HISTOLOGY TYPES OF CHEST WALL TUMOURS: FIFTEEN YEAR SINGLE CENTER EXPERIENCE.

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ABSTRACT

BACKGROUND/OBJECTIVE: Chest wall tumours are not uncommon.They are regarded as malignant until otherwise proven.The objective of this study is to analyze the histological variants in our institution and compare same with relevant data available in the literature.

Materials and Methods: We performed a retrospective study of chest wall tumours at our institution(NCTCE, UNTH, Enugu, Nigeria), for a period of 15 years, spanning October, 2001 to September, 2015. The pathologic reports were retrieved from the hospital pathology archives and correlated with patients' copies in the hospital record.The lesions were classified as primary and secondary based on the clinical and radiological data as well as the histological reports.

RESULTS: A total of 158 chest wall tumours were identified in 158 patients with a mean age range of (45 +/- 6). The male to female ratio was 1:1.1(male = 74, 46.84% and female =84, 53.16%). There were 81 primary chest wall tumours, out of which benign soft chest wall tumour was 50(61.73%) and malignant soft chest wall tumour was 13(16.05%).The benign bone and cartilage chest wall tumour accounted for 1(1.23%) and malignant component was 17(20.99%).The secondary chest wall tumours studied were 77, out of which 30(38.96%) were invasive and 47(61.04%) were metastatic

CONCLUSION:The commonest primary malignant chest wall tumour was malignant fibrous histocytoma while the most common secondary chest wall tumours seen in this study was mostly metastatic epithelial neoplasms.

KEY WORDS: chest wall, tumour, histology, malignant,

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INTRODUCTION

Chest wall tumours account for 5% of all thoracic malignancy and vary widely in pathology. This is because they arise from a range of cell types which including soft tissue, bone and cartilage as well as metastatic disease, each with different growth potentials, presentations, diagnostic properties and prognosis.[1,2,3,4,5] Although chest wall is not an organ, it functions as a fundamental unit with complex interplay between soft tissue, bone and cartilage in protecting thoracic and abdominal viscera and providing integrity of respiratory function.

Primary chest wall tumours occur in the 5th and 6th decade of life with equal gender distribution and with equal possibility of either being malignant or benign[6]. More than 50% of chest wall tumours are malignant and typically are secondaries, either as invasive from neighboring structures or metastatic in nature[7].

Pain and mass are the ways chest wall tumours present[8]. Some are found incidentally on chest x-rays while others are asymptomatic[9,10]. Radiologic imaging is important in the assessment of these tumours especially in determining anatomic origin, extent of response to treatment and recurrence. Chest X-ray can be used to determine the location, size, growth rate of the mass as well as to detect calcification, ossification or bone involvement[11]. Computerized tomography enables more accurate assessment of tumour morphology, composition, location and extent of soft tissue involvement [12].

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Though, radiologic evaluations are useful in determining tumour invasion, surgical treatment planning and follow up, their features are nonspecific[12,13,14]. Histology provides the supreme court of diagnosis. Tru-cut biopsy, excisional and incisional biopsies are the commonest methods employed. The use of fine needle aspiration cytology is controversial[4,6,11,15]. Cytologic specimen is unsatisfactory and the use of the results obtained therefrom leads to inadequate treatment and worse prognosis[16,17].

Surgical extirpation with or without reconstruction, chemo-radiation and physiotherapy are the common modalities of treating chest wall tumours. Decision of choice is governed by the size of the tumour, extent of resection, the need for reconstruction and associated co-morbidity. Patients with extensive or complicated lesion are best served with a multidisciplinary approach[18]. Resection prolongs survival and also is a palliation for symptomatic lesions[19].

Materials and Methods

We performed a retrospective study of chest wall tumours at our institution National Cardiothoracic Center of Excellence (NCTCE), University of Nigeria Teaching Hospital(UNTH) Ituku-Ozalla,Enugu for a period of 15 years, spanning October, 2001 to September, 2015. The pathologic reports were retrieved from the hospital pathology archives and correlated with patients' copies in the hospital record. Clinical and radiological data were obtained through a review of hospital records of these patients. The lesions were classified as primary and secondary based on the clinical and radiological data as well as the histopathological reports and in some cases, immunohistochemical findings. There were 158 histopathological reports from the morbid anatomy department and 158 of them were correlated with the patients' database in the Health Information Technology Department.

