Case Report

Extensive Cystic Changes in a Mediastinal Solitary Fibrous Tumour Causing a Diagnostic Dilemma

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Abstract

Extra-pleural solitary fibrous tumours (SFTs) are relatively rare tumours, usually located in the subcutaneous tissue, deep soft tissue of extremeties, retroperitoneum and abdomino-pelvic cavity, and may be difficult to recognise when encountered at unusual locations. Mediastinal SFTs are extremely rare tumours and the occurrence of cystic changes in these tumours is even more rare. We report the case of a 35-year-old male with a posterior-superior mediastinal mass with extensive cystic change causing a diagnostic dilemma. Histopathological examination revealed a tumour with extensive cystic change, with the cystic spaces containing blood. The solid areas showed plump, round to oval cells arranged in a pattern-less pattern, with a prominent Staghorn pattern of vasculature. Tumour cells were immunopositive for CD99, B-cell lymphoma-2 (bcl2), and CD34 (focally), leading to a diagnosis of SFT, which was confirmed by nuclear immunopositivity for signal transducer and activator of transcription 6 (STAT6). In view of the atypical clinical and radiological features and the many morphological mimics, an appropriate immunohistochemical panel is extremely useful in arriving at the right diagnosis, particularly STAT6 immunohistochemistry which identifies the molecular signature characteristic of SFT/haemangiopericytoma group of tumours. Also, mediastinal SFTs are associated with unusually aggressive behaviour, unlike at other sites; thus, patients with mediastinal SFT should be followed-up for a prolonged period. **[Indian J Chest Dis Allied Sci 2017;59:87-90]**

Key words: Solitary fibrous tumour, Haemangiopericytoma, Medistinum, STAT6.

Introduction

Extra-pleural solitary fibrous tumours (SFTs) are ubiquitous tumours of fibroblastic origin.[1] Rarer than their pleuro-pulmonary counterparts, SFTs, including those previously referred to as haemangiopericytomas (HPCs), are usually located in the subcutaneous tissue, deep soft tissue of extremeties, retroperitoneum and abdomino-pelvic cavity, and may be difficult to recognise when encountered at unusual locations. Mediastinal SFTs/HPCs are extremely rare tumours and occurrence of cystic change in these tumours is even more rare.

Case Report

A 35-year-old male presented with low backache for five months, for which he had been evaluated outside, and found to have renal calculi. Chest radiograph performed then showed a mass in the right superior zone. Subsequent contrast-enhanced computed tomography (CECT) of the chest confirmed a mass in the superior mediastinum, for which he was referred to our out-patient department. At the time of initial presentation, the patient was asymptomatic. There was no history of fever, night sweats, anorexia, weight loss, cough, chest pain, haemoptysis, dyspnoea, dilated veins over chest, facial puffiness, jaundice, urticaria, abdominal pain, or any other systemic complaint. There was no history of any swellings or lumps elsewhere on the body, symptoms suggestive of thyroid dysfunction, exertional weakness of limbs, drooping of eyelids, difficulty in swallowing, or of tuberculosis in the past. He was a non-smoker.

On physical examination, breath-sounds were reduced in the right infraclavicular area; there were no adventitious sounds. Rest of the systemic examination was unremarkable. On CECT chest, there was a posterior-superior mediastinal mass showing areas of heterogeneous enhancement and internal non-enhancing areas suggestive of necrosis. The mass was abutting the right lateral border of the trachea, with no significant mass effect (Figure 1).

Possible differential diagnoses included foregut duplication cyst, neurogenic tumour with cystic change, and hydatid cyst. Hydatid serology was negative. The patient underwent resection of the mass. Intra-operatively, no attachment of the mass to the pleura

[Received: May 27, 2016; accepted after revision: November 22, 2016]

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was noted. In the post-operative period, he developed right-sided pleural effusion, and was treated with broad-spectrum antibiotics. He also developed mild right-sided ptosis and miosis (Horner syndrome) on the second post-operative day, for which no active intervention was advised, and he was discharged.

