

# Management of the primary chest wall tumors: review of 45 cases

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**Objective** The aim of the study is to discuss presenting clinical features, the pathology, surgical risks and optimal approaches of chest wall tumors.

**Methods** The records of the patients were retrospectively reviewed, who underwent for resection of primary chest wall tumors between 1985 and 1992.

**Results** During this period 45 patients were operated. The mean age of the 27 men and 18 women was 34 years. The chest wall tumor was benign in 24 cases and malignant in 21. The most common benign tumor was chondroma (30%) and the most common malignant tumor was chondrosarcoma (30%). Excision (Total,

local or en bloc) was applied to 80% of the patients. Combined therapy (Radiotherapy and/or chemotherapy) was applied for 15% and biopsy was done for 5% of the patients.

**Conclusion** Chest wall resection is diagnostic and therapeutic procedure in primary chest wall tumors. As providing confidential surgical border, a resection with wide margins is preferable. For this instance we recommend using modern reconstruction techniques, largely.

**Key words** Chest wall, tumor, surgery, management.

## Introduction

Primary chest wall tumors are very rare. Its ratio is only 1-2 % among total malignant tumors (1,2). More than half of these tumors are malignant (3,4). They are usually originates from bone and soft tissue elements of thoracic cage (1,5).

The source and the histologic types of these tumors are different in various reports. Bony structures were shown as a major source by some authors. It is mentioned that the soft tissue components are the essential origin of these tumors. The most common benign tumors are; chondroma, lipoma and fibroma. The most common malignant tumors are; chondrosarcoma and fibrosarcoma.

Excisional and incisional biopsies, large and en bloc resections, muscle flaps and prosthetic materials are the diagnostic and therapeutic modalities.

## Material and Method

The records of all cases in which resection of primary chest wall tumor was performed at the Atatürk Thoracic Surgery Center from 1985

through 1993 were reviewed. The age range of the 24 patients who had primary benign tumor was 4-65 (mean 30) years and the range of 21 patients who had primary malignant tumor was 3-95 (mean 38) years. The tumor was of benign nature in 10 women and 14 men, and malignant in 8 women and 13 men.

All patients were admitted with a complaint of palpable mass and pain. Clinical diagnosis was performed with chest X-ray and computerized tomography (CT). Table 1 summarizes the localizations all of 45 cases.

Total surgical resection was applied to all of the patients who had primary benign tumor. Surgical excision was applied in 11 (52%) cases, and excisional biopsy was performed for 3 (14%). In addition, excision and chemotherapy were practiced in 2 (10%), excision, chemotherapy and radiotherapy were carried out in 4 (19%) patients, and excision and radiotherapy were applied to 1 (5%), who had primary malignant disease.

In primary chest wall tumors, precise preoperative diagnosis was not possible. The lesions were provisionally classified as chest wall tumors and definitive diagnosis was made from histologic study of the excised tissue.

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Table 1. Histologic types, localizations and therapeutic approaches of the cases.

Primary Benign Tumors					Primary Malignant Tumors						
Histologic Type	No.	%	Localization		Treatment	Histologic Type	No.	%	Localization		Treatment
			Anterior/ Axilla	Posterior/ Posterior					Anterior/ Axilla	Posterior/ Posterior	
Chondroma	7	30	7		TE	Chondrosarcoma	6	28	4 Sternum	1	TE, TE+CT+RT
Neurofibroma	2	8	2		TE	Osteosarcoma	3	14	3		R1, TE1, TE+CT1
Neurilemmoma (Schwannoma)	2	8		2	TE	Ewing's sarcoma	3	14	2	1	TE2, ER+CT+RT1
Fibrous Dysplasia	3	13	3		TE	Soliter Plasmacytoma	2	10	1 Sternum	1	LE+RT1 LE+CT+RT1
Lipoma	3	13		3	TE	Malignant Fibrous Histocytoma	1	5		1	TE
Osteochondroma	2	8	2		LE 1, TE1	Rhabdomyosarcoma	1	5	1		TE
Hemangioma	2	8		2	TE	Hemangiopericytoma	2	10	2		ER1, TE+CT+RT1
Eosinophilic granuloma	1	4	1		LE	Malignant mesenchymal tumor	3	14	2	1	B2, LE+CT+RT1
Osteoma	1	4	Scapula 1		TE						
Osteoblastoma	1	4	1		LE						
<b>TOTAL</b>	<b>24</b>	<b>100</b>	<b>16</b>	<b>8%</b>	<b>3/8</b>	<b>TOTAL</b>	<b>21</b>	<b>100</b>	<b>17</b>	<b>8%</b>	<b>3/4</b>

TE: Total Excision, LE: Local Excision, CT: Chemotherapy, RT: Radiotherapy, ER: En bloc Resection, B: Biopsy.

