7 cm adjacent to the ascending aorta and the superior caval vein. A right-sided thorascopic resection of the mass was performed using the Da Vinci Xi® surgical system. Pathologic examination confirmed the mass to be an ectopic parathyroid adenoma. The postoperative course was uneventful. Hypercalcaemia had disappeared within 3 days. A 1-year follow-up showed a complete restoration of the patient's quality of life. The Da Vinci Xi® surgical system proved to be beneficial for resecting this mediastinal tumour in a minimally invasive fashion.

Keywords: Da Vinci; Da Vinci Xi; mediastinal; parathyroid adenoma; minimally invasive; robotic surgery; hyperparathyroidism

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Introduction

Hypercalcemia in adults is defined as an ionized fraction of calcium above 5.6 mg/dL. Patients present with multiple orthopaedic, abdominal and neurological complaints. 90% of hypercalcemia cases are the result of malignancy or primary hyperparathyroidism.

Primary hyperparathyroidism is caused in 6–16% of all patients by ectopically located parathyroid tissue (1). The prevalence of a mediastinal parathyroid adenoma ranges from 6% to 30% in patients with ectopically located parathyroid adenomas (2).

Mediastinal parathyroid adenomas are most commonly located in the anterior mediastinum (3). They are often not accessible via a cervical approach, and sternotomy or thoracotomy are related with a significant increase in morbidity. A minimally invasive approach is feasible, but technically demanding. Robotic systems offer increased accessibility to lesions located in the mediastinum (2).

This particular mediastinal mass was resected using the da Vinci Xi® surgical system. With only a handful of case

reports published in over a decade, literature on the robotic resection of mediastinal parathyroid adenomas remains scarce ever since the first report in 2004 (4).

Case presentation

An 83-year-old woman was investigated for muscular weakness, related to hypercalcaemia. Primary hyperparathyroidism was evident (blood calcium level of 13.6 mg/dL; parathyroid hormone level of 673.2 ng/L). An FDG-PET-CT revealed a mediastinal mass without increased uptake located adjacent to the ascending aorta (*Figure 1*).

Patient was referred for surgical resection.

Patient positioning and preparation: the patient was positioned in a supine position, with the right part of the thorax slightly elevated. Single-lung ventilation was established and CO₂ was insufflated (*Figure 2*).

The Da Vinci Xi® patient side-cart was deployed to the left-hand side of the patient. The first trocar, for introduction of the 30° camera, was inserted in the 7th

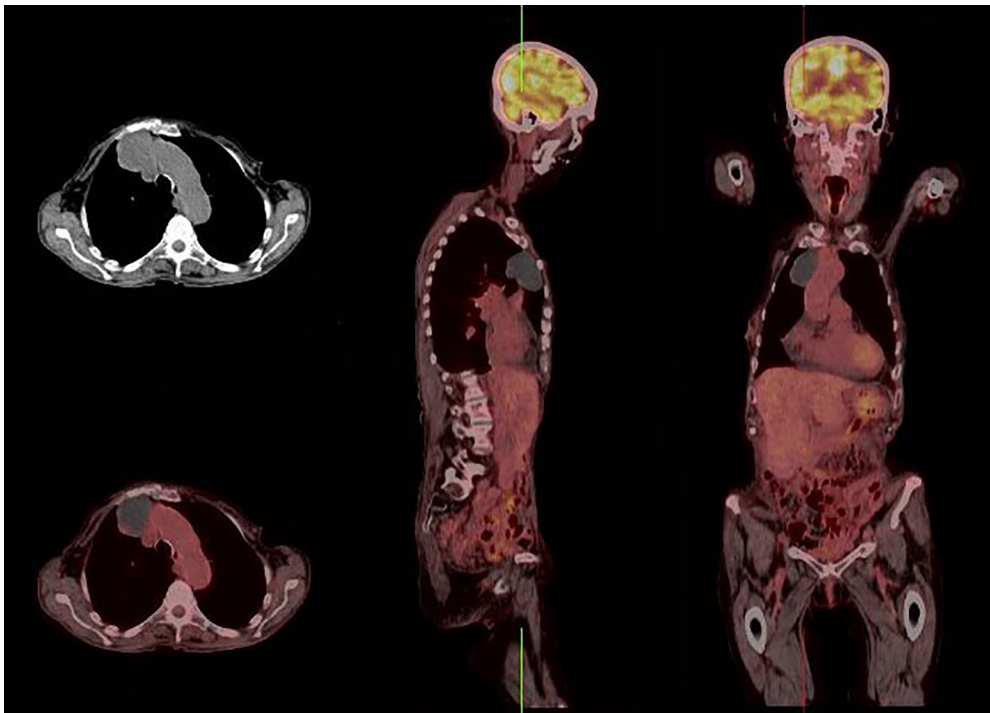


Figure 1 FDG-PET-CT showing a mediastinal mass without increased uptake adjacent to the ascending aorta.