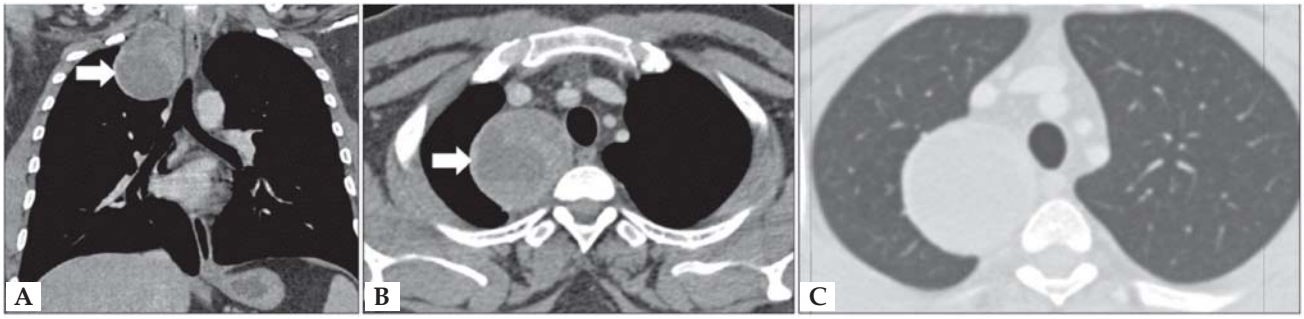

Figure 1. Contrast enhanced coronal reconstructed computed tomography image showing (A) a well-defined heterogeneously enhancing round soft tissue mass with internal necrosis (arrow) in superior mediastinum, (B) abutting the right lateral margin of trachea on the axial image and (C) on axial lung window image, no pulmonary parenchymal changes are seen in the surrounding region.

The excised specimen comprised of cystic soft tissue measuring 5cm × 4cm. Cut-section showed a single smooth-walled cyst with areas of haemorrhage, and focal solid areas in the wall. Histopathological examination of haematoxylin-eosin stained sections (Figure 2) showed a tumour with extensive cystic changes and the cystic spaces contain blood. The solid areas showed a Staghorn pattern of vasculature. Higher magnification revealed a tumour composed of plump, round to oval cells arranged in a pattern-less pattern. Tumour cells had scant cytoplasm, ill-defined cytoplasmic borders, and vesicular nuclei with inconspicuous nucleoli. At places, the tumour cells showed spindling. Interspersed thin-walled vessels with hyalinisation were seen. Mitoses were limited to 2/10 high power-fields. Necrosis was not identified. At the periphery, a nerve was seen adherent to the tumour. Reticulin stain demonstrated a peri-cellular network of reticulin fibres. On immunohisto-chemistry, tumour cells were immune-positive for CD99, B-cell lymphoma-2 (bcl2), and CD34 (focally), while these were negative for cytokeratin, epithelial membrane antigen (EMA), transducin-like enhancer genes (TLE1), S-100, chromogranin, synaptophysin, desmin, myogenin and smooth muscle actin. MIB1 labelling index was 3%. Diffuse, strong nuclear positivity for STAT6 was present. Based on the histopathological and immunohistochemical features, a diagnosis of extra-pleural SFT with extensive cystic change was made. The adherent nerve that was resected was considered to be responsible for the post-operative development of Horner syndrome.

Patient is doing well on follow-up one year after surgery.

Discussion

Haemangiopericytomas are mesenchymal tumours hypothesised to arise from pericytes, with a pattern of branching thick-walled vessels with perivascular fibrosis.[2] Solitary fibrous tumours, initially reported as localised pleural mesothelioma,[3] are circumscribed lesions characterised by spindle-shaped cells within

