AIDS-related Lymphoma

Modupe Teniola
Visiting Medical Student
Morehouse School of Medicine MS4
Dr Lieberman

Advanced Radiology
Beth Israel Deaconess Hospital
Agenda

- Definition of Lymphoma and the different categories associated with AIDS
- Brief explanation of AIDS associated lymphomas
- Patient Presentation
- Imaging modalities in the diagnosis of Non-Hodgkin's Lymphomas
- Prognosis of lymphoma patients
Definition of a Lymphoma

- Lymphomas are neoplasms that originate from malignant transformation of lymphoid cells.
  - Originate from lymph nodes and present as an enlargement of the node.

- Thomas Hodgkins published the first description of lymphomas in 1832.
Categories of Lymphomas

- There are different classifications of lymphomas and the WHO (2001) classified 43 types into four categories
  - Mature B cell neoplasm
  - Mature T cell and Natural Killer Neoplasm
  - Hodgkin Lymphoma
  - Immunodeficiency associated lymphoproliferative disorders

[en.wikipedia.org/wiki/Lymphoma](http://en.wikipedia.org/wiki/Lymphoma)
In the immunodeficiency-associated disorders category there are lymphomas:

- Associated with a primary immune disorder
- Associated with the Human Immunodeficiency Virus (HIV)
- Post-transplant
- Associated with Methotrexate therapy
Lymphomas and HIV

- An immune-compromised state, such as Acquired Immunodeficiency Syndrome, increases the incidence of neoplastic transformation.
- Lymphomas develop in HIV-infected patients at the same frequency as in other immunosuppressive disorders.
AIDS defining malignancies

- 25-40% of HIV-1 seropositive patients eventually develop a malignancy
- There are four AIDS defining malignancies of which two are lymphomas
  - Kaposi’s sarcoma
  - Non-Hodgkin’s lymphoma
  - Primary CNS lymphoma
  - Invasive Cervical carcinoma

Fig. 1: Picture of a man with Kaposi Sarcoma.
AIDS related lymphomas

- AIDS related lymphomas are mostly categorized into three:
  - Systemic non-Hodgkin's lymphoma
  - Primary CNS lymphoma
  - Primary effusion ("body cavity") lymphomas
Non Hodgkin’s lymphoma

- Systemic non-hogkins lymphoma accounts for the majority of AIDS associated lymphomas
- Primarily encountered in patients with more advanced disease:
  - CD4 <100/ul
  - Poorly controlled HIV
  - It can develop with undetectable HIV viral load
- 70-90% of the lymphomas are high grade and almost exclusively diffuse large B cell and Burkitt’s lymphoma

Images from: www.uhrad.com/ctarc/ct086.htm
Primary CNS lymphoma

- Incidence in HIV infected patients is 2-6%
- Pathogenesis is strongly related to Epstein-Barr virus infection
  - EBV DNA sequences can be detected in the CSF of patients
- Increased incidence with prolonged survival of HIV-1
- Found in patient with a CD4 count usually <50/ul

Fig 4: This is an MRI/T1 weighted image obtained after intravenous contrast.

Shows a ring enhancing lesion in the medial left temporal lobe.
Primary effusion lymphoma

- Predilection for body cavities such as peritoneal, pleural, and pericardial spaces without an identifiable tumor mass
- Malignant cells are monoclonal B-cells
- Contain genomic material from HHV-8, kaposi sarcoma associated herpesvirus and EBV
- Those with prior history of Kaposi’s sarcoma, have an increased risk of developing this type of lymphoma
- Radiographic images in primary effusion lymphoma reveals evidence of the local effusions. Chest radiographs and CT reveals pleural and/or pericardial effusion, slight serosal (pleural, pericardial) thickening, and the absence of parenchymal abnormalities, solid masses, or mediastinal enlargement
Mr. B.P

- Mr. B.P is a 69y/o male from Cape Verde with HIV, CD4 156, VL 489,000 copies/ml
- In Cape Verde, 4/2008, he had cough, dyspnea, and weight loss (10kg)
- Diagnosis: Tuberculosis
- Presented to ID clinic at BIMDC 9/18/2008 for follow-up
Image 1: CXR PA/Lateral: Showing an apical cavity (purple arrow) with reticular and nodular opacities (blue arrow). An anterior mediastinal mass can also be seen on the lateral view.

PACS BIDMC
Since the last visit, Mr. BP reports that he continues to feel fairly well.

He denies fevers, chills, night sweats, weight loss, cough, or hemoptysis.

He also complains of epigastric abdominal pain. The pain is of an achy quality and it also keeps him awake at night. He has had the pain off and on previously but it has gotten worse over the past few days.

He denies nausea, vomiting, or diarrhea.

He has mild constipation.
Extrapulmonary Tuberculosis

Tuberculosis can affect different parts of the body and it could be the source of the patient’s abdominal pain.
PACS BIDMC: Image 2: Scout Image of the chest CT and abdomen showing an anterior mediastinal mass
Image 3: Axial and coronal chest CT of patient’s B.P. Showing the characteristic tree in bud pattern, which consists of small centrilobular nodules of soft-tissue attenuation connected to multiple branching linear structures of similar caliber that originate from a single stalk.
**Anterior Mediastinal Mass**

Image 3: Sagittal view of Patient’s B.P. CT, showing an anterior mediastinal mass.