The tumours were further subdivided into different groups as: (1) soft tissue, bone and cartilage or haematologic or lymphomas (2) benign or malignant, (3) primary or secondary and finally (4), the secondary was subdivided into invasive or metastatic.

Data were analyzed using SPSS version 16(Chicago). Rates and proportions were calculated with 95% confidence interval (CI). The proportions were compared using students't- tests. Level of significance was set at $P < 0.05$.

Results

There were 158 patients, with 74 males (47.13%) and 84 females (52.87%). The male to female ratio was 1:1.1. The mean age was 50.0 years (range is 3-97 years). The highest age range affected was 51-60 years, with n=43 (24.71%), followed by 31-40 years, with n=40 (22.99%). The lowest age range was 81-90 years with n=0, (0.00%), followed by 91-100 years with n=1 (0.58%), see figure 1.

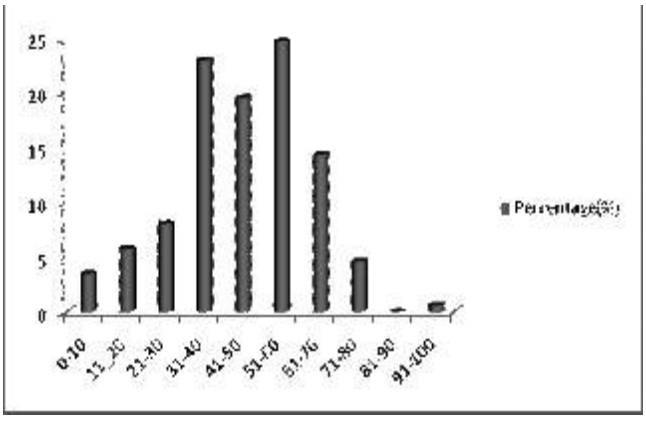


Figure 1: Showing age range of patients

There were 158 histopathological slides, out of which 81 (51.27%) were primary tumours of the chest wall and 77 (48.73%) were secondary chest wall tumours. Within the primary chest wall tumours, benign soft tissue was 50(61.73%) while the malignant soft tissue was 13 (16.05%). The benign bone and cartilage soft tissue was 1 (1.23%) while malignant bone and cartilage was 17(20.99%). Among the secondary chest wall tumours, invasive was 30 (38.96%) while metastatic was 47 (61.04%).

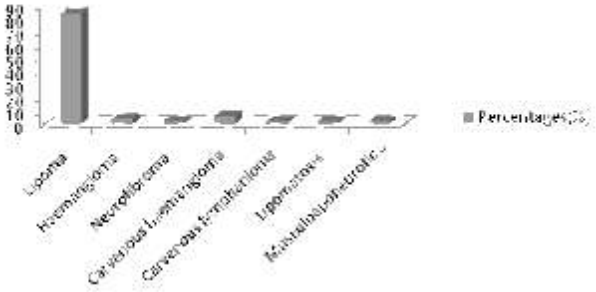


Figure 2: showing the distribution of primary benign soft tissue chest wall tumours

Within benign group of the soft tissue chest wall tumours, lipoma was the highest, n=42 (84.00%), followed by carvenous haemangioma with n = 3 (6.00%). See figure 2. Among the malignant soft tissue tumours, malignant fibrous histiocytoma was the highest, with n = 5 (38.46%), followed by rhabdomyosarcoma, with n = 4 (30.77%), See figure 3. Within malignant bone and cartilage chest wall tumours, multiple myeloma was the highest with n = 8 (53.33%) followed by chondrosarcoma with n = 49 (26.67%). Also see figure 4. We recorded only 1

chondroma as a benign bone and cartilage tumour.

