RADIOLOGICAL HALLMARKS OF LUNG CANCERS IN HIV

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Objectives

1. To identify radiological hallmarks of lung tumours associated with HIV infection

2. To differentiate these from conditions with similar radiological presentations
Significance

- HIV infection is an independent risk factor for developing lung cancer.

- Mechanism: Immunosuppression, chronic inflammation and a direct oncogenic effect of the virus.[1]

- A shift in mortality and morbidity has been observed in people living with human immunodeficiency virus from acquired AIDS to non-AIDS diseases.
Incidence of lung cancers

- Lung cancer is a rising cause of non-AIDS related among the >1.2 million people living with HIV in the US
- Their smoking prevalence >40%\textsuperscript{[3]}

Changing Trends

- ADC; AIDS-defining cancer;
- KS, Kaposi sarcoma; NHL,
- Non-Hodgkin lymphoma
- NADC-Non- AIDS-defining cancer.

- Pre-HAART = NADC 31.4%
- Post-HAART = NADC 58% [11]

Cancer incidence rates by time periods of HAART availability (Adapted from Crum-Cianflone, AIDS 2009)
HIV Associated Lung malignancies

- Kaposi Sarcoma
- Non Hodgkin’s lymphoma

- Non small cell cancers (Adenocarcinoma)
- Small cell cancer
- Soft tissue sarcoma[7]

Non AIDS defining malignancies
Outline

- Menu of tests
- Kaposi sarcoma (index case)
- Lymphangitic carcinomatosis (Differential for Kaposi sarcoma)
- AIDS related Pulmonary Lymphoma
- Non-Hodgkin’s lymphoma
- Sarcoidosis (Differential for lymphoma)
- Non small cell cancer-Adenocarcinoma
- Non small cell cancer-Squamous cell carcinoma
- Small cell cancer
- Soft tissue sarcoma-Pulmonary angiosarcoma
- Summary
- Lung cancer screening
Menu of tests:
Anatomy Review

![Chest Radiograph with labeled structures]

Key Structures:
- Spinal process
- Trachea
- Clavicle
- Soapula
- Anterior rib
- Aortic knob
- Bronchial bifurcation
- Left bronchus
- Vascular hilum
- Hilum
- Descending aorta
- Posterior rib
- Right atrium
- Breast soft tissue
- Diaphragm
- Gastric air bubble
- Liver

Courtesy: Dr. Nasir Khan; Radiographic Explanations of Chest Anatomy PA; Chest Radiograph;
KAPOSI Sarcoma

Our Patient:

- 36 year old man with past medical history of HIV presented with a history of chronic non-productive cough x 6 months
- Currently complaints of multiple episodes of cough with blood tinged sputum.
  - Chest X Ray- Hilar enlargement and broncho-vascular interstitial thickening.
  - Infection vs. Malignancy?
  - Dedicated Chest CT was advised.
X-Ray in Kaposi Sarcoma

- Parenchymal Reticulonodular opacities
- Predilection towards peri-hilar mid to lower zones
- Hilar lymphadenopathy[^6]
CT in Kaposi Sarcoma

- Diffuse peri-bronchovascular and perilymphatic consolidation with associated ‘Flame shaped opacities’
- Mediastinal and hilar lymphadenopathy
Lymphagitic carcinomatosis: Companion Patient 1

- Hematogenous spread of lung or breast malignancies
  - Nodular Interstitial thickening.
  - 'Dot in the box'
  - Lymphadenopathy
AIDS related pulmonary lymphoma

- Multiple peripheral well-defined nodules of varying sizes
- Centrilobular nodules
- Subpleural parenchymal infiltrative changes
- Peribronchovascular reticular infiltrative changes [9]

Courtesy: Paul A. Volberding, MD, University of California San Francisco
Lymphoma
Companion Patient 2

Anterior mediastinal and hilar lymphadenopathy

- Differential from AIDS related pulmonary lymphoma:
  - Presence of mediastinal and/or hilar adenopathy on chest radiography
  - Presence of extra-thoracic lymphoma extension
Sarcoidosis

Companion patient 3

- Bulky Bilateral symmetrical hilar lymphadenopathy

- Multiple punctate peri-bronchovascular nodules

- Ground-glass opacity in the lower lobes.
Adenocarcinoma

Companion Patient 4

- Bilateral crazy paving pattern
  - Solid component (Invasive component) - Consolidation in the left lower lobe
    - Lepidic spread: Ground glass component
- FDG-PET - FDG avidity in the left lower lobe corresponding to invasive component
Squamous cell carcinoma

Companion Patient 5

- Spiculated nodule in the right upper lobe
- Cavitary nodule in the right lower lobe (synchronous carcinomas).
  - Paraneoplastic syndromes

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Small cell carcinoma

Companion Patient 6

On CT, presentation in the form of a direct infiltration of adjacent structures by metastatic mediastinal lymph nodes is more common.

- Small cell carcinoma of the lung is the most common cause of SVC obstruction, due to both compression/thrombosis and/or direct infiltration.

- In this case there was attenuation/infiltration of the right pulmonary artery.
A lobulated low attenuation mass occupies and expands the left main pulmonary artery

Sub pleural consolidation in the lateral segment of the left lower lobe is probably an infarct
Take home pearls

Intervention:

- Smoking cessation would substantially reduce the expecting lung cancer burden among PLWH and should be priority in HIV care[3]

- Lung cancer screening with LDCT for patients aged 55-75 with a 30 pack smoking history has been shown to be efficient in the general population [2]
Lung cancer screening in HIV with CT

• In a study, to evaluate the use of CT as a screening test for HIV related malignancies.

• A **positive** image (21%) patients

• Lung cancer was diagnosed in **10 patients** (six at early stages), of which **nine** were **CT detected**[4]

• However, nodular patterns and lymphadenopathy were common findings in chest films of HIV patients.
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