Primary Chest Wall Neoplasms an Experience of 39 Patients

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Objective To evaluate treatment approaches, role of surgical resection and reconstruction and outcome of patients with primary chest wall tumor. **Study Design** A prospective observational study. **Place and Duration.**The study was conducted at the Department of Cardiothoracic Surgery, Postgraduate Medical Institute, Lady Reading Hospital from March 1996 to April 2000. **Patient and Methods** A total of 39 patients underwent resection for primary chest wall tumors. Male were 27 and female were 12. Age range was 15 years – 55 years with a mean age of 23±2 years. 75% of patients presented with a painless mass while 25% complained of pain. Twenty three were on right side, twelve were on the left side while 4 extended onto the sternum. Sizes were <3cm (7 patients), 3-5cm (24 patients), 5-10cm (6 patients) and > 10cm (2 patients). Chest radiograph in all and CT thorax was done in 20 cases. Out of 39 cases, 25 had previous biopsies attempted by other surgeons leading to ulceration and fungation in 18 cases. Chest wall resection and primary closure was done in 33 cases. In 4 cases marlex mesh alone was used while in 2 cases it was reinforced with Methyl Methacrylate. **Results** Mean operative time was 68 (±40) minutes. Postoperatively, 19 patients required ventilation. Out of these, 14 patients were extubated the same day, 3 the next day while 02 patients died despite prolonged ventilation. Post-operative flail was observed in 3 cases without respiratory compromise. Histopathology reporting were chondrosarcoma in 24, fibrosarcoma in 6 cases while the rest were not reported. Twenty one patients were followed-up for up to one year with no evidence of disease while the remaining were lost to follow up. **Conclusion** To conclude primary chest wall tumors can be safely managed by resection and primary closure or chest wall reconstruction and are associated with long term survival.

Key words: chest wall neoplasms, resection, chondrosarcoma

Neoplasms of the chest wall encompass various bone and soft tissue disorders[1]. Primary and metastatic neoplasms of both the bony skeleton and the soft tissues are included as well as primary neoplasms that invade the thorax from adjacent structures such as the breast, lung pleura and mediastinum[2]. From a practical standpoint however treatment for cure is most often limited to resection of primary chest wall tumnours[3].

For over one century, chest wall reconstruction has been a challenge that surgeons have confronted with varying levels of fear and trepidation. Surgeons have subsequently worked diligently at acquainting themselves with the various dangers in various ways[4]. O'Dwyer (1887) and Fell (1891) described positive pressure airway ventilation and the importance of upper airway control[5]. Lund (1913) HedbPom (1921) classified tumors of the chest wall[6]. Watson and James (1947) discussed the use of fascia lata grafts for closure of the chest wall defects[7].

The incidence of malignancy in primary chest wall neoplasms varies and has been reported to be in the range of 50–80%[8]. When combined malignant fibrous histeocytoma, chondrosarcoma and rhabdomyosarcoma are the most common primary malignant neoplasms[9].

Evaluation of patients with chest wall tumors include a careful history, physical examination, assessment of the extent of disease by chest radiographs, computed tomography (CT) scan; bone scan followed by pathological diagnosis by incisional biopsy[10].The ability to close large chest wall defects is the main consideration in the surgical treatment of most chest wall neoplasms. Primary closure remains the best option available when possible[11]. Adequate resection and dependable reconstruction are the mandatory ingredients for successful treatment. Resulting chest wall defects may be partial or full thickness, skeletal defect requiring soft tissue or skeletal reconstruction respectively[12]. The aim of this study was to analyze the role of surgical resection, different surgical options and outcome of primary chest wall tumors in our circumstances.

Material and methods

Thirty nine patients with primary malignant chest wall tumors were treated at the Department of Cardiothoracic Surgery, Lady Reading Hospital, Peshawar between March 1996 and April 2000. Tumors arising primarily from within the mediastinam, lungs and pleura with secondary involvement of the chest wall as well as tumors of the breast were excluded from this study.

After clinical evaluation, CT thorax was obtained in selected number of patients for assessment of the extent of disease. Incisional biopsy was done for lesions more than 5 cm for histologic diagnosis while excisional biopsy was done for smaller tumors.

The indications and extent of surgical resection depended primarily on the degree of spread of the primary tumors and on the location of these lesions. Primary closure was done for defects less than 5 cm anywhere on the thorax. For neoplasms of rib cage one uninvolved rib above and below was resected.

Reconstruction was done for thoracic defects longer than 10 cm anywhere on the thorax for stabilization and prevention of flail. Reconstruction of full thickness skeletal defects was accomplished with Marlex Mesh and Methyl Methacrylate. Post-operatively these patients were

closely monitored for respiratory distress and flail and were ventilated selectively when required.

