INFLUENTIAL HEALTH INFORMATION

ROLE OF RADIOLOGY IN INFECTIOUS DISEASES, HIV/AIDS OVERVIEW.

AYOUB, ABDUL BscRTT2-2009/2010 (Muhimbili University of Health and Allied Sciences, MUHAS)

ABSTRACT:

INTRODUCTION:

Since the first case of HIV/AIDS appeared in USA and Africa more than two decades ago, the incidence of HIV/AIDS has continuously been increasing worldwide. It is estimated that 42 million people lived with HIV/AIDS in 2009 among whom 29.4 million (70%) were in Sub-Saharan Africa .1Since there is no cure or vaccine presently available or in sight in near future, the current treatment strategy is to treat the opportunistic infections and HIV associated conditions. Developing countries account for about 60% of prevalence and 90% of new infections arise in the poor countries.2 In Africa the "worst case" scenario projections in the next 20 years are that: One quarter of the workforce will die, life expectancy will decrease from average of 63 to 47 years and 14 million children will be orphaned.2

OBJECTIVES:

Emphasis on Diagnostic Imaging as the mainstay of management of patients with HIV/AIDS and related diseases.

Demonstration of the role of radiology in the evaluation of patients, as guidance in interventional procedures such as drainages and biopsies as well as in the follow up of patients.

Establishment of correct diagnosis of HIV associated conditions as they are very important so that patients can get appropriate treatment and less expenses are incurred during management.

METHODOLOGY:

This paper is a product of reviewing manuscripts and data available in journals,books and internet as stipulated in the reference section.

The role of radiology in diagnosing and treating HIV/AIDS manifestations in each body system:

HIV/AIDS spares no organ or system hence all radiological modalities have a role to play in the diagnosis and follow up of HIV/AIDS patients as is demonstrated in this imaging summary:

