EARLY RESULT OF EXCISION OF 220 CASES OF PRIMARY CHEST WALL TUMORS IN 12 YEARS PERIOD.

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ABSTRACT

Objective: To assess the surgical outcomes in primary chest wall tumors.

Methodology: Two hundred and twenty patients from June 2002 to December 2014 were retrospectively analyzed. Patients of all ages, both sexes and operable primary chest wall tumors were included. Clinical evaluation, routine investigation, chest radiographs, computed tomography and biopsy were done. Complete excision of chest wall tumors, with 5cm free margin and removal of one normal rib above and one normal rib below, was done; specimens were sent for histopathology. In skeletal reconstruction plastic surgeon was involved. Patients were sent to oncologist for adjuvant therapy accordingly. One year follow up were done.

Results: Out of 220 cases patients 143 (65%) were male and 77 (35%) were female, age ranged from 9 to 80 years with a median of 27.8 years. One hundred and fifty one patient (68.63%) experienced painless mass and 69 (31.3%) painful mass. There were 113 (51.3%) patients presenting with chest wall mass on right side, 70 (31.8%) left sided and 37 (16.8%) on sternum. Sizes were < 3cm 78 (35.4%), 3-5, 92 (41.8%), 5-10 cm 42 (19%) and > 10cm 8 (3.6%). Chest wall resection and primary closure was done in 107 (48.6%) cases while in 113(51%) resection and reconstruction was done, using Marlex Mesh alone in 98 (86.7). cases and reinforced with methyl methacrylate in 15 (13.2%) cases. Histological chondrosarcoma was reported in 134 (61%), Fibrosarcona in 55 (25%), Ewing sarcoma 24 (11%) while 7 (3%) specimens were reported as chondroma. Post operative flail was observed in 8 (3.6%) cases, 5 (2.27%) Patient died despite prolonged ventilation. All alive patients were tumor free at one year follow up.

Conclusion: 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: Metastases; Chest Wall Tumors; Peshawar

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INTRODUCTION

Chest wall tumors are more commonly either metastases or local invasion of underlying adjacent tumor. Primary chest wall tumors account for only 0.04 of all new cancers diagnosed and 5% of all thoracic neoplasms. Approximately 60% of primary chest wall tumors are malignant. Although primary chest wall tumors are diagnosed in every age group, they are more likely malignant in the extremes of age: in the young and elderly. For example Ewing sarcoma is more common in children and young adults and chondrosarcona in middle adult life. When combined osteosarcomma, chondrosarcoma and rhabdomyosdrcoma are the most common primary malignant neoplasms.[2,3] A little more than half the lesions are primary tumors of the chest wall and the reminder are metastatic. It is relatively frequent location for metastases from distant organs but extension of under lying lung, Mediastinum tumors may also occur. Many studies have reported that metastatic lesions occur with about the same frequency as primary tumors.[4,5] from a practical stand point however treatment of cure is most often limited to resection of chest wall tumors.[6]

Malignant primary tumors are mostly symptomless and grow slowly. With extension of these masses; pain accur. Evaluation of these patients include a careful history, physical examination, assessment of the extent of disease by chest radiographs, computed tomography (CT) scan followed by pathological diagnosis by incisional or excisional biopsy.[7]

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.[8] The resulting chest wall defect may be partial or full thickness skeletal defect, requiring soft tissue or skeletal reconstruction respectively.[9] Surgeons are not always able to close the defect primarily with autogenous tissue, in tumors which are large; and are given adequate margins. Titanium implants in combination with synthetic or biologic mesh can be safe and effective way of reconstruction of large full thickness chest wall defect.[10] Surgical treatment of these tumors therefore varies substantially; from simple marginal resection to cases that need a multimodality approach such as reconstruction surgery systemic chemotherapy and radiotherapy. For low grade malignant tumors such as chandrosarcoma complete removal is the treatment of choice as there is no effective chemotherapy or radiotherapy. Osteosarcoma, Ewing sarcoma and other small cell tumors are more responsive and can be treated with surgery, generally combined with perioperative chemotherapy and or radiotherapy to achieve improved local control, fewer metastases and better survival.[11]

The objective of this study was to analyze the role of surgical resection; various surgical options and outcome of primary chest wall tumors in our circumstances.

MATERIAL & METHODS:

This retrospective study of patients operated for primary chest wall tumors at the department of thoracic surgery lady reading hospital Peshawar is from June 2002 to December 2014. Clinical data of 220 patients, who were operated, was obtained from computerized data base. Records were carefully analyzed for demographic features, operative approach and outcome. Patients of all ages and both sexes, having potentially resectable primary chest wall tumor, no distant metastasis on clinical and radiological assessment were included while those patients having tumors arising primarily from within the Mediastinum, lung and pleura with secondary involvement of the chest wall as well as tumors of the breast were excluded from the study.

