A rare case of monophasic pleuropulmonary synovial sarcoma [v1; ref status: not approved 2, <http://f1000r.es/URdbBv>]

Rateesh Sareen¹, Pandey Chandralekh², Mohit Sareen³, Akanksha Dutt⁴

¹ Pathology, SDMH Hospital, Jaipur, India

² Pathology and Bacteriology, Bhagwan Mahaveer Cancer Hospital and Research Center, Jaipur, India

³ Department of Oral Medicine and Radiology, Rajasthan Dental College and Hospital, Jaipur, India

⁴ Anesthesiology, SMS Medical college, Jaipur, India

Correspondence to Rateesh Sareen: drateeshsareen@yahoo.co.in

v1 First published: 11 December 2012, 1:63 (doi: 10.3410/f1000research.1-63.v1)

© Usage Licensed by Creative Commons CC-BY 3.0

How to cite this article: Sareen R, Chandralekh P, Sareen M *et al.* (2012) A rare case of monophasic pleuropulmonary synovial sarcoma [v1; ref status: not approved 2, <http://f1000r.es/URdbBv>] *F1000Research* 1:63 (doi: 10.3410/f1000 research.1-63.v1)

Abstract Pleuropulmonary synovial sarcoma is a diagnostic challenge. Synovial sarcoma is a soft tissue tumor of joints and extremities and are rarely seen in the mediastinum. We report this tumor at a very unusual location – the mediastinum in a 40-year-old female. The histopathology picture along with the location suggested a differential diagnosis of solitary fibrous tumor or mesothelioma, but immunohistochemistry helped in reaching the diagnosis of synovial sarcoma.

Introduction

Primary synovial sarcoma arising in the lung is very rarely seen in clinical practice^{1,2}. Before 2005, only 60 cases of synovial sarcoma in the pleuropulmonary region were reported in the English-language scientific literature³. It is normally a tumor found in adolescents and young adults between 15 and 40 years of age. Males are affected more than females¹. The use of molecular techniques like immunohistochemistry (IHC), polymerase chain reaction (PCR) and fluorescence *in situ* hybridization (FISH) is required for confirmation of diagnosis. They include detection of translocation T(x; 18) (p11.2; q11.2) is a highly specific gene mutation for synovial sarcoma⁴.

Classically, synovial sarcoma has a biphasic pattern and is composed of sheets of spindle cells and sharply segregated epithelial cells forming gland-like areas⁵. Diagnosis of monophasic synovial sarcoma, particularly at an unusual location like the mediastinum, is a challenge as it is often misdiagnosed as primary pulmonary spindle cell sarcoma/carcinoma or metastatic carcinoma^{6,7}. Further work-up including clinical, histopathological and immunohistochemical findings are core when the diagnosis is

uncertain and molecular testing is necessary⁸. This is particularly important for cases like ours from developing countries where financial and infrastructural constraints are major drawbacks.

Case

A 40-year-old female presented with complaints of cough, chest pain and shortness of breath with progressive weight loss for the past year. The past medical history was unremarkable. The radiological study x-ray (PA view, [Figure 1](#)) showed a large round opacity in the lower zone of the right lung with small nodules in the middle and lower zones of the left lung. Bronchoscopy revealed a right-sided growth involving the middle and lower pulmonary lobes. The computed tomography (CT) of the thorax ([Figure 2](#)) showed a well-defined mass measuring 8x7x6 cm on the right lung, infiltrating the diaphragm with small nodules of 1–2 cm in the left upper and lower lung lobes. The origin of mass from lung substance or pleura could not be identified with certainty.

CT-guided fine-needle aspiration cytology and bronchoalveolar lavage was inconclusive. Finally, a right side partial lobectomy

Figure 1 X-Ray Chest Arrow marked area shows a mass lesion on right side.

Figure 2 CT Chest Arrow shows tumor reaching upto pleura on right side.

was performed. On histopathology, we received three soft tissue pieces, the largest one measuring 19cm x 15cm x 10cm and consisting of part of the lung tissue with the tumor. A well circumscribed tumor measuring 19cm x 9cm x 9cm was seen.

Figure 3. The cut surface of the tumor was fleshy, homogenous gray-white with areas of calcification. The other two pieces comprised of lung tissue measuring 7cm x 6cm x 2cm and tumor measuring 6cm x 6cm x 4cm.

Microscopy examination showed a spindle cell tumor with a varied pattern of cellularity, with areas of high cellularity mixed with low cellularity areas (**Figures 4 and 5**). The tumor cells were arranged in random, fasciculate and at places storiform pattern. Cytologically the cells had varying degrees of anaplasia with fusiform to plump cells having hyperchromatic nuclei and mild to moderate pink eosinophilic cytoplasm. Necrosis was minimal, there were occasional mitotic figures seen and metastatic calcification was also noted. It was therefore interpreted as a low-grade spindle-cell neoplasm of uncertain histogenesis. The tumor on immunohistochemical analysis was Epithelial membrane antigen cytoke-
 ratin5/6, mic-2, bcl-2 and calponin

Figure 3 Gross photograph of excised tumor.

