

Malignant peripheral nerve sheath tumor of the anterior mediastinum: a rare presentation

Babusha Kalra,¹ Pamela Alice Kingsley,¹ Harinder Singh Bedi,² Kanwardeep Singh Kwatra,³ Preeti Negi¹

¹Department of Radiation Oncology,

²Department of Cardiothoracic and

Vascular Surgery, ³Department of Pathology, Christian Medical College and Hospital, Ludhiana, India

Abstract

Malignant peripheral nerve sheath tumor (MPNST) is a rare tumor that accounts for 5% of all thoracic neoplasm usually located in the posterior mediastinum and is generally associated with a poor outcome. We present a case of MPNST of the anterior mediastinum presenting in a rare location leading to diagnostic dilemmas and treated primarily by surgical resection.

Introduction

Malignant peripheral nerve sheath tumors (MPNST), also called malignant schwannomas or neurofibrosarcomas, comprise approximately 5-10% of all soft tissue sarcomas; 50% of such tumors are associated with neurofibromatosis type I (NF-1) and Von Recklinghausen disease. The incidence of MPNST is 0.001% in the general population. The overall five year survival rate is approximately 50% in patients with resectable tumor. Most neurogenic tumors in the thorax occur in the posterior mediastinum and MPNSTs in the anterior mediastinum are rare.¹ We report a case of MPNST presenting as an anterior mediastinal mass treated primarily by surgical resection.

Case Report

A 46-year-old man with 20 pack-year was referred to our hospital for work up and investigations of a large anterior mediastinal mass as can be seen on chest radiography in March 2012. He had neither symptoms nor family history of neurofibromatosis Type I (NF-1). Mr. KS complained of dry nonproductive cough and dyspnea on exertion since January 2012. He was a known hypertensive and has been on

irregular medications for a period of eight months. General physical examination revealed a soft cystic swelling in the right cervical region. Breath sounds were diminished on the left side with muffled heart sounds on auscultation. Contrast enhanced computed tomography (CT) scan of the chest revealed a large 17×9.9 cm minimally enhancing mass with speckled multifocal calcification in the anterior mediastinum (Figure 1). The mass was seen extending up to the left anterior lateral chest wall with invasion of the pleura with evidence of mild pericardial effusion.

A CT guided percutaneous core needle biopsy was performed. Histopathology revealed a tumor composed of cartilaginous areas and spindle cell morphology with pleomorphic hyperchromatic nuclei and yielded differential diagnosis of immature teratoma, teratocarcinoma, chondrosarcoma, MPNST with cartilaginous areas and sarcomatoid carcinoma with cartilaginous area. All the relevant tumor markers namely alpha fetoprotein (AFP), human chorionic gonadotrophin (HCG) and lactate dehydrogenase (LDH) levels were within normal limits. Hence after discussion in tumor board, the decision was taken for complete excision of the tumor which was performed via a mini sternotomy.

Intra operatively a large lobulated mass, soft to firm in consistency was seen in the anterior mediastinum extending from the retrosternal region to the region behind left anterior chest wall and was adherent to the pericardium and left pleura posteriorly and appeared to be arising from the intercostal nerve. No enlarged lymph nodes were identified. On gross inspection revealed a greyish white to a greyish brown encapsulated slightly nodular soft tissue mass measuring 18×16×10 cm and weighing 1490 g and showed no invasion of neighboring organs (Figure 2). Serial sections through the mass revealed greyish white solid trabeculated cut surface with focal hemorrhagic and myxoid areas. Histopathologic examination showed a cellular tumor composed of spindle shaped cells arranged in sweeping bundles and fascicles. The cells had oval to spindle hyperchromatic nuclei with coarse chromatin and small nucleoli. There was mild nuclear pleomorphic and frequent mitotic figures (up to 10/10HPF). Cytoplasm was indistinct, eosinophilic and blended with intercellular collagen fibers. Some areas showed prominent myxoid changes. In some areas, islands of metaplastic cartilage could be identified along with areas of osseous differentiation. Spindle cells with wavy and buckled nuclei and occasional area of palisading was seen. Areas of necrosis and hemorrhage were also present with scattered small to medium sized blood vessels. Immunohistochemistry examinations revealed that the tumor cells stained positive for vimentin, S100 and Bcl2; negative for cytoke-