After clinically evolution, CT thorax was obtained in selected number of patients for assessment of the extent of disease. Incisional biopsy was done for tumors > 5cm while excisional biopsy was done for smaller tumors. Complete excision of the chest wall tumor with 5cm free margins specimens were sent for histopathology.

The indications and extent of surgical resection depends primarily on the degree of spread of primary tumor and on the location of these lesions. Primary closure was done for defects less then 5cm any where on the thorax. For neoplasms of the rib cage one uninvolved rib above and below was resected. Reconstruction was done for thoracic defects larger than 10 cm any where on the thorax for stabilization and prevention of flail. Reconstruction of full thickness skeletal defects was accomplished with Marlix Mesh and Methyl Methacrylate.

Postoperative patients were transferred to intensive care unit and their vital recorded at intervals. Patients were closely monitored for respiratory distress and flail and were ventilated selectively when required.

Patients were sent to oncologist for adjuvant therapy for follow up patients were advised periodic visits for one year.

RESULTS:

Relevant preoperative data is shown in table (I). As shown, out of 220 patients, 143(65%) were male and 77(35%) female patients with a mean age of 27.8 years. The age range was 9-80 years. One hundred and fifty one (68.6%) patients experienced mass while 69 (31.3%) presented with a painful mass. One hundred and thirteen (51.3%) chest wall tumors presented on right side, 70 (31.8%) left side and 37 (16.8%) on sternum. Sizes were < 3 cm, 78 (35.4%); 3-5 cm 92 (41.8%), 5-10 cm 42 (19%) and > 10 cm 8(3.6%). Resection of chest wall tumor and primary closure was done in 107 (48.6%) Patients, while resection and reconstruction was done in 113 (51%) patients. Marlex Mesh alone was used in 98(86.7%) While it was reinforced with methyl Methacrylate in 15 (13.2%) patients as shown in table II.

Table III shows histological features of excised specimen chondrosarcoma was reported in 134 (61%), fibrosarcoma in 55(25%), Ewing's Sarcoma in 24 (11%) and chondsoma in 7 (3%) patients. Postoperative flail was observed in 8 (3.6%) cases while 5 (2.27%) patients died despite prolonged ventilation. Patients were followed for upto one year with no evidence of recurrence.

Table: I Preoperative Data:

Variables	No	%Age
SEX		
Male	143	65
Female	77	35
AGE (Years)		
Male <40	86	60
Male >40	57	40
Female <40	45	58
Female >40	32	42
PRESENTATION		
Painless mass	151	68.6
Painful mass	69	31.3
LOCATION		
Right chest	113	51.3
Left chest	70	31.8
Sternum	37	16.8
SIZE		
< 3 cm	78	35.4
3 - 5 cm	92	41.8
5 - 10 cm	42	19
>10cm	8	3.6

Table: II Surgical Procedures:

Variable	No	%Age
A. Resection and primary closure	107	48.6
B. resection and reconstruction	113	51
a. Marlex Mesh	98	86.7
b. Methyl Ethacrylate	15	13.2

Table: III Histopathology Of Tumors:

Variable	No	%Age
Chodrosarcoma	134	61
Fibrosarcoma	55	25
Ewing's Sarcoma	24	11
Chondroma	7	3

DISCUSSION:

Primary chest wall tumors involve a wide group of soft tissue and skeletal structure of thorax. Primary chest wall tumor are best classified according to their tissue of origin, bone or soft tissue, and further sub classified according to whether or not they are benign or malignant. Most of these tumors are uncommon with information garnered from individual case reports or institutional case series. Primary chest wall tumor including bony and soft tissue account for approximately 2% of all primary tumors found in the body. [10, 11]

Chest wall tumors are most commonly found in the third and forth decade of life.[12] In our study there were 143 (65%) male and 77 (35%) female patients, who had their diseased diagnosed between 20 and 40 years of age.[10,12]

Patients often present with a palpable enlarging mass. Less commonly asymptomatic patients are diagnosed due to an incidental finding on imaging as part of screening or for investigation of an unrelated condition. Soft tissue masses are often painless, whereas bony lesions both benign and malignant are typically painful due to growth and periosteal damage. Symptoms develop as the tumor grows and can be associated with local invasion of adjacent structures.[10] In our study 151(68.6%) patients presented with painless mass. Due to variety of the chest wall tumors, time between onset of symptoms and diagnosis is often long. Rapid increase in size, involvement of surrounding tissues and cortical destruction often suggest malignancy, although they are not pathognomonic.[11,12]

