DOI: 10.7860/JCDR/2021/45837.14398

Original Article

Radiology Section

Unusual Thoracic Tumours- A Concise Imaging Approach

ALKA GOYAL[1], MEENU BAGARHATTA[2], NARESH KUMAR MANGALHARA[3], VIKAS JHANWAR[4], RAGHAV TIWARI[5], SUNITA KUMARI[6]

BY-NC-ND

ABSTRACT

Introduction: There are certain uncommon large thoracic masses sharing overlapping radiological features with commoner ones except few salient characteristic features. Diagnosing these uncommon tumours has practical implications for patient management and prognosis including obviating unnecessary surgeries.

Aim: To demonstrate characteristic Computed Tomography (CT) features of large common and certain uncommon intra-thoracic masses.

Materials and Methods: A retrospective cross-sectional search was done in January 2020, from the archives of patients record in Radiology Department from December 2017 to January 2019 for intra-thoracic tumours. Those tumors or masses meeting inclusion criteria were analysed by two radiologists who were blinded about the histopathologic reports. A probable radiological diagnosis was made and it was later matched-up with the histopathologic reports to reach to a confirmed diagnosis. The unique CT features were separately tabulated and their p-value for a particular diagnosis was calculated using Fisher's-exact test.

Results: Out of total 23 cases studied, 12 bronchogenic carcinomas and 11 uncommon diagnoses including Solitary fibrous tumour, Synovial sarcoma, Pulmonary blastoma, Askin's tumour, Schwannoma and Metastasis were found. Subtle rib erosion in Askin's tumour (p-value=0.004), intra-tumoural vessels in Synovial sarcomas (p-value=0.0006) and intense enhancement in some non-bronchogenic tumours (p-value=0.0137) were found to be significantly associated features.

Conclusion: When encountering an opaque hemithorax on chest radiograph and a large mass on CT, one should look for certain peculiar features of these unusual lung masses to suggest them as a differential diagnosis, as "Our eyes see only what our mind knows".

Keywords: Chest, Computed tomography, Histopathology, Mesenchymal tumours

INTRODUCTION

Imaging evaluation of thoracic tumours gives information on the extent of tumour involvement, potential for resectability and its response to therapy [1]. Routine radiological evaluation includes conventional radiography and computed tomography. Chest X-ray is a rather insensitive imaging modality for thoracic tumours. In routine clinical practice, CT is the most common cost effective imaging modality applied for the evaluation of intra-thoracic masses. CT helps in staging, characterisation and prognostic evaluation of mass lesions and thus, alerts the clinicians and radiologists about a malignancy [2]. Magnetic Resonance Imaging (MRI), can be better informative in certain conditions like to look for chest wall soft tissue details, mediastinal involvement or to determine neurogenic origin of masses [3].

Bronchogenic carcinomas constitute a major bulk of the common thoracic tumours presenting mostly when small in size due to their central location or early metastasis [4]. However, in some cases, they may present at a larger size and may then have to be differentiated from uncommon intra-thoracic masses which mostly present when large in size and show no signs of invasion/metastasis.

It is important to note that the imaging appearances of common and uncommon thoracic tumours exhibit considerable overlap. Hence, the diagnosis of an unusual lung tumour is mostly made retrospectively from a biopsy report [4]. In this study, we aim to demonstrate characteristic CT features of large common and certain uncommon intra-thoracic masses along with their histopathology correlation. We further wish to encourage co-radiologists to include these tumours in differential diagnoses apart from the common ones by identifying their characteristic CT features which has practical implications for patient management and prognosis including deterring unnecessary surgeries.

MATERIALS AND METHODS

This retrospective cross-sectional data analysis was done on archives of patient record in Radiology Department from December 2017 to January 2019 for intra-thoracic tumours. Study was conducted in January 2020 in SMS Medical College and Hospital, Jaipur, Rajasthan. Since this study involves secondary data analysis, calculation of sample size was not required and all patients meeting the inclusion criteria were treated as sample size. Moreover, since it is a retrospective non-interventional study with treatment of all the patients completed before start of the study, consent was waived-off.

Inclusion criteria: All cases having large intra-thoracic masses (>7 cm in widest dimension on CT scan) and all cases having contrast enhanced CT chest scans and whose histopathology reports were traceable were included in the study.

Exclusion criteria: All cases having masses of cardiac/pericardial or mediastinal origin and those cases who had received neo-adjuvant therapy prior to scanning, were excluded from the study.

Out of total 44 selected cases, 23 cases have been found to meet the above mentioned criteria. All the included chest CT scans were reviewed consensually by two experienced radiologists. Both were blinded about the histopathology reports. All lesions were confirmed to be intra-thoracic and >7 cm and then following information was collected about each one of them- location, shape, margins, enhancement pattern, cavitation, calcification, presence/absence of necrosis, intra-lesional vessels, associated pleural/pericardial effusion, suspect lymphadenopathy and rib involvement [Table/Fig-1].