Correspondence: Pamela Alice Kingsley, Christian Medical College and Hospital, Brown Road, Ludhiana, 141008 Punjab, India. Tel.: +91.161.502.6999. E-mail: pamelajeyaraj@yahoo.co.in

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atin, cytokeratin 7, epithelial membrane antigen, desmin, SMA, Myf4 and CD99 consistent with the diagnosis of MPNST with cartilaginous and osseous differentiation, histologic grade II (Figure 3). As the patient had undergone R₀ resection, adjuvant treatment was not offered and was advised regular monthly follow up for close observation.

Discussion

Malignant peripheral nerve sheath tumor is also known as *malignant schwannoma*, *neurofibrosarcoma* and *neurogenic sarcoma*. They are extremely aggressive with an incidence of 4-10% amidst all soft tissue sarcomas.² More than 50% patients with MPNST have NF1 with a reported five year survival of 15%.³ Frequently diagnosed in patients aged 20-50 years MPNST do not exhibit any sex predilection and usually present as an enlarging soft tissue mass.⁴

Transthoracic imaging like CT, MRI and PET can distinctly determine the location of the lesion. In our patient the unusual location lead to multiple differential diagnosis. The CT picture of MPNST include a large heterogeneous mass with occasional bony destruction and local invasion. However, histopathological examination remains the mainstay to arrive at the diagnosis of the malignant nature of schwannoma.⁵ They are identified by atypical spindle shaped cells with nuclear polymorphism, frequent mitosis and a high prolifera-

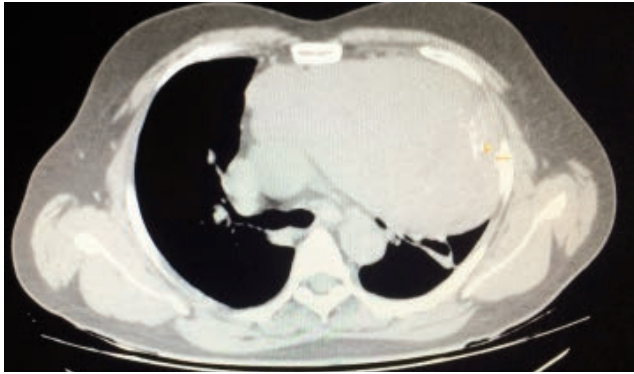


Figure 1. Computed tomography scan of chest showing anterior mediastinal mass (17×9.9 cm) with speckled calcification.

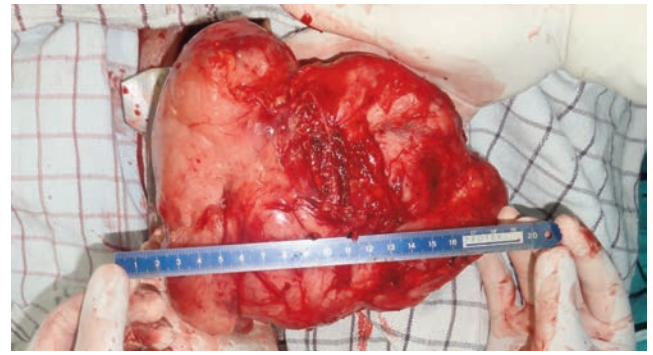


Figure 2. Nodular soft tissue mass measuring 18×16×10 cm and weighing 1490 g.

