

# RADICAL RESECTION AND RECONSTRUCTION OF CHEST WALL CHONDROSARCOMA PRESENTING AS BREAST LUMP.

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## ABSTRACT

*Chest wall tumors are uncommon and include a variety of cartilaginous, bony and soft tissue lesions. The clinical presentation varies from no symptoms to chest pain or ulcerating chest mass. A retromammary chondrosarcoma of the chest wall can present as a painless breast mass and may be mistaken for breast tumor. A careful clinical examination and relevant investigations are a corner stone to plan an appropriate surgical procedure.*

**Key words:** chondrosarcoma, breast, chest wall resection & reconstruction.

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## INTRODUCTION

Chest wall tumors are classified into three categories: primary, secondary and metastatic. They can also be classified as benign and malignant neoplasms as shown in Table-1. Primary chest wall tumors are uncommon and only represent 0.2 to 2% of all tumors (1).

The commonest neoplasm of the chest wall is chondrosarcoma and constitutes 20-30% of primary chest wall tumors. It arises from the costochondral (80%) or chondrosternal (20%) junctions respectively (2). We report a case of retro mammary chondrosarcoma which presented as a breast mass. After careful critical examination and radiological diagnosis, radical resection and reconstruction of the chest wall was successfully performed.

## CASE REPORT

A 48 years old lady presented with a history of right sided retro mammary chest pain of one month's duration. There was no history of cough or shortness of breath. On superficial palpation the right breast was normal but on deep palpation there was a fixed palpable mass with freely mobile overlying breast tissue. There were no palpable regional lymph nodes. Haematology and Biochemistry were normal as was her mammogram. Chest -X-Ray revealed an opacity and computed tomography (CT) of thorax showed a mass arising from the costochondral junction in the retro mammary area. The radiological features were consistent with costochondroma of the chest wall (fig 1A & B). After informed consent, surgery was planned. The mass was approached by a crescent shaped incision along the right breast crease. The breast was reflected from the bed to the lateral side along with part of the pectoralis major muscle (fig 2A & B). The mass measured 5cm x4.5 cm and a rib above and below was excised en bloc with a 5cm clear margin. The excised specimen was removed and sent for histopathology (fig 2 C & D). The defect in the chest wall was reconstructed with methylmethacrylic cement sandwiched in marlex mesh (fig 3A). The right breast was sutured back to its anatomical position and the skin was closed using subcuticular monocryl stitches (fig 3B). The patient was extubated on table. Her post operative recovery was uneventful.

## DISCUSSION

The common benign primary neoplasms of the chest are: fibrous dysplasia, chondroma and osteochondroma.



Fibrous dysplasia comprises 30% of benign chest wall tumors. Chondromas are slow growing tumors and are common in the second and third decades of life. They are asymptomatic and should be distinguished from chondrosarcomas (2). Osteochondromas arise from the bony cortex of the rib and are uncommon. Complete resection of these tumors should be performed because they can transform into chondrosarcomas. Malignant primary chest wall tumors include: bony sarcomas (3); Ewing sarcoma, cartilaginous tumors (chondrosarcoma) and soft tissue sarcoma. Sometimes multiple myeloma presents with local bony lesions (solitary plasmacytoma).

Patients with malignant chest wall lesions commonly present with chest pain which is due to peri-osteal invasion and is a poor prognostic sign. Soft tissue sarcomas have a better prognosis and they mostly present as a painless mass. The five years survival in these cases is 60%. The five years survival of Ewing sarcoma, osteosarcoma and plasmacytoma is 47%, 15% and 20% respectively (4,5). In patients with chondrosarcoma of the anterior chest wall, the reported 5 years survival after complete resection is 70%. The outcome is poor in patients who have incomplete resection or who develop metastasis (approximately 26% of cases).

Incomplete resection, metastasis and age above fifty are poor prognostic factors. The main goal of surgery is complete en bloc resection to prevent local recurrence and prolong overall survival(6). Preoperative evaluation of the patient is very important including a complete history, physical examination and radiological evaluation.

Preoperative pulmonary function tests should be performed in major chest wall resections to evaluate the patient's respiratory physiology and postoperative recovery because surgery alters the chest wall dynamics and respiratory physiology (7,8). The Mayo Clinic has reported a 5 years survival of 96% in complete resection in chondrosarcoma and 70% for those who have incomplete resections (9,10). There is still considerable controversy about safe resection margins. The Mayo clinic reported that with 4cm or greater tumor resection margin recurrence at 5 years is only 29% as compared to those who have a 2cm margin. However Memorial-Sloan-Kettering experience shows 2-5 cm margin and a rib above and below is adequate but a lateral margin of 4 to 5 cm on the rib is advised because most of malignant tumors tend to spread along the bone (11,12).