A probable radiological diagnosis was consensually reached for each case and it was correlated with the histopathology report to reach a confirmed diagnosis.

S. No.	Final diagnoses	Shape	Size (cm)	Margin	Add. features and pressure effect	Enhancement pattern	Cavitation/Necrosis/ Intra-lesional vessels	Calcification	LAP	Effusion	Rib change
1.	Pulmonary blastoma	Round	15×13	Smooth and lobulated	Inverted dome and cardiac shifting	Heterogenous and Intense	Necrosis (+++)	-	-	-	-
2.	Askin's tumour	Round	12×8	Smooth and lobulated	No mass effect	Homogenous and moderate	Minimal necrosis	Ring like coarse calcification	-	Mild left pleural and pericardial	Left 4th rib destruction
3.	Mucinous adenocarcinoma metastasis	Ovoid	15×11	Smooth	Opaque hemithorax	Heterogenous intense peripheral and septal	Necrosis (+++)	Coarse calcification	-	Minimal left pleural and mild pericardial	-
4.	Synovial Sarcoma	Round	10×10	Smooth	Lower lung mild cardiac shifting	Intense heterogenous with shaggy inner margins	Necrosis (+++) and large intra-lesional vessels	-	-	Mild left pleural and pericardial	-
5.	Squamous cell carcinoma	Irregular	12×9	Undefine	Central	Heterogenous	Necrosis(+++)	-	-	-	-
6.	Adenocarcinoma	Oval	9×7	Smooth	No mass effect	Heterogenous	Mild necrosis	Absent within the lesion	+	Minimal right pleural	-
7.	Adenocarcinoma	Round	9.5×9.0	Smooth	No mass effect	Heterogenous	Mild necrosis	-	+	-	-
8.	Adenocarcinoma	Round	9.0×8.5	Smooth	No mass effect	Heterogenous	Significant necrosis	-	+	Minimal left pleural	-
9.	Synovial sarcoma	Round	14×14	Smooth	Cardiac shifting	Heterogenous predominantly peripheral intense with shaggy margin	Large areas of necrosis with intra-tumoural vessels	-	-	Minimal left trapped pleural effusion	-
10	SFT	Round	13.5×13	Smooth and lobulated	Lower lung and diaphragmatic flattening	Solid, mild heterogenous	Small necrotic areas	Tiny foci of calcification	-	-	-
11.	Askin's tumour	Oval	30×25	Smooth	Cardiac shifting and diaphragmatic inversion	Heterogenous and intense with shaggy inner margins	Necrosis (+++)	-	-	-	Left 5th rib destruction
12.	Schwannoma	Round	11×11	Smooth	Paravertebral	Homogenous	-	Speck of calcification at periphery	-	-	-
13.	Squamous cell carcinoma	Irregular and spiculated	11×9.0	Undefine	Centrally located with distal collapse	Heterogenous	Necrosis and cavitation +	-	-	Mild right pleural effusion	-
14.	Squamous cell carcinoma	Irregular	8.5×7.5	Undefine	Mid lung zone	Heterogenous	+	-	+	Minimal right pleural effusion	-
15.	Squamous cell carcinoma	Round	7.5×7.0	Lobulated	Peripheral	Heterogenous	Cavitation +	_	+	Mild right pleural effusion	-
16.	Small cell carcinoma	Irregular	10×9.0	Undefine	Central with distal collapse	Heterogenous	+	-	+	Minimal right pleural effusion	-
17.	Synovial sarcoma	Round	9.0×9.0	Smooth and well defined	Lower lung and cardiac shifting	Heterogenous	Necrosis with intra-tumoural vessels	_	_	Mild left pleural effusion	-
18.	Pulmonary blastoma	Round	14×13.5	Smooth and lobulated		Heterogenous	+	_	+	_	-
19.	Large cell carcinoma	Oval	14×10	Undefine		Heterogenous	+	-	-	-	-
20.	Adenocarcinoma	Irregular	11×10	Smooth		Heterogenous	-	-	+	Minimal left pleural and pericardial effusion	-
21.	Large cell carcinoma	Oval	11.3×10.5	Smooth	Peripheral	Heterogenous	+	-	+	-	-
22.	Small cell carcinoma	Irregular	8.6×8.0	Undefine	Central	Heterogenous	Few necrotic areas	+	+	Moderate left pleural effusion	_
23	SFT	Round	12×11	Smooth	Lower lung no mass effect	Heterogenous	+	_	_	Minimal left pleural effusion	-

[Table/Fig-1]: Imaging characteristics of masses.
Necrosis (+++)-extensive, SFT: Solitary fibrous tumour; Add.: Additional; LAP: Lymphadenopathy

STATISTICAL ANALYSIS

The unique CT features mentioned in the above list were separately tabulated and p-value for a particular diagnosis was calculated using Fisher's-exact test. The statistical analysis was done using statistical software SPSS for windows (version 16).

