



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Extended thymectomy, left pneumonectomy, pericardiectomy and partial pleurectomy for a large thymoma, using only a median sternotomy

Jorge Cruz, André Sena, Catarina Carvalheiro, Ricardo Ferreira*

Champalimaud Foundation, Lung Department, Lisbon, Portugal

ARTICLE INFO

Article history:

Received 18 February 2017

Received in revised form 12 June 2017

Accepted 12 June 2017

Available online 29 June 2017

Keywords:

Thymoma

Sternotomy

En bloc resection

Case report

ABSTRACT

We present a case of a large thymoma with invasion to the hilum of the lung and pleural dissemination. A 58-year-old woman was diagnosed with a type B2 thymoma, with suspected pericardium, pulmonary artery and left lung invasion and pleural metastasis (Masaoka-Koga stage IVb). A radical resection was planned after systemic chemotherapy. Through a median sternotomy, we resected the tumour, and after confirmation of pericardium and left lung invasion, we also performed resection of the pericardium, of the lung and of the pleural metastasis. The median sternotomy allowed a safe dissection of pulmonary vessels and main bronchus.

© 2017 The Author(s). Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Background/introduction

The thymoma is the most common tumour of the anterior mediastinum. For its staging, several classifications were developed, and the most accepted and used, is the Masaoka-Koga. In this system the tumour is encapsulated and there is no invasion in stage I; in stage II there is invasion of the mediastinal fat or pleural or micro invasion into the capsule; in stage III the invasion reaches the pericardium, the great vessels or the lungs; and in stage IV there is metastatic spread (pericardial or pleural – IV A; to the distant through circulatory system – IV B) [1].

If there are no distant metastasis, the best treatment is surgery; but due to the invasion of structures such as pleura, lung, trachea, pericardium, heart and great vessels, the Masaoka-Koga stage IV thymoma is very difficult to treat. In these cases, it is recommended neo adjuvant therapy (usually chemotherapy and radiotherapy) and, if possible, a radical surgical resection. With treatment long-term survival improves although a stage IV remains shortened when compared to early-stage disease [2,3].

Here we report a case of a patient with a stage IV thymoma treated with chemotherapy and then by a radical resection with a pleuropneumectomy, through median sternotomy.

2. Case presentation

A 58-year-old woman, with no relevant medical history, was presented with retrosternal discomfort (with 2 years of evolution), sporadic dysphagia to solids (with months of evolution) and more recently left cervical swelling.

Chest X-ray findings suggested the presence of a mediastinal mass and a computer tomography (CT) scan revealed a bulky mass ($16 \times 8, 5 \times 8$ cm) in the anterior mediastinum, drifting to the left hemithorax, with locoregional infiltrative extension to pericardium and left pleura, with a SUV 12.54 in the PET-Scan and 3 thickenings of the left pleura, also hipermetabolic (SUV 12.39, 10.05, 8.41). Histopathologic analysis of a CT-guided percutaneous core biopsy specimen was compatible with the diagnosis of lymphoma T type leukemia/lymphoblastic lymphoma. Since the subsequent hematologic study excluded lymphoproliferative disease, a new CT-guided percutaneous core biopsy specimen (that came inconclusive) and a biopsy specimen obtained by minithoracotomy, allowed the diagnosis of type B2 thymoma, in a Masaoka-Koga stage IV B.

Three cycles of systemic chemotherapy with cisplatin, cyclophosphamide, and doxorubicin were administered according to institution protocols.

A new CT and PET scan demonstrated a reduction in size and metabolic activity of the mediastinal tumour (6 cm in the major diameter and SUVmax of 6) and a greater response of the pleural thickenings, now with a single irregular thickening (47×19 mm, SUVmax 4.5). The patient simple lung function tests were normal (Fig. 1).

* Corresponding author at: Rua Francisco Ferrer 2, 2º esquerdo, 1500-461 Lisbon, Portugal.

E-mail address: rmferreirast@gmail.com (R. Ferreira).