The aim of chest wall reconstruction during surgery is three fold, providing chest wall stability, soft tissue coverage and maintenance of pulmonary function.

Chest wall defects less than 5 cm and located at the apex and in the scapular area usually don't require reconstruction(13,14).

Skeletal reconstruction is achieved with synthetic materials such as silicone elastomers, acrylics, marlex, prolene meshes and gortex patch (polytetrafluoroethylene)(15,16,17).

We prefer a methyl methacrylate (bone cement ) sandwiched between the prolene and marlex mesh because of its light weight and adherence to the bones, which allows tissue in-growth. Another advantage is its radiolucency which is very helpful to evaluate the lung field in the follow-up radiological investigations (CXR and CT-scan)(18). Soft tissue coverage is provided by myocutaneous flaps including pectoralis major, latissimus dorsi, rectus abdominus, serratus anterior and trapezius muscle. The latissimus dorsi flap was first used in 1950 by Cambell (19). Omental flaps can be useful for poorly healing infected and radiated wounds as described by Kirticuta (20).

The reported post-operative mortality for chest wall resection and reconstruction is 3.8-4.5%. Post operative complications are mostly pulmonary, including chest wall instability, respiratory insufficiency, hemothorax, infection and post operative atelectasis (21,22). Cardiac arrhythmia and thrombo-embolism has also been reported. All most ten to fifteen percent of post operative patients develop respiratory insufficiency. Infection of reconstruction material and subsequent infection of myocutaneous flap is a real challenge to deal with. When resection is incomplete or substandard, recurrence of cancer is a late complication (8,18).

In conclusion, tumor of chest wall resection and reconstruction is a real surgical challenge that needs a multi-disciplinary approach including the thoracic surgeon, oncologist, pulmonologist, plastic surgeon, intensivist and the physiotherapist.

To achieve the best results and long survival, a complete history and physical examination and relevant radiological investigations are essential.

In our case, physical examination revealed a retro-mammary mass. CT scan of the thorax showed chondrosarcoma of the chest wall and radical resection and reconstruction of chest wall was performed with good results.



Two years post surgery, CT-scan has showed no recurrence and the patient is enjoying a normal life (fig 1C & D).

**Table 1 Primary chest wall tumors**

Type	Bone and cartilages	Soft tissue
<b>Benign</b>	Chondroma	Fibroma
	Fibrous dysplasia	Lipoma
	Osteochondroma	Rhabdomyoma
	Osteoblastoma	Neurofibroma
	Giant cell tumor	Heamangioma
	Aneursymal bone cyst	Lymphangioma
<b>Malignant</b>	Chondrosarcoma	Soft tissue sarcoma
	Osteosarcoma	Desmoid tumor
	Ewing's sarcoma	Squamous cell carcinoma
	Plasmacytoma	Basal cell carcinoma
		Melanoma
		Neuroectodermal tumor

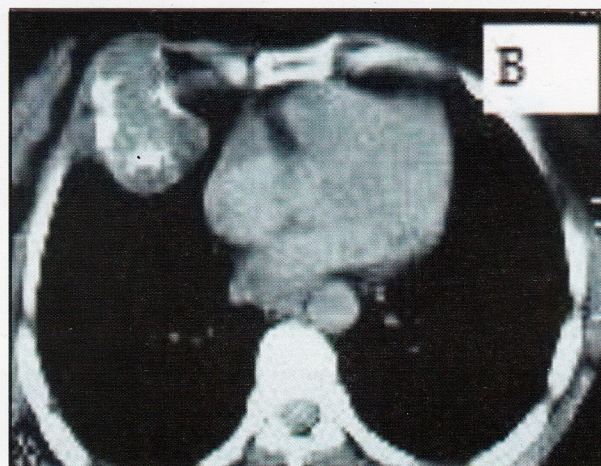
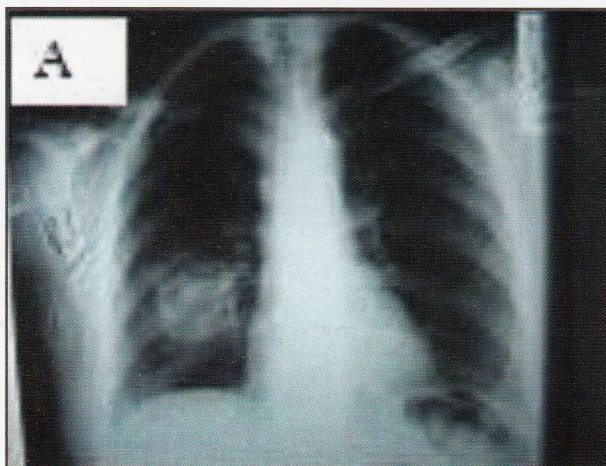


Fig-1(A) Preoperative chest X-ray showing a lesion in the right hemithorax.  
Fig-1(B) CT-scan chest showing features of chondrosarcoma.