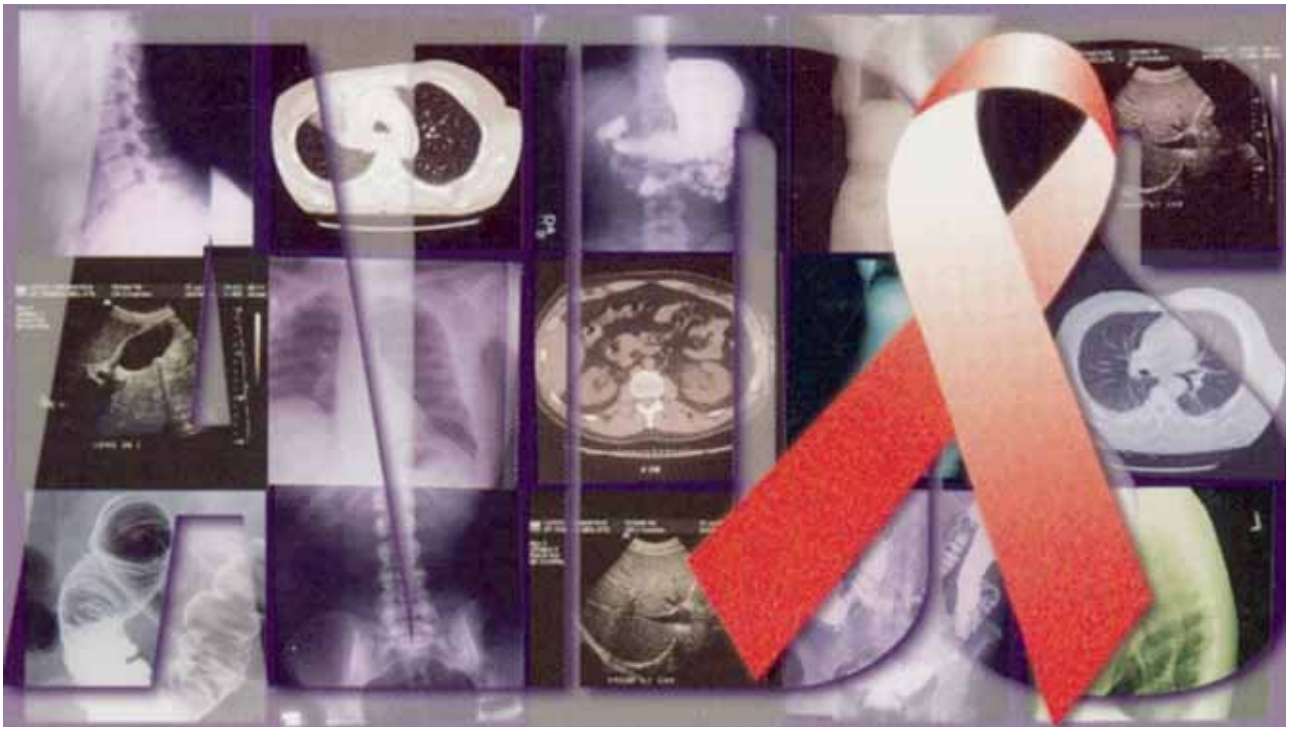


Figure1. Summary of important modalities used in imaging HIV/AIDS patient.

IN THE LYMPHATIC SYSTEM:

HIV/AIDS can present with enlarged lymph nodes (lymphadenopathy). In fact, lymphadenopathy is one of the common signs of HIV infection. Causes of lymphadenopathy in HIV include: Reactive Follicular Hyperplasia (50%), AIDS related Lymphoma (20%), Tuberculosis (17%), Kaposi's sarcoma (10%)Rest – Mets, opportunistic infections and Drug reactions.

Ultrasound and CT-Scan play an important role in diagnosing lymph node (LN) enlargement and differentiating from other masses.

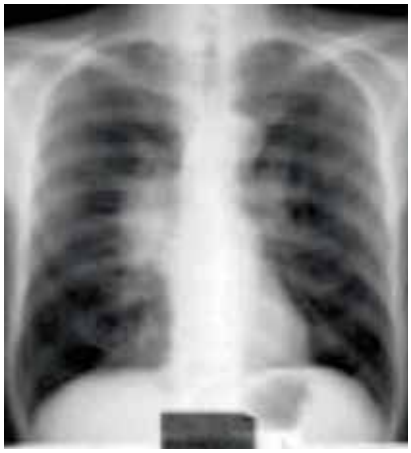


Figure 2. A chest x-ray showing enlarged

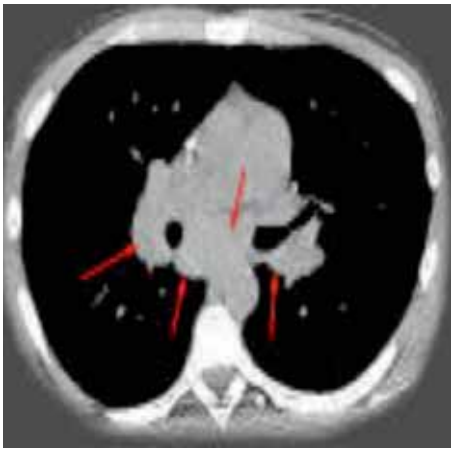


Fig3. CT scan of the chest demonstrating parahilar lymph nodesenlarged mediastinal lymph nodes