RESULTS

Among the 23 patients studied, 13 were males and 10 were females. Mean age was 44 years (44±10.67 years), ranging from 3-70 years. Core biopsy of all the patients was done in Radiology Department.

Among all the masses studied, 15 (65.22%) had their origin from the lungs, 2 (8.70%) were from pleura, 2 (8.70%) were from chest wall and rest 4 (17.39%) were indeterminate in origin.

The most predominant margin was smooth and lobulated (17 i.e., 73.91%). Most of the masses originating in the lungs, were showing heterogenous density with presence of necrosis (21 out of 23 i.e., 91.30%). Most of them had associated minimal to mild pleural effusion (14 out of 23 i.e., 60.87%). Calcification was seen only in 5 patients (Sr. No. 2,3,10,12,22) (21.74%). Intra-tumoural vessels were seen in 3 lung masses [Table/Fig-1-3].

Intra-tumoural vessels were found to be extremely significant for the diagnosis of synovial sarcoma [Table/Fig-4]. Both chest wall lesions were associated with subtle rib destruction suggesting osseous origin, later confirmed as Askin's tumour on histopathology (Sr. No. 2 and 11) [Table/Fig-1]. This association of rib erosion with Askin's tumour was found to be very statistically significant (p-value 0.004) [Table/Fig-5]. About 10 out of 23 (43.48%) masses had associated lymphadenopathy.

None of the mass lesion centered in lung parenchyma had rib destruction. Two localised pleural based masses were diagnosed as solitary fibrous tumour on histopathology. About 4 out of 23 masses had indeterminate origin i.e., from lungs/pleura/chest wall,

S. No	Age (years)	Sex	Probable diagnosis on CT	Location	Side	Final HPE diagnosis
1.	65	M	Bronchogenic neoplasm likely non-small cell carcinoma	Lung	L	Squamous cell carcinoma
2.	62	M	Bronchogenic neoplasm likely squamous cell carcinoma	Lung	R	Squamous cell carcinoma
3.	58	M	Bronchogenic neoplasm likely squamous cell carcinoma	Lung	R	Squamous cell carcinoma
4.	63	M	Bronchogenic neoplasm likely non-small cell carcinoma	Lung	R	Squamous cell carcinoma
5.	54	F	Bronchogenic neoplasm likely non-small cell carcinoma	Lung	L	Adenocarcinoma
6.	70	F	Bronchogenic neoplasm likely non-small cell carcinoma	Lung	R	Adenocarcinoma
7.	42	M	Bronchogenic neoplasm likely non-small cell carcinoma	Lung	L	Adenocarcinoma
8.	65	M	Bronchogenic neoplasm likely non-small cell carcinoma	Lung	L	Adenocarcinoma
9.	59	M	Bronchogenic neoplasm likely small cell carcinoma	Lung	R	Small cell carcinoma
10.	63	M	Bronchogenic neoplasm likely small cell carcinoma	Lung	L	Small cell carcinoma
11.	65	M	Bronchogenic neoplasm likely non-small cell carcinoma	Lung	R	Large cell carcinoma
12.	66	M	Bronchogenic neoplasm likely non-small cell carcinoma	Lung	R	Large cell carcinoma
13.	3	M	Pulmonary blastoma	Lung	R	Pulmonary blastoma
14.	6	M	Pulmonary blastoma	Lung	R	Pulmonary blastoma
15.	36	F	Neoplastic lesion	Lung	L	Mucinous adenocarcinoma metastasis
16.	20	F	Mesenchymal neoplasm likely sarcoma	Lung/pleura*	L	Synovial sarcoma
17.	21	F	Mesenchymal neoplasm likely sarcoma	Lung/pleura*	L	Synovial sarcoma
18.	22	F	Mesenchymal neoplasm likely sarcoma	Lung/pleura*	L	Synovial sarcoma
19.	16	F	Askin's tumour	Chest wall (left 5th rib)*	L	Askin's tumour
20.	9	M	Askin's tumour	Chest wall (left 4th rib)*	L	Askin's tumour
21.	55	F	Benign mesenchymal neoplasm	Pleura/chest wall*	L	Schwannoma
22.	45	F	Pleural based neoplasm possibly SFT	Pleura	R	Solitary fibrous tumour
23.	47	F	Pleural based neoplasm possibly SFT	Pleura	L	Solitary fibrous tumour