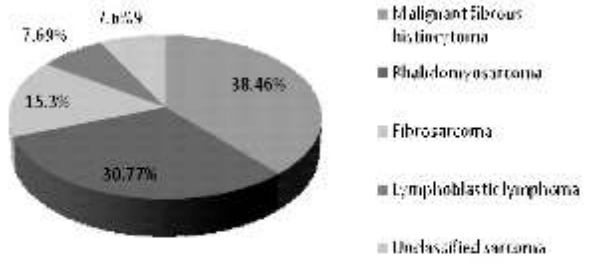


Figure 3: Showing the distributions of the primary malignant soft tissue chest wall tumours

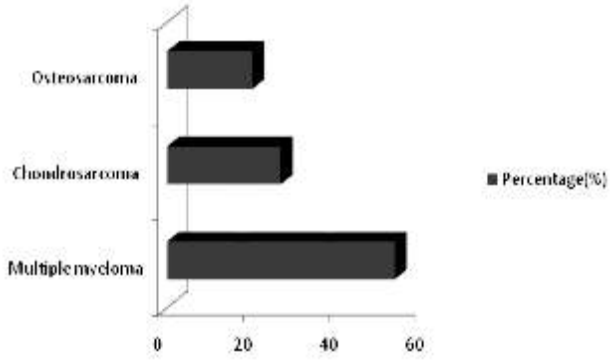


Figure 4: Showing the distribution of primary malignant bone and cartilage chest wall tumours.

Of about 108 cases of malignant chest wall tumours in our study, 77 (71.30%) were metastases from distant organs or direct invasion from adjacent structures. The primary sites for both the invasive and metastatic tumours are shown in figures 5 and 6.

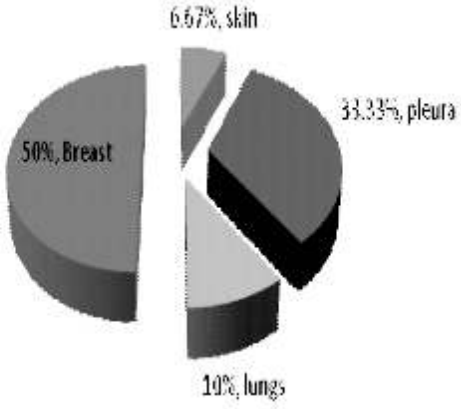


Figure 5: Showing the distributions of invasive secondary chest wall tumours

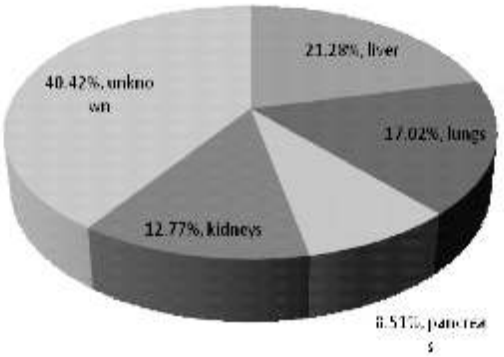
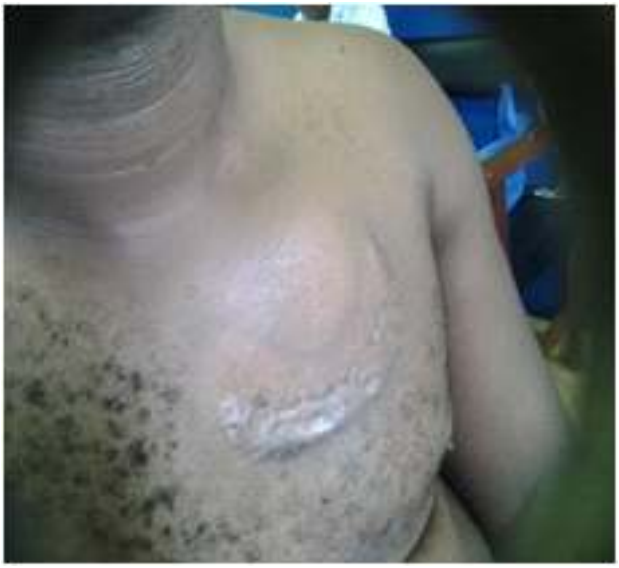


Figure 6: Showing the distribution of metastatic secondary chest wall tumours

The commonest histologic types were carcinomas (64.27%) followed by mesotheliomas(20.31%) and melanomas(5.45%). Among the metastatic tumours, 40.42% had unknown primary sites even after immunohistochemical staining.