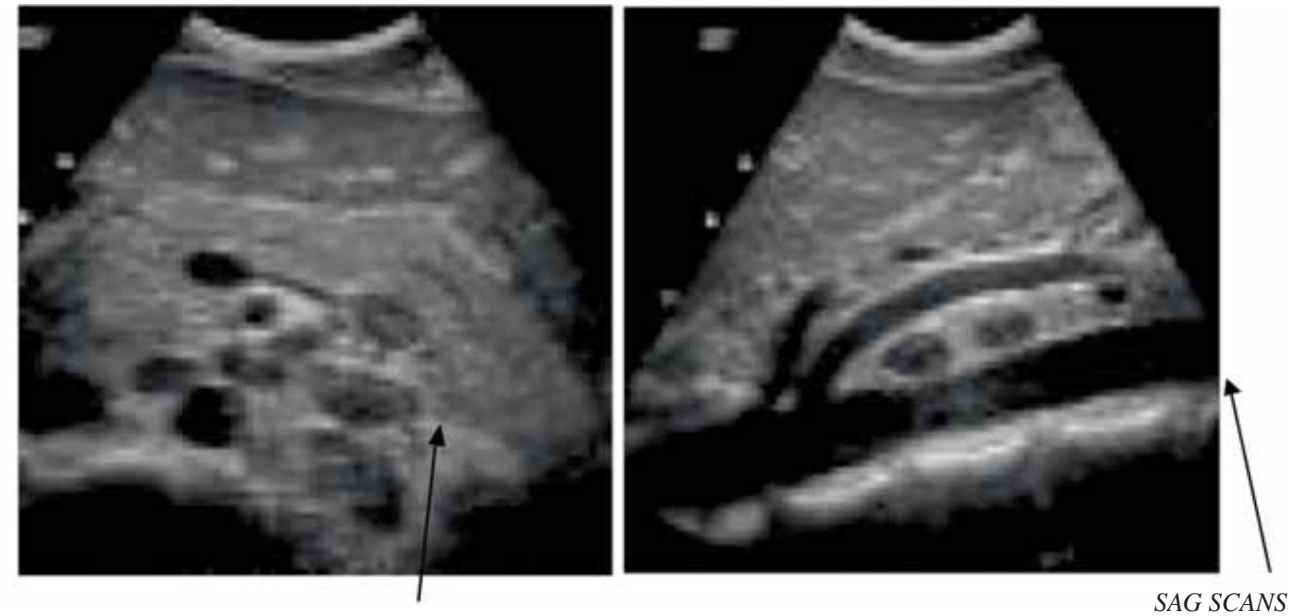


Fig 4.Imaging modalities demonstrating enlarged lymph nodes in paraaortic regions.

THE RESPIRATORY SYSTEM.

It is estimated that pulmonary complications occur in 70% of patients with HIV/AIDS and these are:Bacterial Pneumonias (5-30%), Tuberculosis (20%), Pneumocystis Carinii Pneumonia (60-80%),Fungal Infections – histoplasmosis, Aspergillosis, Candidiasis and cryptococcal infection (2-15%),Tumors –Kaposi's Sarcoma (15%) and Lymphomas (9-31%) and Lymphocytic Interstitial Pneumonitis.