[Table/Fig-2]: Baseline characteristics of subjects including their probable CT diagnosis and final HPE diagnosis.
*Masses with indeterminate origin
HPE: Histopathological examination; CT: Computed tomography; M: Male; F: Female; R: Right; L: Left; SFT: Solitary fibrous tumour

CT findings	No. of tumours	Percentage
Location		
Lung Chest wall Pleura Indeterminate	15 2 2 4	65.22% 8.70% 8.70% 17.39%
Margins		
Smooth/Lobulated Undefined	17 6	73.91% 26.09%
Enhancement		
Homogenous Heterogenous Intense	2 21 5	8.69% 91.30% 21.73%
Calcification	5	21.74%
Pleural effusion	14	60.87%
Intra-tumoural vessels	3	13.04%
Chest wall/rib involvement	2	8.69%
Intra-thoracic suspect lymph nodes	10	43.48%

[Table/Fig-3]: Spectrum of CT findings of lung masses along with their relative frequencies.
CT: Computed tomography

CT diagnosis	Intra-lesional vascularity present	Intra-lesional vascularity absent	Total
Synovial sarcoma	3	0	3
Others	0	20	20
Total	3	20	23

[Table/Fig-4]: Statistical analysis of intra-lesional vascularity as a CT feature.
p-value=0.0006 (Extremely statistically significant), calculated via Fischer's-exact test

CT diagnosis	Rib erosion present	Rib erosion absent	Total
Askin's tumour	2	0	2
Others	0	21	21
Total	2	21	23

[Table/Fig-5]: Statistical analysis of rib erosion as a CT feature.
p-value= 0.004 (Very statistically significant), calculated via Fischer's-exact test
CT: Computed Tomography

3 of them proved as synovial sarcomas and 1 as schwannoma on histopathology [Table/Fig-2]. About 5 out of 23 (21.73%) cases had intense enhancement, all 5 tumours being non-bronchogenic in origin and this feature was found to be significantly associated for non-bronchogenic origin (p-value 0.0137) [Table/Fig-6].

CT features	Intense enhancement present	Intense enhancement absent	Total
Non-bronchogenic	5	6	11
Bronchogenic	0	12	12
Total	5	18	23

[Table/Fig-6]: Statistical analysis of intense enhancement as a CT feature. p-value=0.0137 (Statistically significant), calculated via Fischer's-exact test

The baseline characteristics of subjects included their probable CT diagnosis and final HPE diagnosis. Out of total 4 squamous cell carcinoma on HPE, 2 were confidently diagnosed on CT scan due to presence of cavitation. Rest 2 were diagnosed as non-small cell bronchogenic neoplasm. All 4 adenocarcinomas and 2 large cell carcinomas were confidently diagnosed as bronchogenic non-small cell neoplasm owing to their large size and predominantly peripheral location. Both small cell carcinomas were diagnosed on CT scan confidently as they had typical features like central location and calcification.

Both pleuro-pulmonary blastomas were diagnosed confidently on CT scan due to their typical age of presentation and imaging features. All 3 synovial sarcomas were diagnosed as mesenchymal neoplasm-sarcomas on CT scan which were proven as synovial sarcomas on HPE. Metastasis from carcinoma colon was diagnosed as neoplastic lesion only on CT scan due to its atypical imaging and solitary lesion. Schwannoma was diagnosed as benign mesenchymal neoplasm on CT. Askin's tumour were correctly diagnosed on CT due to its typical rib erosion feature. Both solitary fibrous tumours were suggested on CT due to pleural based neoplastic localised masses [Table/Fig-2].

DISCUSSION

There are a wide variety of large thoracic tumours which present with imaging features mimicking those of the common varieties of bronchogenic carcinomas. On initial chest radiographs, these masses usually appear as an opaque hemithorax or an obvious large opaque mass. CT scan, however, remains the imaging modality of choice [3]. Moreover, the CT scanners are day by day becoming more sophisticated in design and versatility and hence, will surely remain the principal imaging modality for evaluation of thoracic masses in near future [5].

In the present study, out of all 23 large thoracic masses, 15 originated from lungs. Out of these 23, 12 were epithelial tumours arising from lung (4-squamous cell, 2-small cell, 4-adenocarcinomas and 2-large cell carcinoma), 10 were mesenchymal tumours (3 synovial cell sarcomas, 2-askin's tumour, 2-solitary fibrous tumour, 2-pulmonary blastoma and 1-schwannoma) and 1 was metastasis from mucinous adenocarcinoma of colon.