Diagnostic workup of patients with chest wall tumors begins with a thorough history and physical examination. Usually a chest radiograph is obtained first. Plain radiograph can demonstrate bony erosion of the lesion, Lytic lesion, mediastinal Lymphadenopathy and the presence of any large pulmonary metastasis. C.T and MRI, however are critical imaging modalities. A chest C.T assesses the extent of bone, soft tissue, pleural and mediastinal involment and pulmonary metastases and helps with surgical planning M.R.I further delineates soft tissue, vascular and nerve involvement.[13]

Although imaging characteristics can suggest diagnosis of bony lesions, many soft tissue tumors require tissue for diagnosis. Biopsy methods include core needle as well as open incisional and excisional biopsy techniques. Care should be taken with the site and orientation of biopsy because it must be completely included in any future definitive surgical excision. The lesion should be approached directly to avoid contamination of unaffected structures.[10,14]

Chondrosarcona and bibrosarcona are the commonest neoplasms.[8,7] In our study chondrosarcoma was reported in 134 (61%) and fibrosarcoma in 55 (25%) cases. The primary objective for adequate local control of chest wall malignancy and prevention of recurrence; remains wide excision. Every effort should be made at resection which result in negative microscopic margins, although the exact margin size is debated, depending upon the specific tumor type.[14,15] Most benign tumors are excised with simply negative margins whereas locally aggressive benign lesion and malignant tumors requires minimum 5 cm margin for wide excision. With rib lesions the excision should generally incorporate resection of all or most of rib involved, adjacent uninvolved rib superiorly and inferiorly and enbloc resection of any attached structures including pleura, lung or diaphragm.[10] Tepliakov vv etal,[16] pointed out the significance of adequate resection margins in treating chest wall tumors. Another study by Mc Millan etal,[17] concluded that both local and distal recurrence can be reduced with adequate resection margins.

Chest wall closure for smaller lesion can usually be done primarily but for larger tumors in which a considerable defect is anticipated both skeletal and soft tissue coverage is necessary.[10] Primary closure was done in 107 (48.6%) patients of our study. Large full thickness defects produce skeletal instability that

impacts on respiratory mechanics, the consequences of which should be considered along with the individual patient's baseline pulmonary status.[10] The ensuing "Paradoxical breathing" is all the more important because the resection is wide typically with a minimum of three ribs involved. Besides the restoration of skeletal rigidity, chest wall reconstruction has five additional objectives; (i) To avoid chest wall defect entails a lung hernia. (ii) To counteract substantial shrinkage of the operated side of thorax, (iii) To prevent impaction of scapular in posterior chest wall defects, (iv) To protect the underlying mediastinal organs and (v) To maintain good cosmetic chest shape.[10,18]

Various procedures are in practice to close defects in the chest wall after resection. Choice of reconstruction depends somewhat on the expertise and preference of the involved thoracic and reconstructive surgeons. Many different types flaps including both pedicaled and free flaps are used in reconstruction. Pedicaled muscles and mycotaneous options include pectorilis major, latissimus dorsi, rectus abdominis and trapezius flaps. Synthetic material used include, polypropylene (Marlex) or polytetrafluorethylene mesh.[18-19] Although these all have specific advantages and disadvantages, all seems to work satisfactorily and most of them may be combined for composite reconstruction of challenging situations. They more or less all comply with a characteristic of ideal prosthetic material. (i) Rigidity to abolish parodoxical movement. (ii) Inertness (iii) Malleability so that it can be fashioned to the appropriate shape at the time of operation. (iv) Radiolucency to create anatomic reference to identify possible local relapse of the primary disease at radiographic follow up. Therefore the choice of a prosthetic material is puzzling and for the most part has been based mainly on the surgeon's preference and some cost effective concerns .[10-20] Resection and reconstruction was done in 113 (51%) of our patients. We prefer to reconstruct the resulting defect by approximating synthetic Marlex Mesh.

Multimodality therapy is critical in the treatment of specific chest wall tumors. The use of multiagent chemotherapy for osteosarcoma and malignant round cell type tumor (Ewing sarcoma) has been critical and significantly improving the overall and disease free survival of patients with these tumors. The use of adjuvant radiotherapy is also significant in certain tumors including malignant soft tissue tumors and osteosarcoma to prevent local recurrence and to treat recurrent tumors. [19-22]

CONCLUSION

Surgery with wide resection margins can be performed with acceptable morbidity and mortality and remains the primary treatment for most chest wall tumors

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