Figure 2 Port placement with a 30° endoscopic camera in the most caudal port.

intercostal space. The tumour was easily visualised. Three more trocars were inserted to allow entry for one ProGrasp® forceps, one Maryland bipolar forceps and one Cadiere forceps. This combination offers three degrees of force distribution and precision.

The mediastinal pleura were first incised alongside the caudal margin of the mass. The aorta and the superior caval vein were localized. The pleura were further dissected alongside the medial margins of the mass. Ventral adhesions to the thoracic wall were cut. The mass was then carefully detached from the ascending aorta and the superior caval vein. During the entire dissection, attention was given to the location of the mass relative to the ascending aorta, the superior caval vein and the phrenic nerve.

After full dissection, the ectopic parathyroid adenoma was removed using an Endobag™ (Figure 3).

A small chest tube was inserted.

The patient was extubated immediately after the procedure; the chest tube was removed two days postoperatively. The patient could be discharged on the sixth postoperative day, after an uneventful recovery. Calcium levels returned to normal within three days. A 1-year follow-up showed a complete restoration of the patient's quality of life, without hypercalcemia.

Pathology confirmed the mediastinal mass to be an ectopic parathyroid adenoma, measuring 7 by 4.5 centimetres (Figure 4).



Figure 3 Complete surgery as recorded by the Da Vinci[®] endoscope (5).

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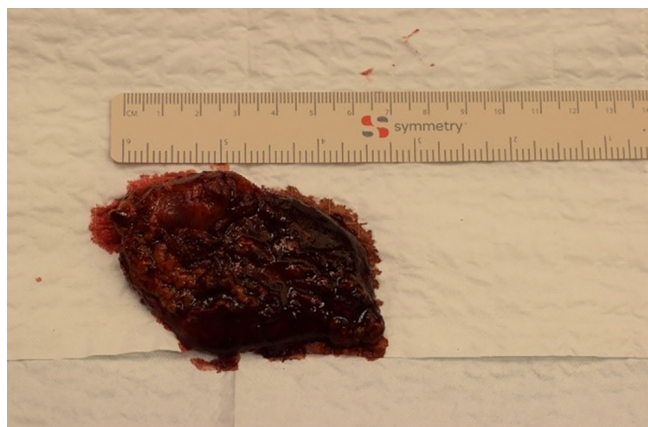


Figure 4 Resected mass measuring 7 by 4.5 centimetres.

Discussion

The Da Vinci Xi[®] surgical system offers two main benefits over classic VATS, exemplified in this case. These are the increased range of motion of the Endowrist[®] instruments, and the stereoscopic 3D HD image of its vision system. These were considered to be more beneficial than the mechanical feedback provided by the more rigid VATS due to the precarious location of the mass.

When compared to open surgery, open surgery comes with increased tissue damage, longer hospitalisation and a higher risk of complications than minimally invasive approaches.

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants 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 manuscript and any accompanying images.

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References

1. Roy M, Mazeh H, Chen H, et al. Incidence and localization of ectopic parathyroid adenomas in previously unexplored patients. *World J Surg* 2013;37:102-6.
2. Van Dessel E, Hendriks JM, Lauwers P, et al. Mediastinal

- parathyroidectomy with the da Vinci robot. *Innovations (Phila)* 2011;6:262-4.
3. Cameron RB, Loehrer PJ, Thomas CR Jr. Neoplasms of the mediastinum. In: Devita VJ, Hellman S, Rosenberg S. editors. *Cancer: Principles and Practice of Oncology*. Lippincott: Williams and Wilkins, Philadelphia, 2001.
 4. Profanter C, Schmid T, Prommegger R, et al. Robot-assisted mediastinal parathyroidectomy. *Surg Endosc* 2004;18:868-70.
 5. Lauwers P, Hendriks J, Yogeswaran SK, et al. Complete surgery as recorded by the Da Vinci® endoscope. *Asvide* 2018;5:791. Available online: <http://www.asvide.com/article/view/27485>

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