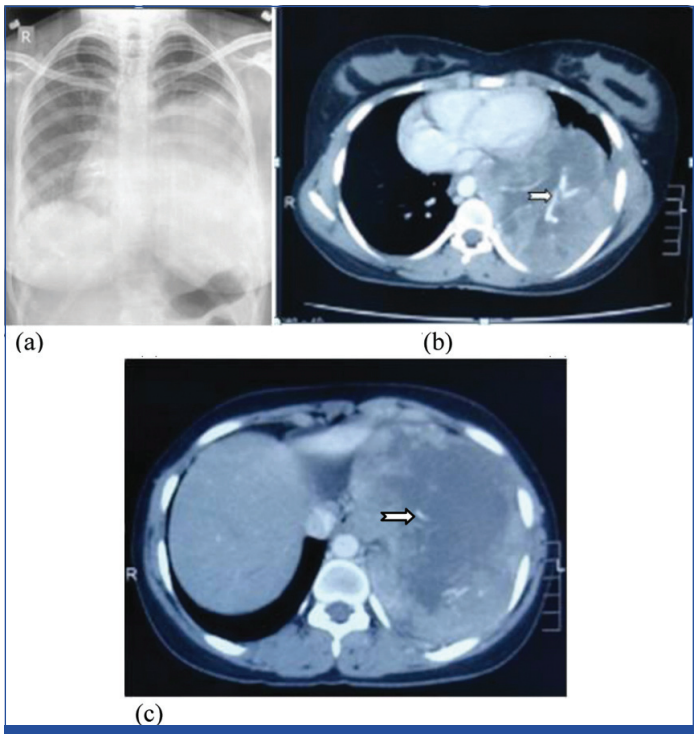
Now taking each tumour independently, CT scan of the four squamous cell carcinoma cases showed heterogeneity due to the presence of necrosis, three of them showed undefined margins and one showed lobulated margins. Although cavitation is an important feature of squamous cell carcinoma [5], this feature was seen in only two out of four cases in this study. Three out of four cases had associated pleural effusion. Suspect lymph nodes were present in two cases. In the present study, complete lung collapse was seen in one centrally located cavitating tumour which later proved to be squamous cell carcinoma on histopathology. One of the cases also had additional large necrotic well defined nodule in the opposite lung.

The CT of four adenocarcinomas included in the study showed large smoothly marginated peripherally located heterogenous necrotic masses with associated lymphadenopathy in all and minimal effusion present in three cases.

Small cell carcinoma was found in two cases. On CT scan, one of them had centrally located large calcified mass with distal collapse, pleural effusion and hilar/mediastinal lymphadenopathy. The other one showed left pleural effusion, large confluent mediastinal lymphadenopathy with left hilar involvement having internal calcification. Intra-tumoural calcification has also been described in up to 23% patients with small cell carcinoma in a study done by Carter BW et al., [6].

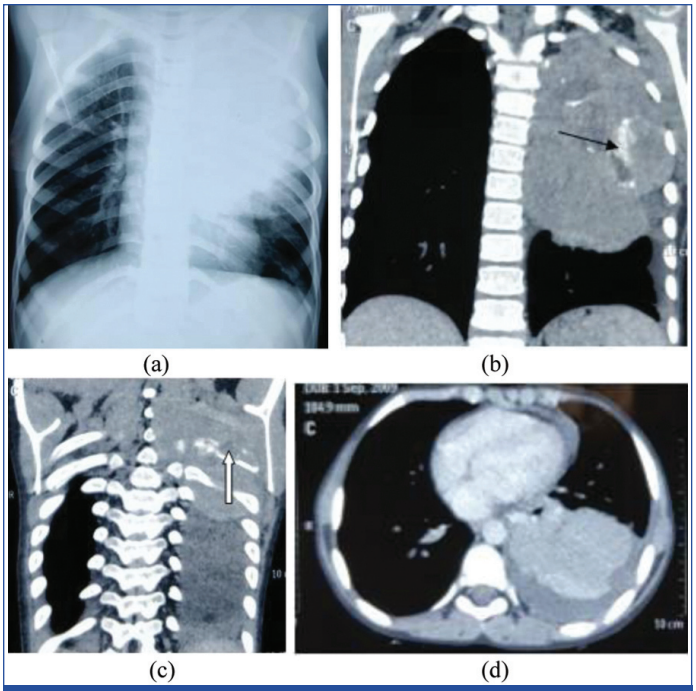
Large cell carcinomas were found in two cases. They showed non-specific findings on CT scan including large heterogenous well defined masses with no effusion. However, one of them had suspected mediastinal lymphadenopathy. Similar findings of having large heterogenous masses with/without lymphadenopathy have also been observed by Hollings N and Shaw P [5].