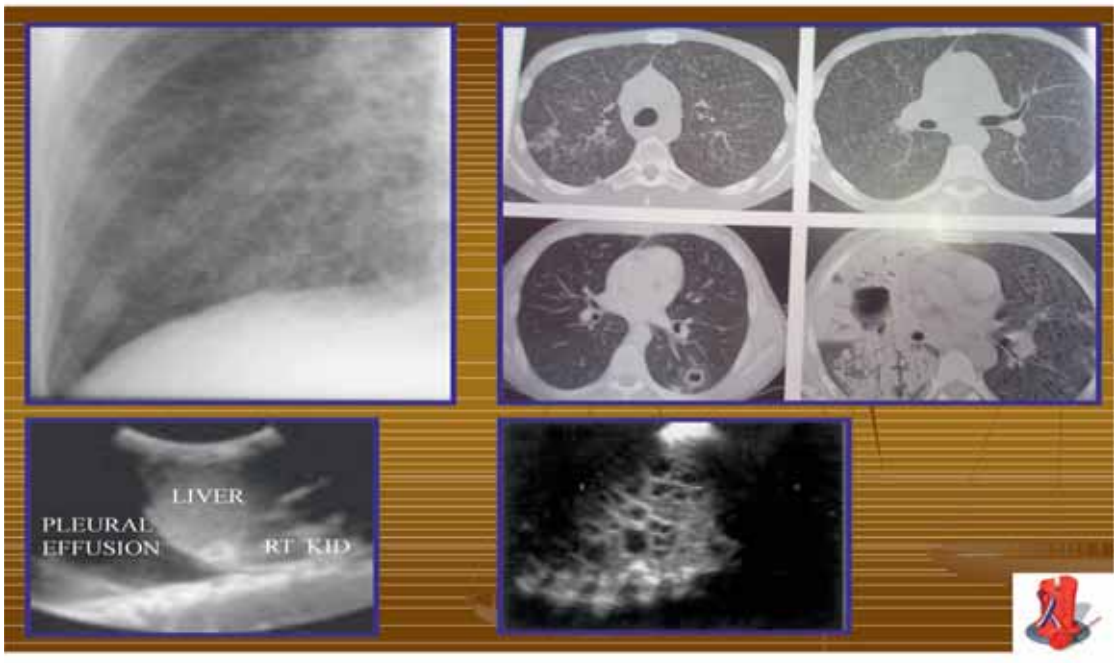


Fig .5 Imaging modalities of the respiratory system.

Several pathological patterns can be seen on chest x-ray though none of them is pathognomonic of any of the diseases.There are certain CXR patterns such as multilobe pneumonias in children, micronodular infiltrates predominantly in the lower lobes and atypical pulmonary tuberculosis (PTB) which have been associated with HIV.Studies are being carried out to test the significance of these associations.

IN THE CENTRAL NERVOUS SYSTEM.

AIDS produces a variety of neurological symptoms which may result in the patient being referred for imaging. About 60% of patients will have progressive dementia and about 90% will have cognitive dysfunction.HIV/CMV cause diffuse changes such as encephalopathy which appears as symmetric periventricular diffuse white matter disease without mass effect. Focal changes are seen as in toxoplasmosis (50-70%), 1° CNS lymphoma (20-30%), Progressive Multifocal Leucoencephalopathy (PML) (10-20%) and fungal, viral and bacterial infections.With multiple CNS lesions the possibility of toxoplasmosis is more likely and with solitary lesions the possibility of lymphoma is same as that of toxoplasmosis