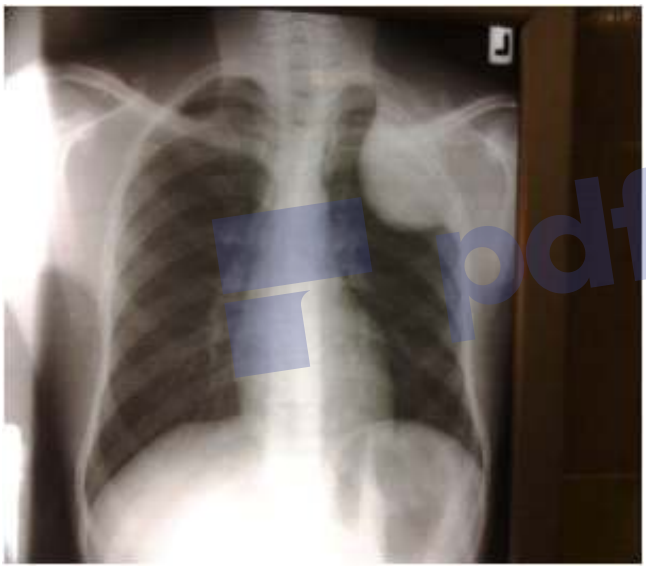
a. Multiple myeloma

b chondrosarcoma

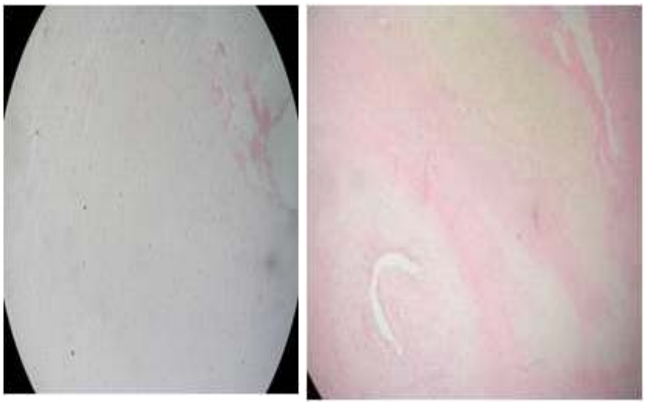


c. unclassified sarcoma

Figure 7: Note that most of the patients involved in the study did present late as can be seen in this figure. A typical appearance of chondroma and chondrosarcoma is depicted in figure 8.



d. Intrathoracic chest wall tumour(osteosarcoma), simulating thoracic outlet syndrome



a. Chondroma b. chondrosarcoma

Figure 8.

DISCUSSION

Chest wall tumours account for 1-2% of all tumours; 60% are malignant[20]. These neoplasms can be primary soft tssue, bone and cartilage or may be metastasis from adjacent or distant structures or organs[21]. In this study, we noted the heterogenous distributions of the tumours according to the structures that make up the chest wall, which are soft and bony-cartilaginous tissues. Among the benign soft tissues, histologically, lipoma was the commonest accounting for 84.00%. This finding is in agreement with other studies[22]. Lipomas of chest wall are usually well circumscribed and situated deep. This was closely followed by haematologic tumours: carvenous haemangioma and haemangioma with 6.00% and 4.00% respectively. Carvenous haemangioma is sharply defined but not encapsulated and made up of large, carvenous vascular spaces, partly or incompletely filled with blood separated by a scant connective tissue stroma.

In the primary malignant soft tissue tumour of the chest wall, we observed malignant fibrous histiocytoma as the most common (38.46%), closely followed by rhabdomyosarcoma (30.77%). Others were fibrosarcoma (15.39%), lymphoblastic lymphoma(7.69%) and unclassified sarcoma(7.69%). In the literature, malignant fibrous histiocytoma was the most common soft tissue sarcoma[23] and is also reported to be rare in the chest region[7]. Our study however, agrees with that of Mohammadtaher et al [22]. MFH have been categorized into storiform-p[eomorphic, myxoid, inflammatory, giant cells and amngiomatoid variants based on histologic features[24]. The storiform-pleomorphic was most common, about 65% and as the name indicates is composed of malignant spindle cells orientated in a storiform pattern, with scattered large, round pleomorphic cells. Rhabdomyosarcoma is a malignant tumour of a skeletal muscle. Histologically, it is classified into embryonal, alveolar and pleomorphic(adult form). Others occur in children, adolescent and young adults[25]. We recorded unclassified sarcoma as 7.69% of all primary malignant soft tissue tumours of the chest wall. Other studies have estimated the prevalence of unclassified sarcoma as about 1% of sarcomas of the chest wall in adults and 10% in infants and children[26].