There were three cases of pleuro-pulmonary synovial sarcoma of the chest in the present study originating either in lung or pleura. Majority of the cases reported in literature as pleuro-pulmonary synovial sarcoma had peripheral/parafissural location with an uncertain origin from pleura/lung due to large size [7]. Same was true for all three cases in this study. All of them further showed relatively homogenous large opacity on chest X-ray with contralateral mediastinal shifting and no obvious bony erosion/lymphadenopathy, while on CT scan, all cases had large heterogenous masses with extensive necrosis and peripheral enhancement with septations and large intra-lesional vessels. Intra-tumoural vessels were found as a very common internal feature (92.9%) in a study done by Kim GH et al., [8]. All of them had ipsilateral minimal to mild pleural effusion with contralateral mediastinal shifting. None of them had calcification/suspect lymphadenopathy or thoracic wall invasion [Table/Fig-7].



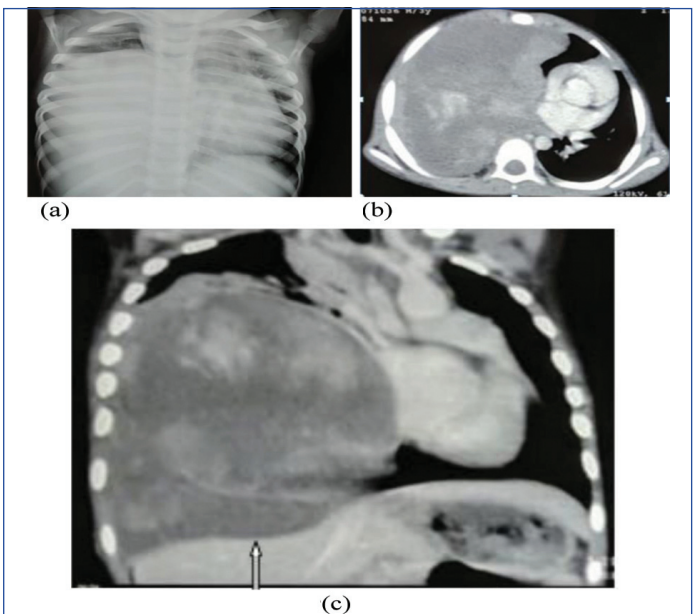
[Table/Fig-7]: Synovial sarcoma in 20-year-old female. (a). Chest skiagram showing large round opacity in left mid and lower zones with mild right sided cardiac shifting. (b) and (c) Axial contrast enhanced CT scans showing large intensely enhancing necrotic soft tissue density mass lesion with prominent intra-lesional vessels.

Two cases diagnosed as Askin's tumour presented as opaque hemithorax on chest X-ray and large extrapulmonary masses with solitary rib destruction on CT scan. One of them had predominantly homogenous enhancement, internal calcification as well as pleural effusion. Other showed heterogenous enhancement with extensive necrosis and contralateral mediastinal shifting. None of them had lymphadenopathy. Solitary rib destruction is a rather specific feature, present in 25-63% cases [9]. Subtle bony changes are sometimes very difficult to identify on chest X-rays so CT scan is a must to pick up this key feature of Askin's tumour [Table/Fig-8] [10].



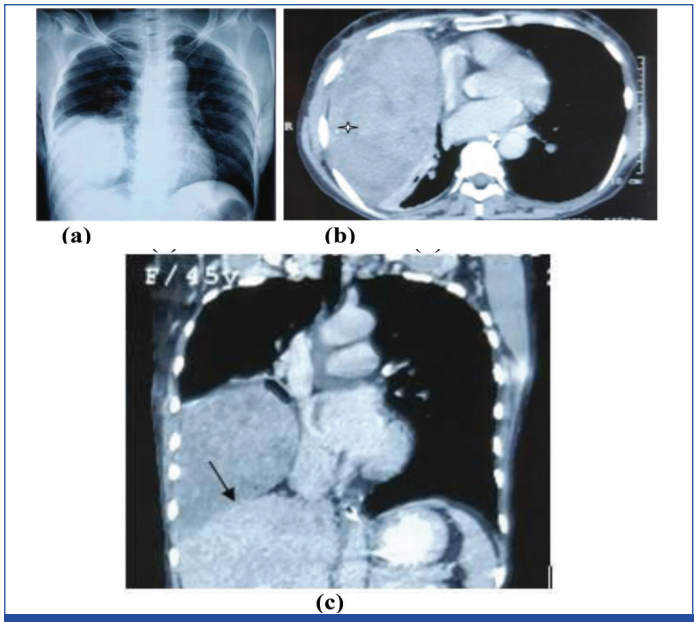
[Table/Fig-8]: Askin's tumour in nine-year-old male child. (a) Chest skiagram showing large homogenous round opacity in left upper and mid zones.(b) and (c) Coronal contrast enhanced CT scans showing large intensely enhancing homogenous soft tissue density mass with lobulated margins in left hemithorax having minimal necrotic component, coarse calcification (black arrow) and associated destruction of left 4th rib (white arrow), not evident in skiagram even in retrospect.(d) Axial contrast enhanced CT scans show soft tissue density solid lesion, also note mild left pleural and pericardial effusion.