Tumor mass in the anterior mediastinum
Differential Dx. of Anterior Mediastinal Mass

- THYMOMA
- TERATOMA
- THYROID
- LYMPHOMA
Image 4: Coronal view of Pt. B.P’s abdomen showing a soft tissue mass encapsulating the major vessel and peripheral displacement of the bowel loops
Sagittal view

Image 5: Sagittal view of the abdominal mass and lymphadenopathy
Image 6: a) Axial Image of the Abdomen CT of the patient showing the soft tissue mass encircling the celiac trunk and b) soft tissue mass in the lower abdomen
CT Findings

- Bilateral diffuse tree in bud densities which are compatible with patient’s diagnosis of TB

- Anterior mediastinal, mesenteric and pelvic nodal masses compatible with high grade lymphoma
Mr. B.P

- WHAT IS THE DIAGNOIS
  - After an exploratory laparatomy, he underwent a mesenteric lymph node biopsy
    - PLASMABLASTIC LYMPHOMA
Plasmablastic lymphoma

- It is a type of AIDS-related non-Hodgkin’s lymphoma, usually presenting in the oral cavity and jaw
  - Extension of lymphoma presents at a later stage
- Rarely presents as cutaneous disease without systemic involvement
- Rapidly progressive and found in those with advanced disease
- Tumor cells are derived from B cells and are plasmablasts that shares features with diffuse B cell lymphoma

Figure 1 - Large ulcerative lesion of the oral cavity in the region of the left hard palate.

Fig 6: www.scielo.br/.../rsbmt/v40n5/a17fig01.jpg
Imaging techniques for the diagnosis of Lymphomas

- Chest Radiographs
  - Most lymph nodes can be affected
  - Can affect adjacent organs causing superior vena cava syndrome, phrenic nerve compression and the compromise of the airway and esophagus

- Other radiological findings
  - Consolidation, masses, or nodules and peribronchial diseases
  - Chest wall, pleural, and pericardial involvement
Imaging Techniques

- Abdomen and Pelvis
  - CT has replaced lymphangiography and ultrasonography for initial evaluation
  - Liver/spleen: fine needle aspiration biopsy under radiologic guidance may lead to needed diagnosis
  - Genitourinary: Involvement is detected by CT scanning in 10% of patients at initial diagnosis. Kidney, testis, ovary are the most affected. Testicular involvement is best evaluated by ultrasound.
Imaging Techniques

Abdomen and Pelvis

- Gastrointestinal tract involvement is seen in 10-60% of patients with NHL
- Barium contrast studies or CT scanning are both useful for evaluating mucosal lesions, although CT assesses extraluminal extent of lesions and associated adenopathy
- Endoscopic procedures are extremely helpful in tumor localization and staging.

Fig 7: Barium contrast studies showing mucosal lesion in the bowel wall

Fig 8: Picture of endoscopic ultrasound
**Imaging Techniques**

- **CNS**
  - Magnetic Resonance Imaging is indicated in patients with neurologic symptoms or signs

- **Skeletal Imaging**
  - Not routinely performed but is indicated in the presence of bony pain and or suspicion of a pathologic fracture
  - Bone lesions are mostly osteolytic in Non-Hodgkin's compared to osteoblastic in Hodgkin’s lymphoma
  - Urgent MRI if suspicion of spinal cord compression
PET scanning

18-fluorodeoxyglucose (18-FDG) appears to be highly sensitive and specific for detecting NHL in nodal and extra nodal sites.

In a study by Schoder et al, intensity appears to correlate directly with tumor aggressiveness in NHL.

Early reports indicate that, for patients with lymphoma, PET/CT results in more accurate initial staging compared to PET or CT alone.
Ann Harbor staging

Fig 9: Lymph nodes

www.uptodate.com/.../Lymph_nodes_body.jpg

Fig 10: Ann Harbor Staging System for Non-Hodgkin’s Lymphoma.

www.dartmouth.edu/~nlevy/staging2.jpeg
Prognosis

- Survival in patients is related in part to the severity of AIDS and to the response to chemotherapy.

- Adverse factors
  - Age > 35 years
  - Intravenous drug abuse
  - Stage III or IV disease
  - CD4 cell count < 100/μL
Summary

- There are different types of lymphomas but there are a certain few that is more predominant in the AIDS population.
- Immunocompromised states such as AIDS predispose to the development of lymphomas.
- There are different imaging modalities in the diagnosis of Non-Hodgkin's Lymphomas.
- Prognosis of patients with AIDS and Non Hodgkin’s Lymphoma is dependent on a lot of factors.
Acknowledgements

- Dr. Lieberman
- Maria Levantakis
- Dr Fargol Booya
- Dr Martin Smith
References

- Santiago Enrique Rossi, MD et al. Tree-in-Bud pattern at Thin section of CT of the lungs: Radiology-Pathologic overview. Education Exhibit. Radiological Society of North America. 2005