Among the primary malignant bone and cartilage tumours of the chest wall, we observed in our study that multiple myeloma was the most common(53.33%), followed by chondrosarcoma (26.6%) and osteosarcoma (20.00%). Other studies are at variance with our observation, in that Chondrosarcoma was the commonest primary malignant bone and cartilage tumours of the chest in their studies[1,19,27,28,].

Solitary myeloma and multiple myeloma are plasma cell tumours that manifest respectively as a single mass or with diffuse bone marrow involvement. There was no observation of solitary myeloma in our study but etra- osseous solitary myeloma which manifests as a nonspecific soft- tissue mass that progresses less frequently to multiple myeloma[29]. Chondrosarcoma is morphologically subclassified into conventional intramedullary, juxtacortical, clear cell, dedifferentiated and mesenchymal variants[30,31]. Well differentiated chondrosarcoma may morphologically resemble chondroma. Chonrdoma in the chest wall is very rare[32]. We observed only one case in 15 years.

Invasion and metastasis are biologic hallmarks of malignant tumours. They are the major cause of cancer related morbidity and mortality.[24,33,34] In this study, secondary chest wall tumours constituted the most significant proportion of disease. Of all the 107 malignant chest wall tumours studied, 77(71.96%) were secondary tumours. Within the secondary chest wall tumours, invasive and metastatic tumours were 38.96% and 61.04% respectively. This observation is in agreement with other study which showed that secondary chest wall tumours comprised most of the malignant types[35]. The primary sites of both

invasive and metaststic tumours are shown in figures 5 & 6. The histologic types were carcinomas, mesotheliomas and melanomas in decreasing order.

CONCLUSION

Lipoma was the most common primary benign chest wall tumour, while malignant fibrous histiocytoma and multiple myeloma constituted the most common primary malignant soft and bony-cartilaginous tissues respectively. Overall, secondary chest tumours were the dominant malignant chest wall tumours in our study. There was equal gender predispodition.

REFERENCES

1. Hsu PK, Hsu HS, Lee HC, Hsieh, Wu YC, Wang, LS et al, Management of Primary Chest Wall Tumours: 14 Years' Clinical Experience. J Chin Med Assoc 2006; 69(8): 377-382.
2. Graeber GM, Synder RJ, Heming AW, Head HD, Lough FC, Parker JS, Zajtchuk R, et al. Initial and long-term results in the management of primary chest wall neoplasms. Ann Thorac Surg 1982; 34: 664-73.
3. Anderson BO, Burt ME. Chest wall neoplasms and their management. Ann Thoracic Surg; 1994; 58: 1774-81.
4. Pailero PC, Arnold PG. Chest wall tumours experience with 100 consecutive patients. J Thorac Cardiovasc Surg 1985; 90:367-72.
5. Warzelham J, Stoelban E, Imdahl A., Results in surgery for primary and metastatic chest wall tumours. Eur J Cardiothoracic Surg 2001; 19(5): 584-588.
6. King RM, Pailero PC, trastek VF, Pichler JM, Payne WS, Bernatz PE. Primary chest wall tumours: factors affecting survival. Ann Thorac Surg, 1986; 46: 597-601.
7. Tateishi U, Gladish GW, Kusimoto M, Hasegawa T, Yokoyama R, Tsuchiya R et al. Chest wall tumours: Radiologic Findings and pathologic Correlation. Radiographics 2003; 23: 1477-1490. Http: 10.1148rg.236015526.
8. Athanssiadi K, Kalavronziotie G, Ronadogianni P, Loutsidi A, Hatzichallis A, Bellenis I. Primary Chest wall tumours: early and long term result of surgical treatment, Eur J cardiothoracic Surg 2001; 19: 587-593.
9. Jeung MY, Gaugi A, Gasser et al. Imaging of Chest wall disorders. radioGraphics 1999; 19: 617-637.
10. Siegel MJ. Magnetic resonance imaging of musculoskeletal soft tissue masses. Radiol Clin North Am 2001; 39: 791-720.
11. Sabanathan S, Shah R. Surgical treatment of primary malignant chest wall tumours. Eur J Cardiothoracic Surg 1997; 11:1011-6
12. Briccoli A, Dc Paolis M, Campanacci L, Mercuri M, Bertoni F, Lari S, et al. Chondrosarcoma of the chest wall: a clinical analysis. Surg Today 2002; 32: 291-6.
13. David EA, Marshal MB. Review of Chest wall Tumours: A Diagnostic, Therapeutic, and Reconstructive Challenge,. Semin Plast Surg 2011; 25(1):16-24.
14. .Park BJ, Flores RM. Chest wall tumours. In: Shields TW, Locicero J, Reeds CE, Feins RH, editors. General Thoracic Surgery. Philadelphia, PA: Linppincott; 2009. PP. 669-678.
15. Incarbone M, Pastorino U. Surgical treatment of chest wall tumours. World Journal of Surgery 2001; 25: 218-230.
16. Mrkin HJ, Large TA, Spanier S. The hazards of biopsy in patients with malignant bone and soft tissue tumours. J Bone Surg Am 1982; 64: 1121-7.
17. Haghi ZS, Kalantari Mr, Attar AS, Salehi M, Tabari A, Soudaneh, M. Primary Malignant Chest Wall Tumours: analysis of 40 patients. J of Cardiothoracic Surgery 2014; 9: 106. http//www.cardiothoracic surgery/content/9/1/10.