Figure 4 Microscopy- H& E 4x The spindle cell tumor cells arranged in random, fasciculate and at places storiform pattern.

Figure 5 Microscopy- H&E 10x Shows plump cells having hyperchromatic nuclei and mild to moderate pink eosinophilic cytoplasm.

positive. TTF-1, calretinin, WT-1 and CD-34 were negative. The tumor was therefore diagnosed as a synovial sarcoma.

Discussion

The mediastinum contains various structures and pluripotent cells that are responsible for the origin of a variety of tumors at this anatomical site. As far as primary sarcoma is concerned, mediastinum sarcomas account for 1.4% of all soft tissue sarcomas. Among sarcomas of the mediastinum, the most common one is a malignant peripheral nerve sheath tumor (26%) followed by spindle cell sarcoma (15%), leiomyosarcoma (9%) and liposarcoma (9%). Synovial sarcoma accounts for 2% of all sarcomas of mediastinum⁹.

There are four morphological types of synovial sarcoma – biphasic tumor, monophasic tumor, monophasic epithelial tumor and poorly differentiated (round) tumor. The biphasic type is easily diagnosed due to the presence of epithelial and spindle cell components

with sharply segregated epithelial cells forming gland-like areas^{2,5}. Primary pulmonary monophasic synovial sarcoma is mainly of monophasic subtype and is difficult to diagnose due to its uniform spindle cell pattern. The differential diagnosis includes malignant peripheral nerve sheath tumor, fibrosarcoma, leiomyosarcoma, sarcomatoid variant of mesothelioma, Ewing's sarcoma, hemangiopericytoma, spindle cell lymphoma, desmoplastic small round cell tumor and metastatic carcinoma⁶. Based on morphology, our first differential diagnosis was solitary fibrous tumor followed by mesothelioma. Ancillary immunohistochemical techniques helped to reach the final diagnosis. The immunohistochemical features of pleuropulmonary sarcoma are similar to those of soft tissue synovial sarcoma¹⁰. EMA, cytokeratin, and vimentin positivity in combination with CD-34 negativity are the most useful and sensitive biomarkers for diagnosis of monophasic synovial sarcoma. In our case, immunostaining was strongly positive for EMA, vimentin, bcl-2 and focally for cytokeratin. It was negative for thyroid transcription factor (TTF)-1, calretinin, WT-1, CD34, S-100 and CD-99. These markers ruled out the possibility of malignant peripheral nerve sheath tumor (S 100 Positive), primitive nerve sheath tumor (CD99 Positive), germ cell tumor (PLAP, Alpha AFP, HCG Positive) and leiomyosarcoma (SMA Positive). P63 and CD34 were negative, which further ruled out thymoma and solitary fibrous tumor. Bcl-2 was positive, but it was not specific, as it could be seen in solitary fibrous tumor and monophasic synovial sarcoma. The diagnosis of pleuropulmonary synovial sarcoma was based on an absence of tumor at any other primary site. Brain metastasis was not seen in our case as it is uncommon in soft tissue sarcoma with only a single reported brain metastasis in the literature¹¹.

The overall prognosis is poor in pleuropulmonary synovial sarcoma¹². Tumor size more than 5 cm, male gender, advanced age >20 years, high mitotic activity >10 mitosis/10 HPF, presence of tumor necrosis and SYT-SSX1 gene variant are the main poor prognostic factors¹³.

To conclude, pleuropulmonary synovial sarcoma is a rare tumor. The diagnosis of this tumor requires meticulous clinical and pathological correlation, immunohistochemistry and molecular techniques. Familiarity with this entity is essential as it carries poor prognosis.

Table 1 IHC Profile of tumors^{10,12}.

Tumor type	Cytokeratin	Vimentin	EMA	S-100	bcl-2	Calretinin	CD34	Desmin
Synovial sarcoma	P	P	P	V	P	N		
Mesothelioma	P	P	P	N	N	P		
Leiomyosarcoma					N			P
MPNST			P	P	N			
Fibrosarcoma	P	V	V	N				N
Angiosarcoma							P	

P-Positive, N-Negative, V-Variable, MPNST-Malignant Peripheral Nerve sheath tumor.

Author contributions

Rateesh Sareen wrote the article and contributed to the conception and design. Chandra lekha Pandey aided in the design and final approval of the manuscript. Akanksha Dutt contributed

in manuscript writing. Mohit Sareen helped in gathering images and literature search.

Competing interests

No competing interests were disclosed.