## Results

Table 1 summarizes the histological diagnosis in all of 45 cases. The patients were discharged from hospital at 7- 10 (mean 9) days postoperatively. Neither death nor serious complication was experienced.

The most common primary benign tumor was chondroma (30%). The most common malignant tumor was chondrosarcoma (30%). More than three-two of the patients (67%, 81%), tumors were located anteriorly or anterolaterally. Total excision was practiced to 30 (67%) patients as a diagnostic and a therapeutic approach (Table 1). Familial history was detected in two patients who had osteochondroma and these cases were accepted as "Multiple Hereditary Osteochondromatosis". Grade I histopathologic morphology was encountered in three patients, Grade II was found in two and Grade III was seen in one, who had Chondrosarcoma.

In two patients, Vicryl mesh was used for stabilization of the excised area who had osteosarcoma and hemangiopericytoma.

Chemotherapy was applied to 6 patients. The sessions were differed from 1 to 6. Additional radiotherapy was applied to five patients (Table 1)

The patients were observed for 4 month to 5 years postoperatively. Among the patients that we could followed-up, 17 cases had benign tumor and 9 cases had malignant tumor. All of the patients who had benign tumor are still living,

recurrence and symptom free. One of the patients who had malignant disease died in late postoperative period due to advanced respiratory distress syndrome. One of them died on the 7th the other was died on the 8th months postoperatively due to widespread metastasis. 5 of the 6 patients are still living without recurrence. In one patient, local recurrence occurred. One of the patient who had soliter plasmacytoma is still living without symptom and recurrence.

## Discussion

Primary benign and malignant chest wall tumors can be originated from ribs, sternum, scapula, intercostal muscles, neuro-vascular structures and other soft tissue elements that constituted the thoracic cage (1,4).

The most common source of these tumors is bony thorax (ribs and sternum) (6,7). In our study, the source was bony thorax in 29 (64%) of 45 cases. These tumors were located on ribs in 26 (90%), on the sternum in two (7%) and on the scapula in one (3%) cases.

More than half of the tumors that arise from ribs are malignant. Almost all of the tumors that arise from sternum are malignant (4,7). In our study, 46% of rib tumors (12 cases) and 100% of sternum tumors (2 cases) were malignant.

The most common benign and malignant tumors are different in various reports. Among them, the most common benign tumors are chondroma and desmoid tumor, the most common

malignant tumors are fibrosarcoma and chondrosarcoma (3,7,8). The most common benign tumor was chondroma (30%) and the most common malignant tumor was chondrosarcoma (30%) in our report.

It is difficult to determine whether the tumor is benign or malignant with symptoms. By the way, it is essential to behave energetic when patient's symptoms show aggression recently (7). Other diagnostic tool is radiological investigation. Cortical destruction is one of the most specific finding of malignant tumors (6,7). CT gives better results. However the role of magnetic resonance imaging is not obvious (1).

Because of tumoral seeding, the needle aspiration and incisional biopsies are inadvisable (8,9). We did not perform needle aspiration for either benign or malignant disease. We performed only five incisional biopsies for establishing the preoperative diagnosis. In all other cases, definitive diagnosis was made from histologic study of the excised tissue.

Resection of the chest wall with wide margins (4cm. and up) is essential for adequate treatment (1,4,10-12). Additional radiotherapy is preferable for eosinophilic granuloma with multiple lesions and for desmoid tumors. It is well known that chondrosarcoma, osteosarcoma, malignant fibrous histiocytoma and liposarcoma are resistant to radiotherapy and chemotherapy. Additional chemotherapy is advisable for solitary plasmacytoma, Ewing's sarcoma and rhabdomyosarcoma (1,4-7,13-17). The therapeutic approaches that we were utilized for our cases were shown in Table I. Stabilization of thoracic cage is important for avoiding flail chest. Defects up to five cm. in diameter on the anterior thorax, can be repaired with regional myocutaneous flaps, whereas there is no need to reconstruction for defects up to 10 cm. in diameter at the posterior thorax. When the defect is greater than five cm. in diameter it can be repaired by different prosthetic materials such as Prolene mesh, Vicryl mesh, Marlex mesh and Gore-Tex (4,18-20). We used "Vicryl Mesh" in two cases.

We conclude that large resections that supported by reconstruction technics and additional therapies will give better results.

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