Two cases of pulmonary blastoma in young children, showed large heterogenous solid-cystic mass lesions with adjacent lung atelectesis and no effusion or rib changes on CT scan. These features were though non-specific but matched closely with those mentioned by Khan AA et al., [Table/Fig-9] [11].



[Table/Fig-9]: Pulmonary blastoma in three-year-old male child. (a) Chest skiagram showing large homogenous opacity in right mid and lower zones with left sided mediastinal shifting. (b) and (c). Axial and coronal contrast enhanced CT scans showing large intensely enhancing heterogenous soft tissue density mass with extensive necrosis in right hemithorax and mass effect as evidenced by diaphragmatic flattening(white arrow) and left sided mediastinal shifting.

Two pleural lesions have been included in the study having features typical of solitary fibrous tumours i.e., peripheral location, heterogenous solid masses with minimal effusion and no calcification/rib changes on CT scan. Literature has described homogeneity in smaller tumours and heterogeneity appearing with increasing size in larger lesions due to haemorrhage and necrosis [Table/Fig-10] [12].

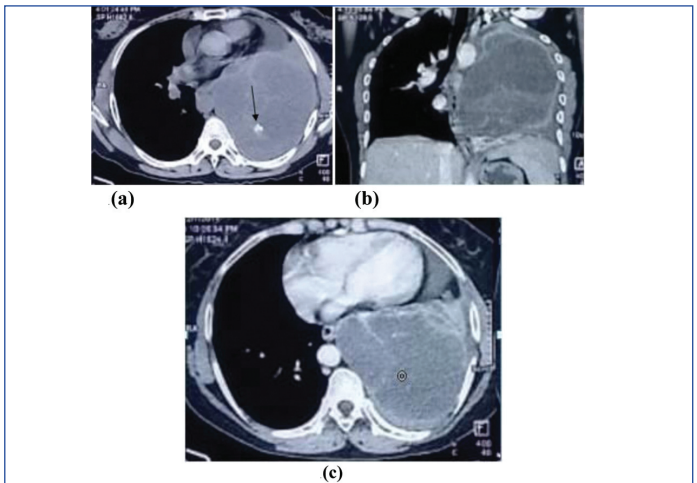


[Table/Fig-10]: Solitary fibrous tumour in 44-year-old female. (a). Chest skiagram showing large round opacity in right lower zone.(b) and (c) Axial and coronal contrast enhanced CT scans showing heterogenous soft tissue density mass lesion in right hemithorax showing small necrotic areas and few foci of calcification, no effusion present. Mass effect of solid lesion is evident as diaphragmatic flattening on coronal images (black arrow).

Another large mass with unusual diagnosis on histopathology was Schwannoma. The CT scan showed all non-specific features like smoothly marginated homogenous extrapulmonary mass lesion in left apical region, with speck of calcification at periphery and no associated pleural effusion/bony changes. Patient further underwent contrast MRI for soft tissue characterisation. Similar findings has also been reported in literature by Ravikanth R [13,14]

Intense enhancing component on CT scan was yet another characteristic feature which was significantly associated with non-bronchogenic tumours.

Finally, the mass with most unusual diagnosis on histopathology was solitary metastasis from mucinous adenocarcinoma of colon whose CT scan showed large heterogenous mass having coarse calcification and cystic component alongwith complete atelectesis of ipsilateral lung and minimal pleural effusion. This was not confidently diagnosed as metastasis on imaging owing to its unusual imaging pattern i.e., large size and solitary lesion, although previous literature has also mentioned a whole spectrum of unusual findings on CT for lung metastases including those found in the case included in this study [Table/Fig-11] [15].



[Table/Fig-11]: Solitary metastasis in thirty six-year-old female (known case of mucinous carcinoma of colon). (a). Non contrast CT scan showing large heterogenous mass lesion in left hemithorax with coarse calcific focus (black arrow). (b) and (c) Axial and Coronal contrast enhanced CT scans showing large intensely predominantly peripherally enhancing soft tissue density mass with cystic component and associated minimal left pleural and mild pericardial effusion.

Limitation(s)

Limitations of this study are that it is single institute study with a small sample size. So, the conclusions drawn need to be validated by larger studies before applying it to the general population.

CONCLUSION(S)

Thus, to conclude, it can be safely suggested that on encountering an opaque hemithorax on chest X-ray and a large mass on CT (with no signs of local invasion or significant pleural effusion or distant metastasis), one should specifically look for some salient characteristic imaging features like the presence of intra-tumoural vessels, subtle rib destruction, coarse calcification, intensely enhancing soft tissue component on CT scan. These imaging characteristics if present, may alert us towards an uncommon diagnosis which may be suggested right away at imaging, while histopathology report is still being awaited. This study however, paves way for future study and research and tends to encourage radiologists to keep unusual and less frequent yet very important differentials in day to day clinical practice.