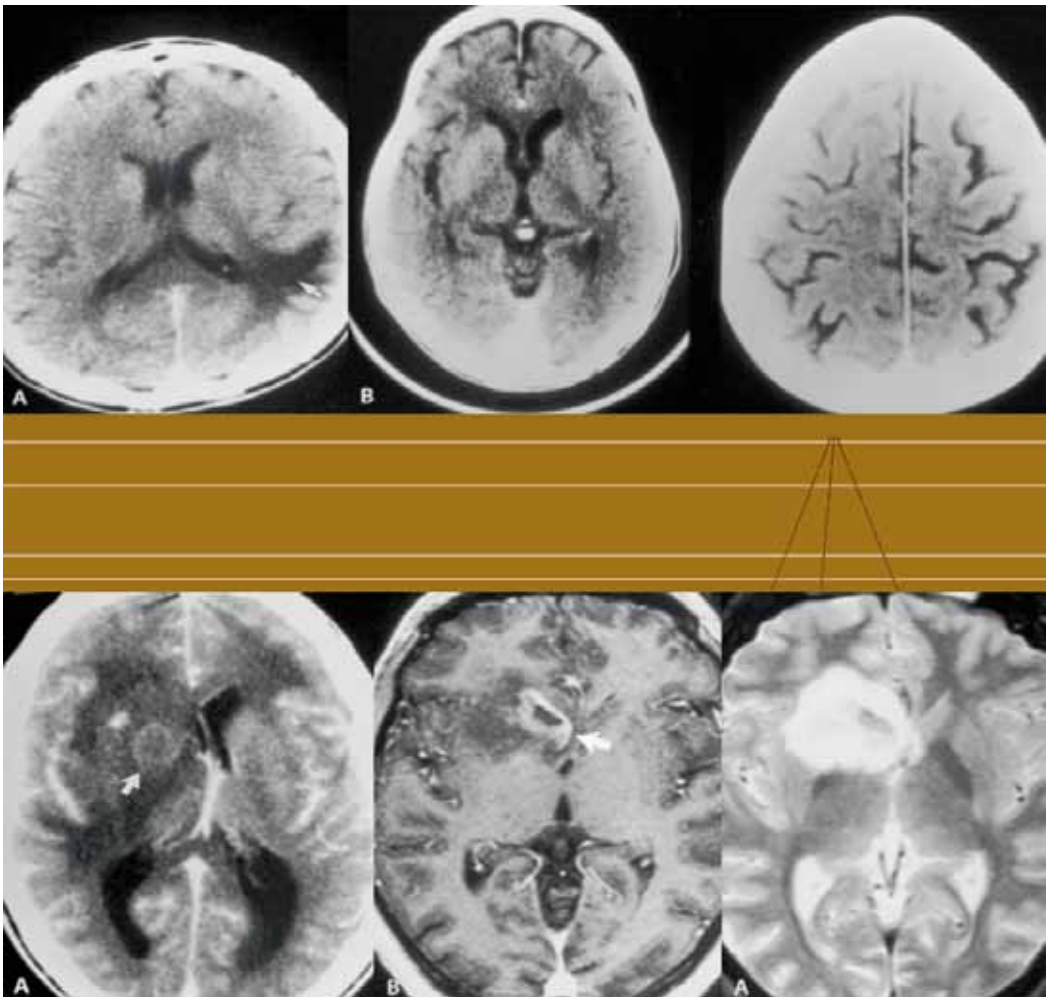
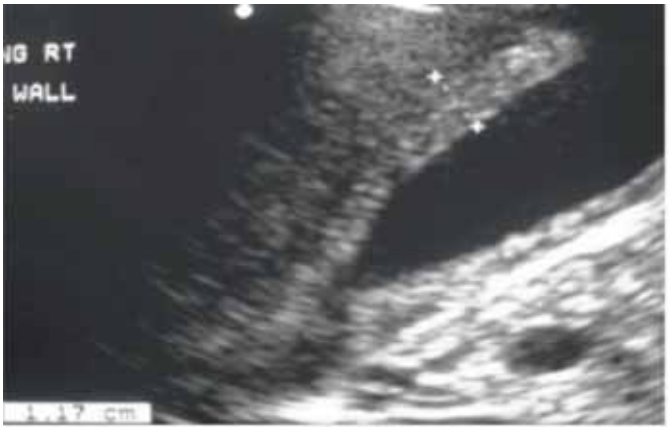


Fig 6.Cross sectionalimaging (CT-Scan & MRI) with or without use of contrast materials helps to describe and localize the lesions so that possible differential diagnosis can be reached with the help of clinical as well as laboratory information

HEPATOBILIARY SYSTEM

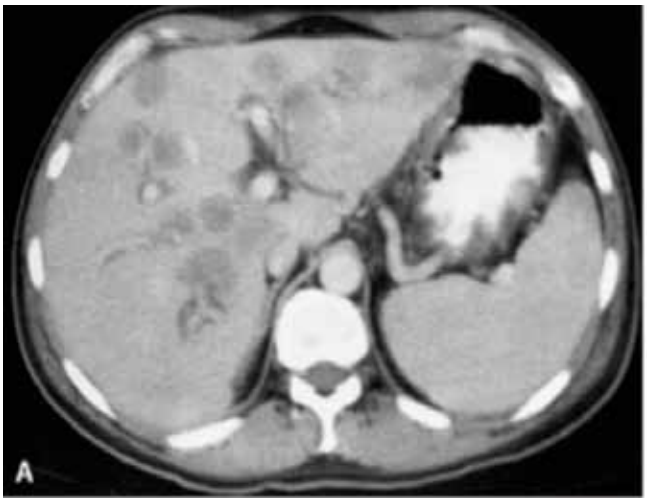
Hepatomegaly and splenomegaly are both common in AIDS patients. The spleen may be enlarged without invoking a secondary process in addition to AIDS or it may be involved by lymphoma, KS or infection.CT or ultrasonography is frequently abnormal in AIDS patients with hepatic dysfunction. There is often fatty degeneration and the liver may also be the site of bacterial amoebic or fungal abscesses.