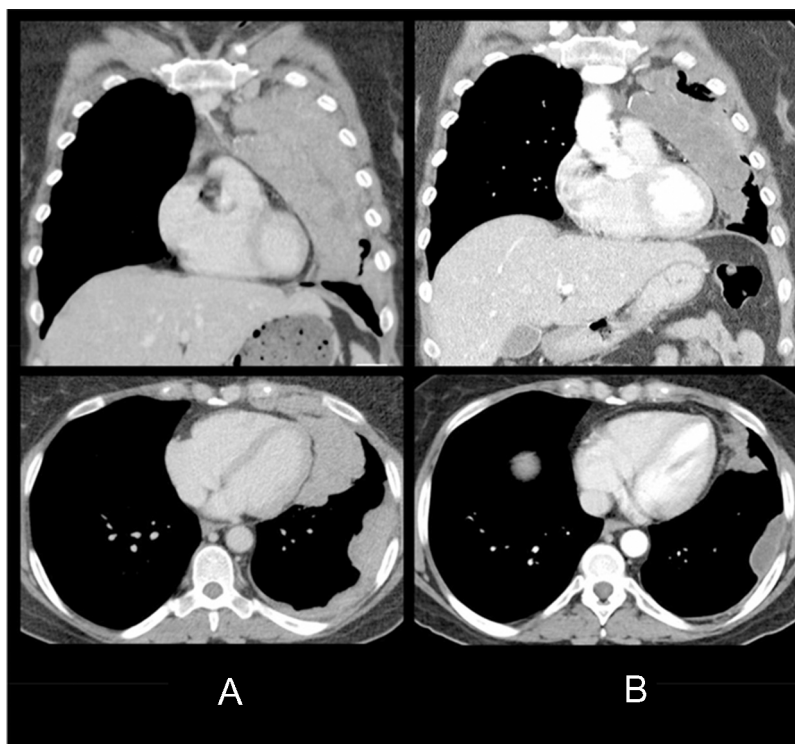


Fig. 1. A – Chest CT scans showing a large mediastinal tumour protruding and invading the left hemithorax, with pleural masses in the wall of the same hemithorax. B – Chest CT scans showing the regression of the mediastinal tumour and pleural masses after three cycles of systemic chemotherapy.

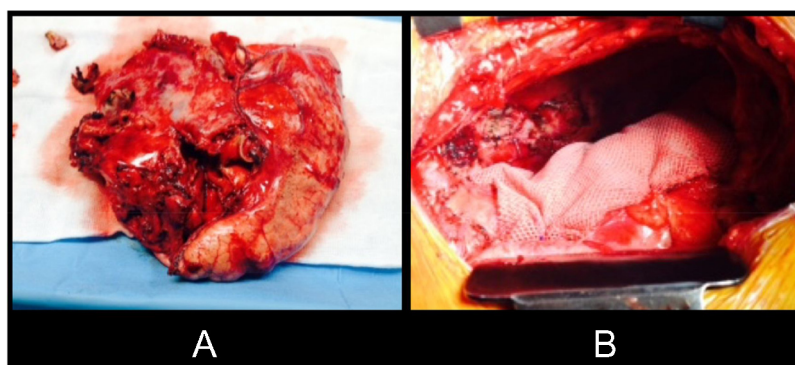


Fig. 2. A – Thymoma and the left lung, resected together. B – Open chest by sternotomy, after resection of the thymoma, left lung and annex pericardium. The pericardium was reconstructed with a synthetic patch.

Following a careful clinical assessment, a radical resection was proposed. Due to the size of the tumour and suspicion of an invasion of the hilum of the left lung (including the main pulmonary artery), an approach by median sternotomy was chosen.

After the median sternotomy, and as suspected, we found that the mediastinal tumour involved the pericardium and the hilum of the left lung, and also a great portion of pulmonary parenchyma. The aorta was not involved and the pulmonary artery was easily dissected from the tumour. The thymoma was resected, along with the left part of the pericardium and the left lung. The pleural thickening, in the chest hall, was also resected. The pericardium was reconstructed with a synthetic patch (Parietex, Covidien) (Fig. 2).

Total Surgical operating time was 150 min.

The postoperative course was long but straightforward, with no major complication, and the patient was discharged 11 days after surgery.

The histological results confirmed a type B2-B3 thymoma, with lung, pleural and vascular invasion, with lymph node from the

hilum and surgical margins free from tumour; the pleural thickening was confirmed to be a metastasis.

After the surgery the patient was referred to oncology, with indication for adjuvant chemo and radiotherapy.