REFERENCES

[1] Santos MK, Sommer G, Puderbach M, Safi S, Schnabel PA, Kauczor HU, et al. Primary intrathoracic malignant mesenchymal tumours: Computed tomography features of a rare group of chest neoplasms. Insights Imaging. 2014;5:237-44.

[2] Aoki T, Tomoda Y, Watanabe H, Nakata H, Kasai T, Hashimoto H, et al. Peripheral lung adenocarcinoma: Correlation of thin-section CT findings with histologic prognostic factors and survival. Radiology. 2001;220(3):803-09.

[3] Dillman JR, Pernicano PG, McHugh JB, Attili AK, Mourany B, Pinsky RW, et al. Cross-sectional imaging of primary thoracic sarcomas with histopathologic correlation: A review for the radiologist. Curr Probl Diagn Radiol. 2010;39(1):17-29.

[4] Bhatia K, Ellis S. Unusual lung tumours: An illustrated review of CT features suggestive of this diagnosis. Cancer Imaging. 2006;6(1):72-82.

[5] Hollings N, Shaw P. Diagnostic imaging of lung cancer. Eur Respir J. 2002;19(4):722-42.

[6] Carter BW, Glisson BS, Truong MT, Erasmus JJ. Small cell lung carcinoma: Staging, imaging, and treatment considerations. Rad Graph. 2014;34(6):1707-21.

[7] Frazier AA, Franks TJ, Pugatch RD, Galvin JR. Pleuropulmonary synovial sarcoma. Rad Graph. 2006;26(3):923-40.

[8] Kim GH, Kim MY, Koo HJ, Song JS, Choi CM. Primary pulmonary synovial sarcoma in a tertiary referral center: Clinical characteristics, CT, and 18F-FDG PET findings, with pathologic correlations. Medicine. 2015;94(34):e1392.

[9] Keehn B, Jorgensen SA, Towbin AJ, Towbin R. Askintumour. Appl Radiol. 2017;46(6):32-33.

[10] Ablin DS, Azouz EM, Jain KA. Large intrathoracic tumours in children: Imaging findings. AJR. 1995;165(4):925-34.

[11] Khan AA, El-Borai AK, Alnoaiji M. Pleuropulmonary Blastoma: A case report and review of the literature. Case Rep Path. 2014;(14):01-06.

[12] Marc P, Fischer S, Brundler M-A, Sekine Y, Keshavjee S. Solitary fibrous tumours of the pleura. Ann Thorac Surg. 2002;74(1):285-93.

[13] Ravikanth R. A rare case of primary benign schwannoma of the pleura. Digit Med. 2017;3(1):36-38.

[14] Mathew B, Purandare NC, Shah S, Puranik A, Agrawal A, Rangarajan V. Lung masses of unusual histologies mimicking malignnacy: Fluorodeoxyglucose positron emission tomography-computed tomography appearance. Indian J Nucl Med. 2019;34(4):295-301.

[15] Seo JB, Im J-G, Goo JM, Chung MJ, Kim M-Y. Atypical pulmonary metastases: Spectrum of radiologic findings. Rad Graph. 2001;21:403-17. https://doi.org/10.1148/radiographics.21.2.g01mr17403.

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Radiodiagnosis, SMS Medical College and Hospital, Jaipur, Rajasthan, India.
2. Head, Department of Radiodiagnosis, SMS Medical College and Hospital, Jaipur, Rajasthan, India.
3. Assistant Professor, Department of Radiodiagnosis, SMS Medical College and Hospital, Jaipur, Rajasthan, India.
4. Assistant Professor, Department of Radiodiagnosis, SMS Medical College and Hospital, Jaipur, Rajasthan, India.
5. Assistant Professor, Department of Radiodiagnosis, SMS Medical College and Hospital, Jaipur, Rajasthan, India.
6. Assistant Professor, Department of Radiodiagnosis, SMS Medical College and Hospital, Jaipur, Rajasthan, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Naresh Kumar Mangalhara,
33, West Mangal Vihar Extension, Near Riddhi Siddh Chauraha,
Jaipur, Rajasthan, India.
E-mail: naresh.mangalhara@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Jul 14, 2020
- Manual Googling: Nov 05, 2020
- iThenticate Software: Dec 08, 2020 (6%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? No
- Was informed consent obtained from the subjects involved in the study? NA
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Jul 14, 2020**
Date of Peer Review: **Aug 29, 2020**
Date of Acceptance: **Nov 07, 2020**
Date of Publishing: **Jan 01, 2021**