Focal lesions in the liver may result from dissemination. A wide variety of organisms can cause acalculous cholecystitis/cholangitis in AIDS, including CMV, Cryptosporidium sp.,Pneumocystis carinii, Isospora belli, tuberculosis, and histoplasmosis.



Dilated GB walls

Dilated portal vein

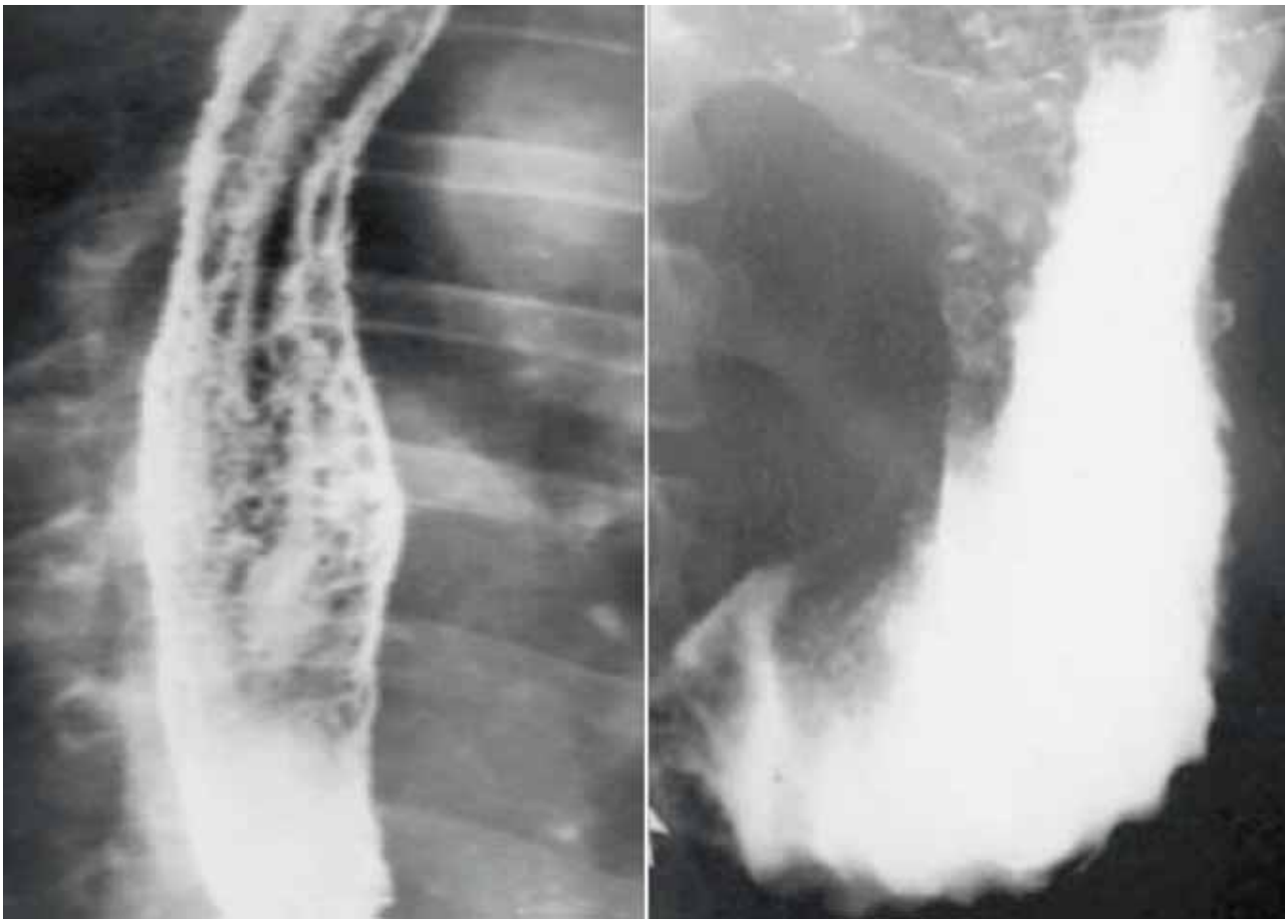


Multi focal lesion of live in homogenous splenic parenchyma

Fig 7.Some imaging modalities of the hepatobiliary system.

IN THE GASTROINTESTINAL TRACT

Many AIDS patients experience severe dysphagia or odynophagia, which may be due to a variety of etiologies including Candidiasis, CMV, HSV or Kaposi's sarcoma.The other common manifestation of HIV in GIT is Diarrhea due to several microbes including bacteria, fungi and protozoa.



Barium swallow *Barium meal*

Fig.8. GIT Imaging modality involving Barium.

RENAL ABNORMALITIES

HIV itself may produce renal disease characterized by progressive renal failure, proteinuria, and diffuse enlargement of the kidneys which are hyperechoic on Ultrasonography. Bacteria, including Mycobacterium tuberculosis and fungi may produce renal abscesses. Non-Hodgkin's Lymphoma may develop renal involvement, either by direct extension of adjacent adenopathy or by lymphoma intrinsic to the kidneys.

Fig 9.A HIV nephropathy

HIV CARDIOMYOPATHY

Recent reports have found that people with HIV have a high rate of dilated cardiomyopathy and that HIV may be a cause of this condition. The role HIV plays in the development of heart disease is not clearly understood. It may directly act on heart cells, or induce disease through the deregulation of the immune system or co-infection with other organisms. Poor nutrition and wasting may also contribute to heart disease, and anecdotal reports have suggested that antiretroviral therapy including protease inhibitors may increase a person's risk of heart disease. Dilated cardiomyopathy is suggestive of a poorer prognosis among people with HIV disease.HIV-infected people also have higher than average rates of left ventricular hypertrophy - a condition where the heart swells to compensate for its increasing weakness.