3. Discussion

The optimal treatment for a Masaoka-Koga stage IV thymoma, has not been established yet. Treatments with induction chemotherapy and/or radiotherapy (which increase the rate of complete resection by regressing an unresectable tumour into a resectable one) followed by a radical resection have shown good overall survival rates. Sometimes, even with induction chemotherapy, it is impossible to separate the tumour from the lung, because of invasion of the hilum. In these cases, if the patient pulmonary status allows it, an aggressive approach with *en bloc* mediastinal thymoma resection and pleuropneumectomy is the only option

for a complete resection. Several reports of such approach have been published, with good short-term results [3,4,2,5].

This case is very interesting from a surgical point of view. The massive invasion of the lung and pleura usually recommend a postero-lateral thoracotomy, but in this case, we needed a safe dissection of the aorta, supra aortic vessels and pulmonary artery, which was not possible with such an approach. Therefore, we decided to operate through a median sternotomy. After sternotomy, we opened the invaded pericardium and we verified that the aorta was not invaded and the main pulmonary artery was easily dissected from the tumour; but the left lung was completely invaded and it was necessary to perform a pneumonectomy. The problem of a left pneumonectomy, by sternotomy, is that the pulmonary vessels are under the heart and the surgical access is difficult. Therefore, the isolation of the pulmonary vessels must be intrapericardic, and for that it is necessary to move the heart anteriorly and to the right. We first dissected and cut the pulmonary vessels and then the left main bronchus.

Here, we demonstrated that an *en bloc* mediastinal thymoma resection and pleuropneumonectomy can be safely achieved using only a median sternotomy approach. The median sternotomy allows not only the safe dissection of the aorta, supra aortic vessels and pulmonary artery, but also the isolation of the pulmonary vessels in the pericardium and the main bronchus. The pleural resection can be easily achieved by using video or a retractor normally used in the harvest of the internal mammary.

4. Conclusion

The approach to a large and infiltrative thymoma (Masaoka-Koga stage IV) is still unclear. The radical surgery combined with chemo and, eventually, radiation therapy seems to offer the best results, when feasible.

A median sternotomy approach, although difficult, allows complete resection of the mediastinal tumour, along with pneumonectomy and pleurectomy, when necessary, avoiding a second incision (namely, a thoracotomy). This way the recovery is less painful and critical lung function is preserved [6].

Conflicts of interest

The authors don't have any financial and personal relationships that could influence their work.

Sources of funding

Nothing to declare.

Ethical approval

This is a case report and informed consent was obtained from the patient.

Consent

This is a case report and informed consent was obtained from the patient.

Author contribution

Not applicable.

Guarantor

Corresponding author.

References

- [1] F.C. Detterbeck, A.G. Nicholson, K. Kondo, P. Van Schil, C. Moran, The Masaoka-Koga stage classification for thymic malignancies: clarification and definition of terms, *J. Thorac. Oncol.* (2011) S1710–S1716.
- [2] F. Venuta, M. Anile, D. Diso, D. Vitolo, E.A. Rendina, T. De Giacomo, F. Francioni, G.F. Coloni, Thymoma and thymic carcinoma, *Eur. J. Cardio-Thorac. Surg.* (2010) 13–25.
- [3] C.D. Wright, Pleuropneumonectomy for the treatment of Masaoka stage IVA thymoma, *Ann. Thorac. Surg.* (2006) 1234–1239.
- [4] D. Fabre, E. Fadel, S. Mussot, O. Mercier, B. Petkova, B. Besse, J. Huang, P.G. Darvelles, Long-term outcome of pleuropneumonectomy for Masaoka stage IVa thymoma, *Eur. J. Cardio-Thorac. Surg.* (2011) e133–e138.
- [5] Y. Shintani, R. Kanzaki, H. Kusumoto, T. Nakagiri, M. Inoue, M. Okumura, Pleuropneumonectomy for a large thymoma with multiple pleural dissemination using median sternotomy followed by posterolateral thoracotomy, *J. Surg. Case Rep.* (2015) 75.
- [6] Riaz Agha, Alexander Fowler, Alexandra Saeta, Ishani Barai, Shivachan Rajmohan, Dennis Orgill, The SCARE statement: consensus-based surgical case report guidelines, *Int. J. Surg.* (2016) 180–186.

Open Access

This article is published Open Access at sciedirect.com. It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.