

PANCOAST TUMOUR WITH SPINE RESECTION - CASE REPORT

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Abstract

Pancoast tumours are defined as tumours arising from the upper lobe and invading the thoracic inlet, representing less than 5% of all lung cancers. Clinical features depend on the involved structures. For many years invasion of the spine was considered unresectable and fatal. Due to the progress in spine surgery, en bloc resection including the spine is nowadays possible.

We report the first case of a successful en bloc vertebral resection of a Pancoast tumour in a 66 year-old male, with a squamous cell carcinoma, treated at our department in a multidisciplinary setting, after induction chemoradiotherapy.

An en bloc resection including the left upper lobe, the first three ribs and the vertebral body of D2, was performed through a Paulson incision after posterior cervico-dorsal arthrodesis.

A complete R0 resection was confirmed on the pathology specimen.

Currently, one year after surgery, although no local recurrence has occurred, the patient is being treated with immunotherapy due to disease progression in the right acetabulum which was irradiated (20Gy) and then submitted to iliac resection and prosthesis reconstruction.

INTRODUCTION

Pancoast tumours were first described in 1838, however they only became a more clear entity after the reports of Henry Pancoast in 1924 and Tobias in 1932.^{1,2,3,4} They represent less than 5% of all lung cancers, being defined as tumours that arise from the upper lobe and invade the thoracic inlet.^{1,3,4} Clinical features depend on the involved structures. The combination of severe and unrelenting shoulder and arm pain along the distribution of the eighth cervical and first and second thoracic nerve trunks, Horner's syndrome (ptosis, miosis, and anhidrosis) and atrophy of the intrinsic hand muscles comprises a clinical entity named as "Pancoast-Tobias syndrome".

Spine involvement has long been considered to be a contraindication for surgery.⁴

CASE REPORT

We report the case of a 66 year-old male, former heavy smoker. He mentioned the presence of cough and left ptosis and miosis in the previous six months.

Chest CT showed a 6 cm long-axis mass in the left upper lobe, invading the first and second ribs and the

vertebral body of D2, with increased uptake on FDG-PET. There were no further uptake locations.

The diagnosis was obtained by fiberoptic bronchoscopy. Pathology revealed a squamous cell carcinoma (PD-L1 > 50%).

The case was discussed at a multidisciplinary meeting, including the neurosurgery team, and neoadjuvant chemotherapy (vinorelbine/cisplatin) and radiotherapy (50Gy) was decided.

Five weeks after the last radiotherapy session, the patient was admitted for a joint surgical procedure between thoracic surgeons and neurosurgeons.

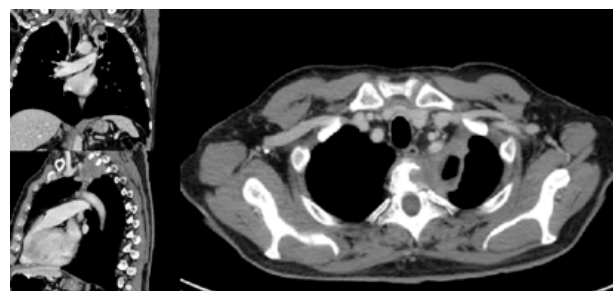


Figure 1

Initial diagnostic Chest CT.

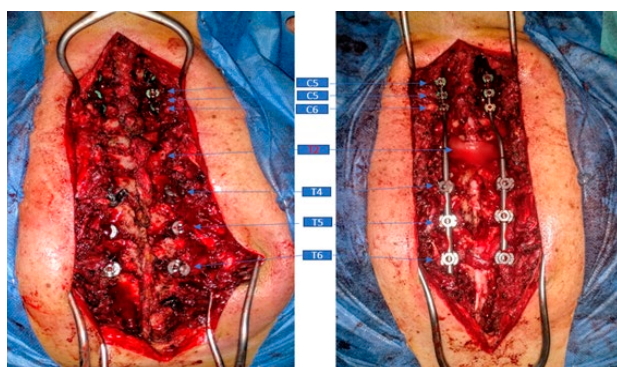


Figure 2 Cervico-dorsal arthrodesis.