Results

All the thirty nine patients underwent surgical resection for primary chest wall tumors. There were 27(69%) male and 12(31%) female patients. There were 17(63%) males and 8(67%) females under the age of 40. Twenty nine (75%) patients experienced painless mass while 10(25%) presented with a painful mass. Table 1 summarizes pre-operative data. Resection of chest wall tumors and primary closure was done in 33(84%) patients while reconstruction was done in 6(16%) patients. Marlex Mesh was used in 4(67%) patients while it was reinforced with Methyl Methacrylate in 2(23%) patients as shown in Table 2.

Table 1. Preoperative date of patients

Variable	n=	%age
Sex		
Male	27	60
Female	12	31
Age (years)		
Male <40	17	63
Male >40	10	37
Female <40	8	67
Female >40	4	33
Clinical presentation		
Painless mass	29	75
Painful mass	10	25
Location		
Right chest	23	60
Left chest	12	30
Sternum	4	10
Size		
<3cm	7	18
3-5cm	24	62
5-10cm	6	15
>10cm	2	05

Table 2. Surgical intervention

Procedure	n=	%age
Resection and primary closure	33	84
Resection and reconstruction	6	16
Marlex mesh	4	67
Methyl	2	33

Table 3 shows histological features of excised specimens. Chondrosarcoma was reported in 24(61.5%), fibrosarcoma in 6(15%) while 9(30%) specimens were not reported. Post-operative flail was observed in 3(8%) patients while 2(5%) patients died despite prolonged ventilation. 5(13%) patients were referred post-operatively for radiation therapy to radiotherapy department. 21 patients were followed for up to 1 year with no evidence of recurrence while the rest were lost to follow up.

Table 3. Histopathology of tumours

Procedure	n=	%age
Chondrosarcoma	24	61.5
Fibrosarcoma	6	15.3
Unreported	9	24.1

Discussion

Primary tumors of the chest wall are uncommon. Altogether primary tumors of the chest wall including bony and soft tissue account for approximately 2% of all primary tumors found in the body[3].

Chest wall tumors most commonly are found in the third and fourth decade of life[2-10]. This was also seen in our series, in which 17(63%) male and 8(67%) female patients had their disease diagnosed between 20 and 40 years of age.

Patients with chest wall tumors commonly present with slowly enlarging painless masses. Most are initially asymptomatic but with continued growth pain invariably occurs[13,14]. This was also found to be true in our study in which 29 of 39(75%) patients had painless mass on presentation. Nearly all malignant tumors are likely to become painful as compared to two thirds of benign tumors. In some instances of rib tumors a mass may not be apparent on physical examination but instead is detected on radiographs of the chest[9].

Diagnostic evaluation of patients with suspected chest wall tumors should include a careful history and physical examination followed by conventional plain and tomographic chest radiography. The precise anatomic location and the assessment of extent and invasiveness of these lesions require the cross-sectional imaging capabilities of CT or MR[2,4,10].

Chest wall tumors that are clinically suspected of being primary neoplasms either benign or malignant require tissue diagnosis by histologic examination. The biopsy however should not interfere with subsequent treatment. An improperly placed biopsy site, extensive soft tissue dissection and wound infection can all complicate subsequent treatment by delaying definitive resection[10].

Chondrosarcoma and fibrosarcoma are the commonest neoplasms[2,6,10]. Chondrosarcoma was reported in 24(61.5%) and fibrosarcoma in 6(15.3%) of our patients. The main criterion for adequate control of chest wall malignancy remains wide excision. All attempts are made at resection which result in negative microscopic margins[2,10]. Our approach to the chest wall resection has been to resect the involved rib in its entirety and to resect adjacent rib both superiorly and inferiorly.

Primary closure remains ideal if possible[2,11]. This was done in 33(84%) patients of our study.

Defects in the chest wall after surgical resection can be closed with a variety of procedures with little functional disturbance[2,10]. Several materials and techniques have been used to reconstruct chest wall defects including fascialata, assorted muscle flaps and numerous prosthetic materials. From the latter category the most commonly used materials are the synthetic mesh fabrics – Marlex, Prolene and Dexon[7]. Resection and reconstruction was done in 6(16%) of our patients. We prefer to reconstruct the resulting defect by approximating synthetic Marlex Mesh. Long term survival of patients with primary malignant

chest wall neoplasm depends on the cell type and on the extent of chest wall resection[8,9].

In conclusion, chest wall resection can be performed with low morbidity and mortality rates and remains the primary treatment for most chest wall tumors. Pretreatment tissue diagnosis is essential in planning. The biopsy should be done at the centre where the definitive treatment will be undertaken.

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