

A GIGANTIC THORACIC MASS – RESECTION AND RECONSTRUCTION

Mendes Alvarenga*¹, José Gonçalo Paupério²

¹ Department of Plastic, Reconstructive and Aesthetic Surgery and Burn Unity, Centro Hospitalar de São João, Porto, Portugal

² Director of Thoracic Surgery, Instituto Português de Oncologia do Porto, Porto, Portugal

* Corresponding author: vama21@gmail.com

Abstract

We present a rare case of a considerable chest wall mass surgically resected in a patient.

A 59-year-old woman was submitted to complete excision of a chondrosarcoma from her 4th right rib 15 years before. After that time, the patient presented with a mass on her right hemithorax, which revealed to be a recurrence after the biopsy.

Chest Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) scans indicated 21x19.5x24 cm of dimension, from supraclavicular fossa to upper abdomen, with the destruction of the 4th, 5th and 6th right ribs, insinuating over the right lung, axillary vessels, right hemidiaphragm and hepatic parenchyma.

The patient was submitted to a complete en bloc excision of the mass, four ribs, atypical resection of the right lower lobe, partial resection of the right hemidiaphragm and reconstruction of the thoracic wall with polypropylene and methacrylate prostheses covered with local soft tissue.

The anatomical specimen weighted approximately 11kgs.

After four days in intensive care and five days in the infirmary, the patient was discharged home; one month later she was readmitted to treat a seroma of the right hemithorax.

To date the patient is well, with no sign of recurrence.

Keywords: Chondrosarcoma, thorax reconstruction, gigantic mass, thorax tumour

INTRODUCTION

Chondrosarcoma is the most frequent bone sarcoma of the adult. The annual incidence is 0.2 per 100 000, with no gender predominance and typically occurs in patients 30–60 years of age.¹ It is the most common primary chest wall tumour, arising from the sternum or costochondral arches. They appear as expanding masses destroying the bone.²

The mainstay of treatment is complete resection. Frequently accompanied by chest wall reconstruction, that must ensure stability and preserve pulmonary physiological functioning (avoid paradoxical chest wall motion and provide an airtight closure).³

The five-year survival rates are over 60%. Poor

prognostic factors include: age over 50 years, incomplete resection, synchronous metastases, and local recurrence.²

CASE REPORT

A 59-year-old female presented with an asymmetrical chest wall due to a large, painless mass on the lateral side of her right thorax. The patient had a personal history of a complete resection 15 years before of a low-grade chondrosarcoma of the right 4th rib and now suffered from hypertension, obesity and chronic obstructive pulmonary disease (COPD).

A chest CT scan revealed a mass of 21x19.5x24 cm going from supraclavicular fossa to the upper abdo-



Figure 1 *Pre-operative.*

men, with the destruction of the 4th, 5th and 6th right ribs insinuating without a clear image of invasion over the right lung, axillary vases, right hemidiaphragm and hepatic parenchyma.

Abdominal and pelvic CT scans showed no evidence of metastatic disease. A core needle biopsy confirmed there was a recurrence from the previously excised chondrosarcoma.

The patient was reviewed by the multidisciplinary team, where upfront surgery was recommended.



Figure 2 *Pre-operative chest CT.*

The patient was submitted to mass excision with four ribs (3rd to 6th), a wedge resection of the right lower lobe and partial resection of the right hemidiaphragm.

Reconstruction of the thoracic wall with a methyl methacrylate polypropylene mesh sandwich was used and sutured to the 7th rib inferiorly and the sternum medially. Soft tissue coverage was achieved with the remaining breast tissue and latissimus dorsi flap.

The patient remained in intensive care for four days. Initially developed type 2 respiratory insufficiency but had a favorable recovery with respiratory physiotherapy and oxygen therapy only.

Nine days after surgery, the patient was discharged with wound care recommendations, analgesics, respiratory kinesiotherapy, and physical exercise; After one month the patient was readmitted for one week for periodical aspirations of a seroma of the right thorax.

The patient retained a full function of her right superior member with a reasonable cosmetic result.