SURGICAL TECHNIQUE

The intervention was divided into four stages. In the first one, the patient was positioned in ventral decubitus and then instrumentation of C4-C7 and T4-T6 was performed and bilateral screws were placed. At last D2 posterior neural arch was removed and the roots of D2 were sectioned bilaterally.

After this the patient was rotated onto a right lateral decubitus and a *Paulson* thoracotomy was made to allow for a left upper lobectomy, anterior section of the first three ribs and posterior disarticulation of the first and third ribs. A left lower lobe wedge resection removed a small peripheral nodule.

In the third part a D1-D2 and D2-D3 discectomy took place, allowing the *en bloc* resection of the full specimen, including the vertebral body of D2. Then a XRL® implant was placed in order to replace the vertebral body.



Figure 3 Operative field after left upper lobectomy with 1st to 3rd ribs, the vertebral body of D2 (arrow on the body of D2) and the specimen.

In the last part the thoracic surgery team completed a mediastinal lymphadenectomy and hemostasis control.

AFTER SURGERY/FOLLOW-UP

He stayed in the ICU for eleven days, being weaned off mechanical ventilation on the fifth day after surgery. The patient developed ventilator associated pneumonia and partial left lung atelectasis, which slowly improved.

He was discharged on day 25th.

Pathology analysis of the specimen confirmed squamous cell carcinoma with free margins. TNM 8th edition: ypT4N0.

The patient had an early progression, or a previously undiagnosed oligometastasis to the right acetabulum, which was irradiated (20Gy) and then submitted to iliac resection and prosthesis reconstruction.

Currently, one year after surgery he is under immunotherapy, with no signs of local or systemic recurrence.



Figure 4 Chest X-ray at discharge.

DISCUSSION

Squamous cell carcinoma, as in our case, is the most frequent histology of Pancoast tumours.¹

For many years spine invasion was considered a contraindication for surgery.^{3,5,6,7} However, progress in spine surgery and instrumentation changed the game. Nowadays *en bloc* tumour resection with curative intent can be performed in selected patients.^{2,5}

In 1989, DeMeester *et al* reported the first case series, including 12 patients, of *en bloc* resection of the lung and a tangential portion of the involved vertebral body after induction RT, reporting and overall survival of 42% after 5 years.⁸ Seven years later, in 1996, Grunenwald *et al* described the first total vertebrectomy.⁹

Later on, Collaud *et al* performed a systematic literature review including a total of 135 patients submitted to *en bloc* resection of lung, chest wall and spine, as part of a multimodality approach. They reported overall survivals of 57%, 43%, and 26% at 3, 5, and 10 years, respectively. In the subgroup of patients with microscopic complete resection the results were slightly better with survivals of 62%, 48%, and 29% at 3, 5, and 10 years, respectively.⁵ This shows the real relevance of an R0 resection.

The extent of spine resection does not seem to impact overall survival, so the length of spine invasion by itself should not be a contraindication for surgery if complete resection is feasible.⁵

Bolton *et al*, in their study reported overall survivals of 47% and 27% at 2 and 5 years, respectively.³

Trimodality treatment, including chemotherapy, radiotherapy and surgery, is the gold standard. Preoperative radiotherapy allows a reduction of the tumour size and viable cells in order to improve the R0 resection rates.

Furthermore, chemotherapy concurrent to RT improve resection rates and can limit the risk of distant metastasis due to occult systemic disease.^{4,10}

Our patient was treated with induction chemoradiotherapy followed by surgery. An R0 resection was obtained.

Knowing that incomplete resection leads to tumour recurrence, *en bloc* resection has become the gold standard for this kind of tumour.^{7,10}

Free-margins resection, as well as the nodal status and T status are the most important prognostic factors.⁴

Due to the extent of the resection important complication rates are associated with these procedures, ranging from 28% to 52%. Some of the most common, as experienced in our case, are atelectasis and pneumonia.⁴

CONCLUSIONS

Spine invasion is no longer a contraindication for Pancoast tumour surgery.

En bloc resection of tumours invading the spine is feasible as part of a multidisciplinary and multimodality approach in experienced centers and carries a good overall survival.

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