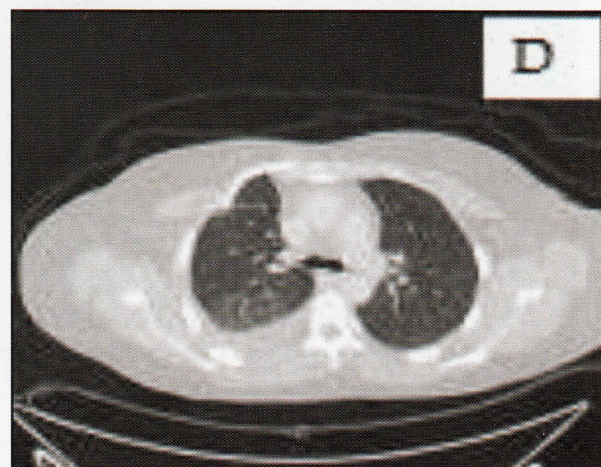
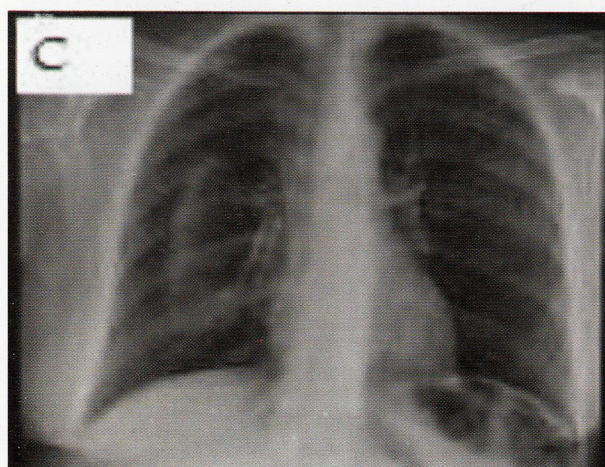


Fig-1(C) Two years follow-up X-ray chest showing normal lung fields and methylmethacrylate cement shadow. Fig-1(D) Two years follow-up post operative C/T scan showing no recurrence.