References

1. Kumar R, Menon S, Desai SB, Pramesh CS, Menon H, Jambhekar NA. Primary endobronchial synovial sarcoma confirmed by SYT-SSX1 fusion gene transcript by reverse transcriptase polymerase chain reaction. *Indian J Pathol Microbiol* 2009; **52**: 520–3.
2. Rong R, Duxtader EE, Tull J, de la Roza G, Zhang S. Metastatic poorly differentiated monophasic synovial sarcoma to lung with unknown primary: A molecular genetic analysis. *Int J Clin Exp Pathol* 2010; **3**: 217–21.
3. Hosono T, Hironaka M, Kobayashi A, Yamasawa H, Bando M, Ohno S, *et al*. Primary pulmonary synovial sarcoma confirmed by molecular detection of SYT-SSX1 fusion gene transcripts: A case report and review of the literature. *Jpn J Clin Oncol* 2005; **35**: 274–9.
4. Trupiano JK, Rice TW, Herzog K, Barr FG, Shipley J, Fisher C. Mediastinal synovial sarcoma: Report of two cases with molecular genetic analysis. *Ann Thorac Surg* 2002; **73**: 628–30.
5. Ewing CA, Zakowski MF, Lin O. Monophasic Synovial Sarcoma: A cytologic spectrum. *Diagn Cytopathol* 2004; **30**: 19–23.
6. Keel SB, Bacha E, Mark EJ, Nielsen GP, Rosenberg AE. Primary pulmonary sarcoma: A clinicopathologic study of 26 cases. *Mod Pathol* 1999; **12**: 1124–31.
7. Hartel PH, Fanburg-Smith JC, Frazier AA, Galvin JR, Lichy JH, Shilo K, *et al*. Primary pulmonary and mediastinal synovial sarcoma: A clinicopathologic study of 60 cases and comparison with five prior series. *Mod Pathol* 2007; **20**: 760–9.
8. Coindre JM, Pelmus M, Hostein I, Lussan C, Bui BN, Guillou L. Should molecular testing be required for diagnosing synovial sarcoma? A prospective study of 204 cases. *Cancer* 2003; **98**: 2700–7.
9. Burt M, Ihde JK, Hajdu SI, Smith JW, Bains MS, Downey R. Primary sarcomas of the mediastinum: Results of therapy. *J Thorac Cardiovasc Surg* 1998; **115**: 671–80.
10. Kottu R, Prayaga AK. Synovial sarcoma with relevant immunocytochemistry and special emphasis on the monophasic fibrous variant. *J Cytol* 2010; **27**: 47–50.
11. Siegel HJ, Dunham WH, Lopez-Ben R, Siegal GP. Intracranial metastasis from synovial sarcoma. *Orthopedics* 2008; **31**: 405–7.
12. Mikami Y, Nakajima M, Hashimoto H, Kuwabara K, Sasao Y, Manabe T. Primary poorly differentiated monophasic synovial sarcoma of the lung. A case report with immunohistochemical and genetic studies. *Pathol Res Pract* 2003; **199**: 827–33.
13. Trassard M, Le Doussal V, Hacene K, Terrier P, Ranchère D, Guillou L, *et al*. Prognostic factors in localized primary synovial sarcoma: A multicenter study of 128 adult patients. *J Clin Oncol* 2001; **19**: 525–34.

Open Peer Review

Current Peer Review Status:

Version 1

Reviewer Report 19 December 2012

<https://doi.org/10.5256/f1000research.239.r401>

© 2012 Levra M. This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Matteo Giaj Levra

Department of Oncology, University of Torino, Torino, Italy

The authors spoke about a diagnosis of synovial sarcoma but there is no evidence of the research of the t(x; 18)(p11.2; q11.2) translocation for this case.

I'm sorry, but to establish a diagnosis of synovial sarcoma the positivity of the translocation is needed. Without the presence of this test I couldn't judge the rest of the paper.

If the authors forgot to write in the paper the execution of the test, they have to write it; otherwise I do not approve the paper.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Reviewer Report 18 December 2012

<https://doi.org/10.5256/f1000research.239.r399>

© 2012 Duffaud F. This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Florence Duffaud

Medical Oncology Unit, La Timone University Hospital, Marseille, France

This short case report does not add any interesting information on monophasic pleural

synovialsarcoma. Furthermore to establish a definitive diagnosis of synovialsarcoma we need to have the presence of the translocation t(X; 18).

In this case report the presence of the translocation is not mentioned. The global treatment of the patient is not reported.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

The benefits of publishing with F1000Research:

- Your article is published within days, with no editorial bias
- You can publish traditional articles, null/negative results, case reports, data notes and more
- The peer review process is transparent and collaborative
- Your article is indexed in PubMed after passing peer review
- Dedicated customer support at every stage

For pre-submission enquiries, contact research@f1000.com

F1000Research