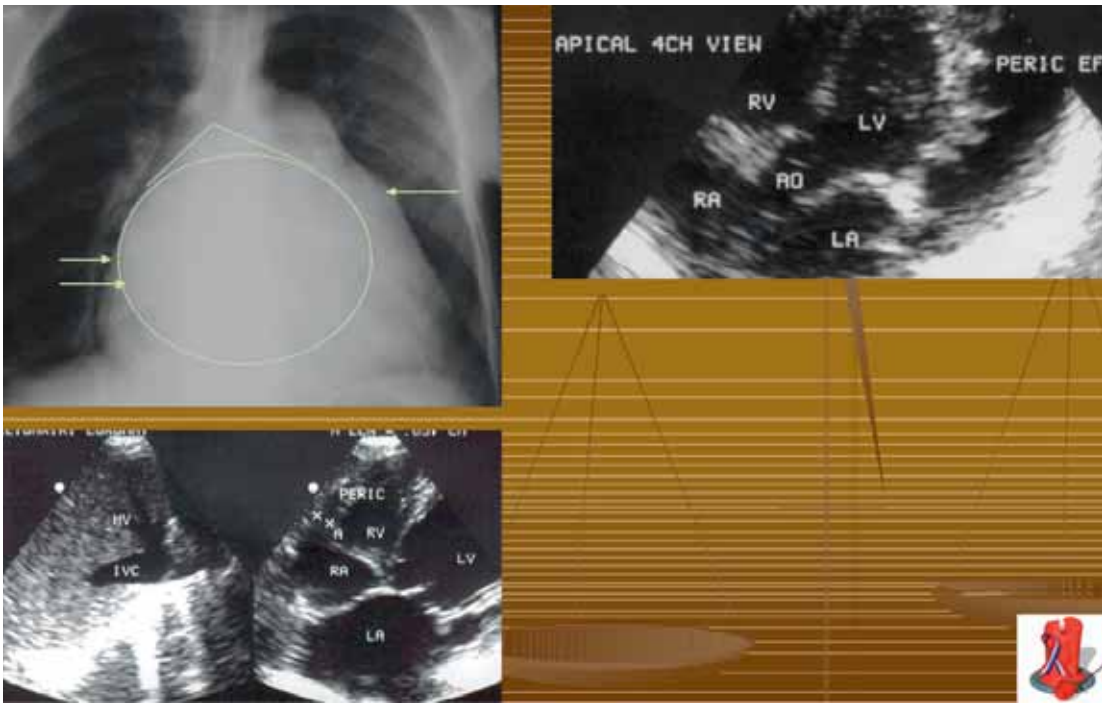


Fig 10:Radiological modalities in diagnosing HIV cardiomyopathy

MUSCULOSKELETAL

Patients with AIDS may develop osteomyelitis from common organisms such as *S. aureus, M. tuberculosis*, or opportunistic organisms such as Nocardia and fungi. Anecdotal reports show that diaphyseal osteomyelitis in adults is common in HIV patients. Many HIV patients present with recurrent cutaneous abscesses or pyomyositis.

HIV ASSOCIATED NEOPLASMS

Among the commonest malignancies associated with HIV/AIDS are epidemic type of Kaposi's sarcoma and non-Hodgkin's Lymphoma (4-10% of patients). 60-fold higher risk as compared to the general population. Can involve peripheral or central LNs, GIT and lungs.

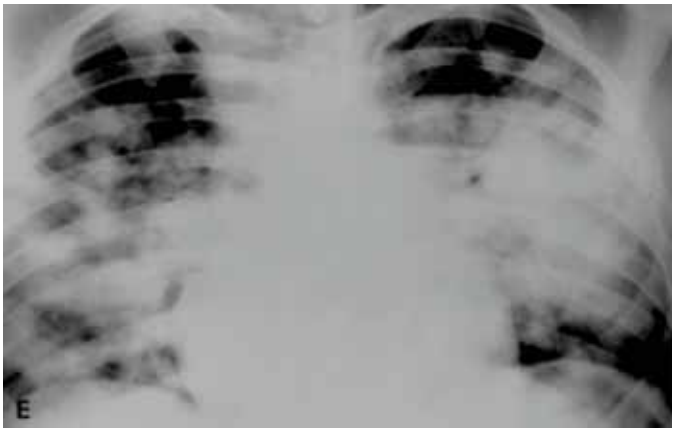


FIG 12Chest radiography demonstrating multiple lung metastases secondary to cancer

CONCLUSION:

HIV does not spare any organ system. Clinicians and radiologists should consider HIV/AIDS as an underlying cause wherever they detect an abnormality, during clinical a procedure. This is because HIV/AIDS is a syndrome which tends to involve all body systems. All radiological modalities have a role to play in the diagnosis and follow up of HIV/AIDS patients.

REFERENCES

1. Data were obtained from a paper presented by Dr. Ahmed Jusaban senior Radiologist KCMC hospital, on pan African congress of radiology and imaging Movenpick Dar es Salaam 2005

2. Muhimbili national hospital department of radiology and imaging, Dar es Salaam data collected from 250 patients attended at radiology department as from Dec 2009 –February 2010

3. Trans abdominal Ultrasound of the alimentary tract in the tropics Prof.Michael G KawooyaMakerere University &ECUREIl pan African congress of radiology and imaging Movenpick Dar es Salaam 2005

4. Ds seminars on the current data of HIV/ statistics

5. Websites. (a) www.xray2000.f9.co.uk
   (b) www.google.ac.tz
   © www.who.links.com