Histologic examination revealed chondrosarcoma, 2nd grade, with extensive myxoid areas. The global size of the excised piece was 30x30x27cm and approximately 11kgs of weight. The skin was not invaded, and surgical margins were clean. Four tumour free lymph nodes were isolated from the pathological specimen.



Figure 3 *Post-operative.*

The patient was reviewed by the multidisciplinary team, where surveillance was recommended. After one year and four months of follow up, a cerebral mass (a metastasis) was detected and excised. Since then, four months have passed with no signs of recurrence.



Figure 4 Pathology specimen.

DISCUSSION

Extensive chest wall resection and reconstruction are challenging procedures that require a multidisciplinary approach⁴.

The consensus for skeletal reconstruction is that any defect less than 5 cm in any location and up to 10 cm posteriorly does not need rigid reconstruction. On the other hand, posterior defects (in proximity to the tip of the scapula) and larger lesions are likely to produce paradoxical chest wall motion, so they require rigid reconstruction⁵.

In case of significant full-thickness defects, synthetic, biologic or composite meshes can be used. No synthetic material has proven to be superior, while biologics are expensive and long-term results are sparse^{2, 6, 7, 8}.

In our case, methyl methacrylate was used between a mesh of polypropylene. It provides a fast, cost-effective tailor-made prosthesis (it can be prepared on the surgical field to the defect shape, hardening after an exothermic reaction, forming a cast). It is fixed on the outer surface of the bony structures, which prevents any blow from compressing visceral organs. Fracture of methacrylate is possible, which increases the risk of infection and can require its removal^{3, 5, 6, 7, 9}.

Full tissue coverage of well-vascularized soft tissue is of paramount importance over the prosthesis. The method used depends on the site, size, availability of tissues from donor sites, and surgeon expertise^{4, 7}.

In this case, soft-tissue coverage was performed with local-regional flaps mainly because it was an elderly and morbid patient. A short operation time is preferable, and the patient accepts the aesthetic outcome.

CONCLUSION

We report a rare case that highlights that even in cases of an enormous tumour mass, extensive chest wall resections and reconstructions can be safely made with appropriate perioperative care and accurate surgical technique.

REFERENCES

1. P G Casali, S Bielack, et al.: ESMO Guidelines Committee, PaedCan and ERN EURACAN, Bone sarcomas: ESMO–PaedCan–EURACAN Clinical Practice Guidelines for diagnosis, treatment and follow-up, *Annals of Oncology*, Volume 29, Issue Supplement_4, October 2018, Pages iv79–iv95.
2. Gladish GW, Sabloff BM, Munden RF, et al.: Primary thoracic sarcomas. *RadioGraphics* 2002;22(3):621–637.
3. F. Shahzad, K.Y. Wong, J. Maraka, M. Di Candia, et al.: Reconstruction of chest wall chondrosarcoma with an anterolateral thigh free flap: An illustration of decision-making in chest wall reconstruction. *International Journal of Surgery Case Reports* (2013) Volume 4, Issue 8, Pages 669-674.
4. Tukiainen E. Chest wall reconstruction after oncological resections. *Scand J Surg* (2013) 102(1):9–13.
5. Khalil HH, Kalkat M, Malahias MN, et al. Chest Wall Reconstruction with Porcine Acellular Dermal Matrix (Strattice) and Autologous Tissue Transfer for High Risk Patients with Chest Wall Tumors. *Plast Reconstr Surg Glob Open*. 2018;6(5):e1703.
6. Salo, Juho T K, and Erkki J Tukiainen. "Oncologic Resection and Reconstruction of the Chest Wall: A 19-Year Experience in a Single Center." *PRS* Aug. 2018
7. Harati K, Kolbensschlag J, Behr B, Goertz O, Hirsch T, et al.: Thoracic wall reconstruction after tumor resection. *Front. Oncol.*(2015) 5:247.
8. A. Losken, V.H. Thourani et al.: A reconstructive algorithm for plastic surgery following extensive chest wall resection. *The British Association of Plastic Surgeons* (2004) 57, 295–302.
9. Sanna S, Brandolini J, et al.: Materials and techniques in chest wall reconstruction: a review. *J Vis Surg* 2017;3:95.