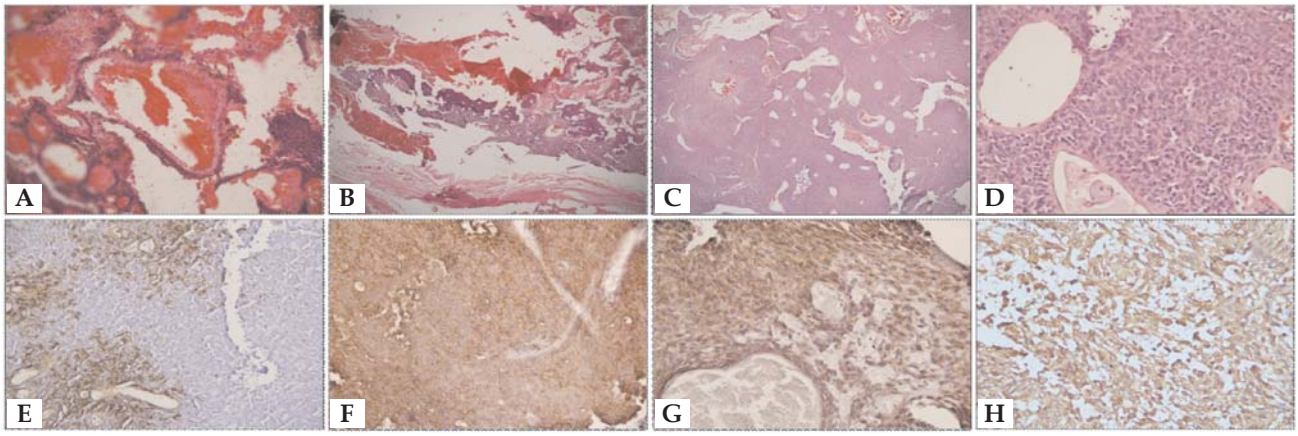

Figure 2. Photomicrographs showing (A) a predominantly cystic tumour with blood-filled spaces (Haematoxylin and Eosin, × 100) and (B) few solid areas (Haematoxylin and Eosin, × 40). The solid areas show (C) a prominent staghorn vasculature (Haematoxylin and Eosin, × 100) and (D) are composed of sheets of round to oval cells with scant cytoplasm, vesicular nuclei and inconspicuous nucleoli (Haematoxylin and Eosin, × 400). On immunohistochemistry, (E) tumour cells are immunopositive for CD34 (focally) (Haematoxylin and Eosin, × 200), (F) CD99 (Haematoxylin and Eosin, × 200), (G) bcl2 (Haematoxylin and Eosin, × 400), and (H) diffuse, strong nuclear positivity for STAT6 is present (Haematoxylin and Eosin, × 400).

a prominent collageneous stroma.[4] Similar neoplasms at locations other than lungs and pleura are termed extra-pleural SFTs. In recent years, based on similarities in clinical profiles and histomorphological features, as well as identification of a recurrent genetic alteration, i.e., NGFI-A-binding protein (NAB2)-STAT6 fusion in these tumours, it has been established that HPC and SFT are two ends of a histological spectrum.[5-7] Based on this, the recent World Health Organization (WHO) classification of soft tissue tumours has merged these two entities into "extra-pleural SFT", and discarded the term HPC.[1] Not only has description of the NAB2-STAT6 fusion simplified nomenclature of these tumours, it has also proved to be of diagnostic utility, as tumours with this gene fusion show specific nuclear expression of STAT6, not seen in most other soft tissue neoplasms.[8]

SFTs/HPCs are solid neoplasms of adulthood that occur as painless, slow-growing, circumscribed masses most frequently in the deep soft tissue of the extremities, retroperitoneum, pelvis, and also intracranially where these arise from the meninges.[1,7,9] Mediastinal HPC/SFTs are extremely rare, with only 40 cases reported till date, most being isolated case reports or single case in a larger series, among which posterior and superior mediastinal location are rarer.[10-13] Patients are usually asymptomatic, and usually solid mass is incidentally detected on imaging performed for other reasons.[14] Only one case of cystic HPC arising in the mediastinum has been identified in literature till date.[15] Extensive cystic changes, especially in a posterior or superior mediastinal SFT/HPC, can cause misdiagnosis as one of many cystic lesions seen in the mediastinum, such as duplication cysts, schwannoma and hydatid cyst.

Histological differential diagnoses of SFTs include synovial sarcoma, mesenchymal chondrosarcoma, myopericytoma and myofibroma, as all can show a Staghorn pattern of vasculature seen in SFT/HPC. Therefore, an appropriate immunohistochemical panel aids in arriving at the right diagnosis. In the present case, cytokeratin, EMA and TLE1 were negative, ruling out synovial sarcoma. Absence of foci of well-differentiated cartilage and negativity for S-100 ruled out mesenchymal chondrosarcoma. Bearing in mind the mediastinal location, other differential diagnoses considered were small cell lung carcinoma extending to mediastinum, which was excluded on the basis of chromogranin, synaptophysin, cytokeratin and thyroid transcription factor-1 (TTF-1) negativity; hemangioendothelioma, which frequently occurs in the posterior mediastinum, harbours slit-like vascular channels and demonstrates CD34 positivity, was ruled out as tumour cells were immunonegative for CD31. Desmin and myogenin negativity excluded rhabdomyosarcoma. However, most importantly, none of these tumours show nuclear positivity for STAT6, which was strongly positive in the present case, clinching the diagnosis. This sensitive immunohistochemical marker has recently become available and is an extremely valuable adjunct to histomorphology in the diagnosis of SFTs.[7]

While tumours previously classified as SFTs have a favourable outcome, HPCs are associated with frequent recurrences. Approximately 10% of cases behave aggressively, with local or distant recurrence, and malignant histological features are the best predictor of adverse outcome.[1,12] Atypical locations of SFTs, including the mediastinum, have been associated with aggressive behaviour, including delayed recurrences.[11,16] Surgical resection is the treatment of choice, and pre-surgical embolisation is effective in reducing blood loss.[13,14] Those with malignant features are further treated with adjuvant therapies; adjuvant treatment protocols, though attempted, have not been standardised, and the efficacy of these modalities has not been established.[10]

To conclude, SFT/HPC arising in the superior-posterior mediastinum is extremely rare, and extensive cystic change may obscure the diagnosis clinically and radiologically. A number of histological mimics exist, further confounding the diagnostic dilemma. An appropriate immunohistochemical panel is extremely useful in arriving at the right diagnosis, particularly STAT6 immunohistochemistry which identifies the molecular signature characteristic of this group of tumours. Lastly, patients with mediastinal SFT should be followed-up for a prolonged period, due to its association with aggressive behaviour and delayed recurrences.

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