18. Penfield FL, Somers J and Templeton AC. "Chest Wall Tumours", Current Problems in Surgery, Vol 32, No. 8, 1995, pp. 635-747.
19. Shah A and D'Amico, "Primary Chest Wall Tumours, "Primary Chest Wall Tumours,' Journal of the American College of surgeons, 2010;(2010)3: 360-366.
20. McCommack P. Chest Wall Tumours. In Bane AE, Geha AS, Hammond GL, et al. (eds). Glenn's Thoracic and Cardiovascular Surgery, 5th ed. Norwalk, CT: Appleton and Lange, 1991: 517-530.
21. Chang AC, Nesbitt JC. Primary chest wall tumours. In: Cameron JL.(ed). Current Surgical Therapy, 7th ed. St. Louis: Mosby, 2001: 751-757.
22. Mohammadtaheri Z, Dorudinia A, Daneshvar A, Azar PA, Mohammadi F. Histologic Types of Chest Wall tumours_ Nine Years of Single Experience. Open Journal of Pathology 2014; 4: 13-19.
23. Weiss SW, Goldblum JR, "Ezinger and Weiss's Soft Tissue Tumours". Mosby-harcour Press, Philadelphia, 2008.
24. Cotran RS, Kumar V and Schoen FJ. Robbins, "Pathologic Basis of Disease", 6th edition, Philadelphia, 1999; ISBN 0-7216-5032-5.
25. Maurer, HM., et al: The Intergroup Rhabdomyosarcoma study – II. Cancer 71: 1904, 1993.
26. McMillian RR, Sima CS, Moraco NH, Rusch VW, Huang J. Recurrence Patterns After Resection of Soft Tissue of the Chest Wall. Ann Thorac Surg. 2013;9(4): 1223-12238.
27. Somers J, Faber LP. Chondroma and Chondrosarcoma. Semin Thorac Cardiovascular Surg. 1999; 11: 270-277.
28. Sullivan PO, Dywer HO, Flint J, et al. Malignant Chest Wall Neoplasms of Bone and Cartilage: A pictorial Review of CT and MR Findings," The British Journal of Radiology 2007, 80(956): 678-684.
29. Kyle RA, Rajkumar SV. Criteria for diagnosis, staging, risk stratification and response assessment of multiple myeloma. Leukemia 2009; 23(1): 3-9.
30. Daly PJ et al,: Dedifferentiated chondrosarcoma of bone. Orthopaedics 1989; 12:763.
31. Rosenthal Dim et al. Chondrosarcoma: Corelation of radiological and histological grade. Radiology 1984; 150-21.
32. Shapeero LG Vanel D, Couanet D, Contesso G, Ackerman LV. Extraskeletal mesenchymal chondrosarcoma. Radiology 1993; 186: 819-826.
33. Hart IR and Saini A. Biology of tumour metastasis, Lancet 1992; 339: 1453.
34. Liotta LA, et al. Invasion and metastasis , In Holland, JF., et al(eds): cancer Medicine, 3rd ed. Philadelphia, Lea and Febiger, 1993, pp. 138.
35. Ozuslu BA, Genc O, Gurkok S and Balkanli K. "Chest Wall Tumours," Asian Cardiovascular & Thoracic Annals 1998; (6)3: 212-215.