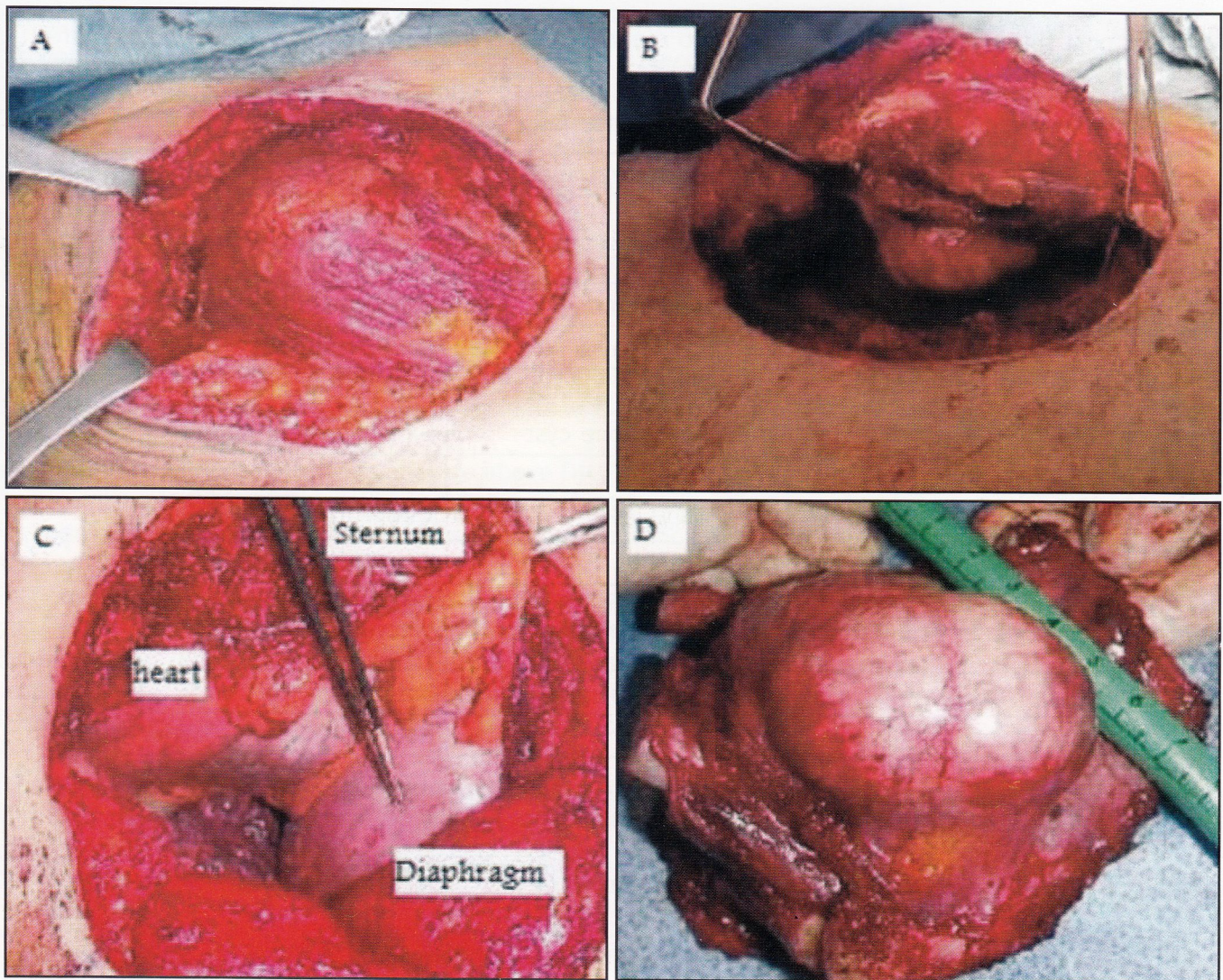


Fig-2(A) The surgical incision. (B) After reflection of breast laterally showing divided costal cartilages with interior view of tumor. (C) View after en-block excision of tumor with labeled structures. (D) Resected en-block specimen.

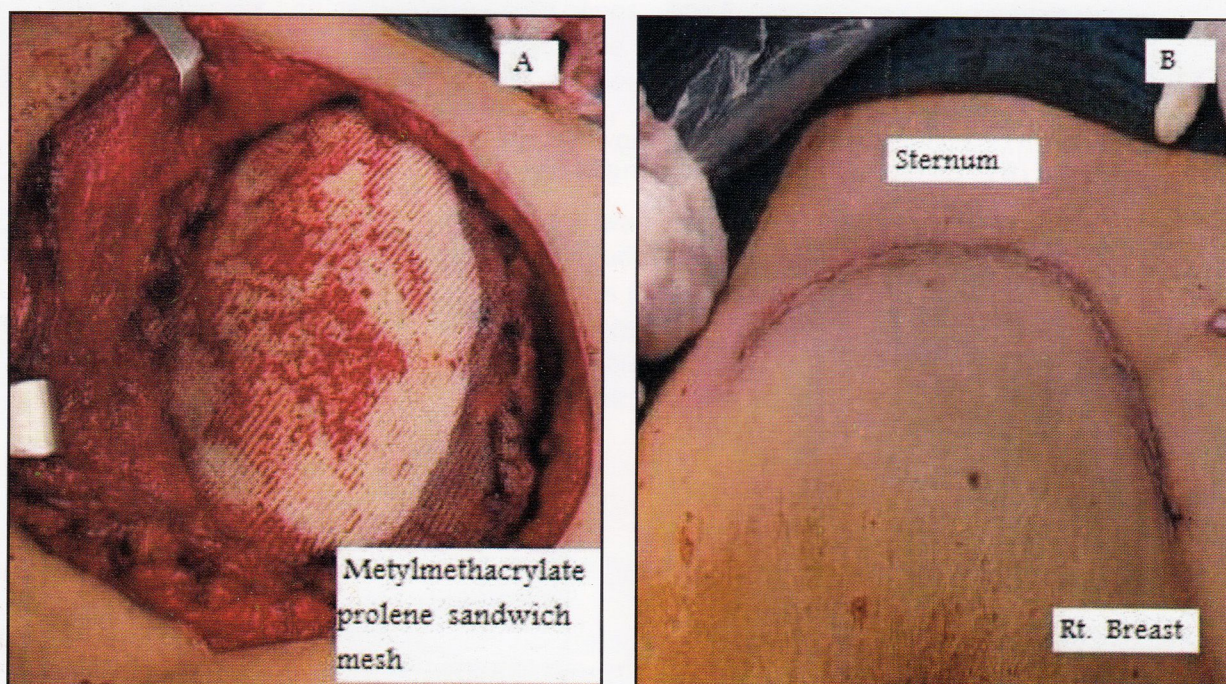


Fig-3 (A) Chest wall reconstruction with methylmeth arcylate prolene mesh. (B) The completed procedure.



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