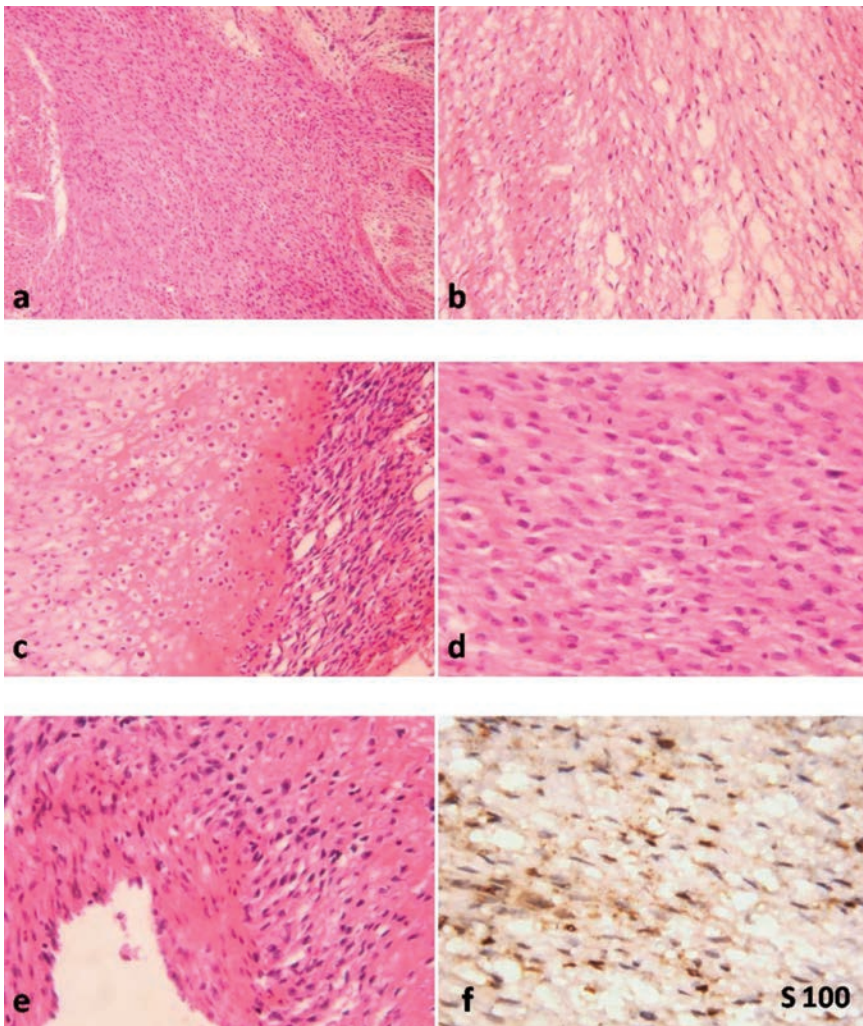


Figure 3. a) Cellular spindle cell tumor with focal myxoid areas; b) myxoid areas with serpentine cells; c) cartilaginous differentiation; d) high mitotic activity in tumor cells; e) plump tumor cells around blood vessel; f) focal S100 positivity.

tive index. The immunohistochemical examination revealed S100 positivity suggesting malignant transformation of schwannoma and vimentin immunopositivity implying its mesenchymal origin.

The multimodal management of MPNST includes wide local excision with *minimum* 4 cm safety margin, adjuvant radiotherapy and chemotherapy.⁶ Complete surgical resection is the best indicator of good prognosis.⁷

In our patient MPNST was identified in the anterior mediastinum extending behind left anterior chest wall and it was well encapsulated. A complete wide excision of the mass was done and R0 resection was achieved. Our patient is asymptomatic and has no evidence of recurrence till date. Zout *et al.* reported that recurrence of MPNST is strongly associated with positive surgical margin and are poorly sensitive to chemotherapy and relative radioresistant.^{8,9}

As reported by Wong *et al.* adjuvant irradiation (>60 Gy) and intra operative electron irradiation is associated with better local disease control.¹⁰ In our patient radiation therapy was not recommended as there was R₀ resection.

Conclusions

In conclusion the authors would like to highlight the diagnostic dilemma due to the location of MPNST in the anterior mediastinum. Although these tumors are typically present in the posterior mediastinum, the possibility of them presenting as anterior mediastinal tumors should be kept in mind. Immunohistochemistry should play an integral part in the diagnosis of these tumors. Adjuvant radiation therapy can be avoided in such cases with R₀ resection balancing with the morbidity associated with mediastinal irradiation.

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