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Assessment of outcomes of abdominal ultra sonography in HIV AIDS patients from Bihar region

Dr Vinayak Gautam[1], Dr Rajendra Kumar[2]
[1] Associate Professor, Department of Radiology, Government Medical College, Betiah, Bihar, India
[2] Senior Resident, Department of Radiology, Government Medical College, Betiah, Bihar, India
[*] Corresponding Author: Dr Rajendra Kumar

Abstract
Ultrasonography is an easy to perform, non-invasive, inexpensive and safe imaging technique that is invaluable in India, where AIDS is prevalent and where sophisticated diagnostic tools are not readily available. The present study was planned with the fact that there is relative lack of literature and studies regarding USG findings in HIV infected patients in Indian subcontinent.
The present study was planned in the Department of Radiology, Government Medical College, Betiah, Bihar. From Feb 2018 to April 2019.Total 50 HIV-positive patients were enrolled in the present study. The ultrasound scans were performed after an overnight fast of at least 12 hours with patients lying supine and using a 3.5–5.0 MHz frequency curvilinear probe on an ALOKA 1700-SSD ultrasound machine. Non-fasting patients, children, and patients with incomplete ultrasound examinations were excluded from the study. Two radiologists performed all sonographic examinations.
Abdominal ultrasonography is an excellent and sensitive modality for routine screening of HIV infected patients. The provision and availability of sufficient clinico-pathologic data in the future would improve the quality of ultrasonographic diagnosis and treatment in these patients. Physicians should exploit this widely available and relatively affordable technology in the management of HIV/AIDS patients with abdominal symptoms.

Keywords: Abdominal Ultra Sonography, USG, HIV AIDS Patients, Bihar Region, etc

Introduction
AIDS is caused by human immunodeficiency virus (HIV). HIV kills or damages the body's immune system cells. There are two types of HIV. Type I and Type II. Type I is more common in India. AIDS is generally caused by unprotected sex with an infected partner. It may also spread through the use of infected syringes of HIV infected people and blood transfusions. The first signs of AIDS is influenza (flu) like symptoms or may be swollen glands but at times symptoms might not appear. Symptoms may appear after two or three months. Generally, blood test is done to confirm the diagnosis. There is no cure, but there are many medicines to fight/ control HIV infection.
HIV is one of a group of viruses known as retroviruses. After getting into the body, the virus enters many different cells, incorporates its genes into the human DNA, and hijacks the cell to produce HIV virus. Most importantly, HIV attacks cells of the body's immune system called CD4 or T-helper cells (T cells). These cells are destroyed by the infection. The body tries to keep up by making new T cells or trying to contain the virus, but eventually the HIV wins out and progressively destroys the body's ability to fight infections and certain cancers. The virus structure has been studied extensively, and this ongoing research has helped scientists develop new treatments for HIV/AIDS. Although all HIV viruses are similar, small variations or mutations in the genetic material of the virus create drug-resistant viruses. Larger variations in the viral genes are found in different viral subtypes. Currently, HIV-1 is the predominant subtype that causes HIV/AIDS. HIV-2, another form of HIV, occurs almost exclusively in West Africa but has occasionally caused travel-related outbreaks elsewhere.
HIV test is done to detect human immunodeficiency virus in saliva, serum or urine. The UN AIDS/WHO policy statement on HIV Testing states that conditions under which people undergo HIV testing must be anchored in a human rights approach that pays due respect to ethical principles. According to these principles, the conduct of HIV testing of individuals must be:
RNA tests detect the virus directly (instead of the antibodies to HIV) and thus can detect HIV at about 10 days after infection as soon as it appears in the bloodstream, before antibodies develop. These tests cost more than antibody tests and are generally not used as a screening test, although your doctor may order one as a follow-up test, after a positive antibody test, or as part of a clinical workup.
Confidentiality: The entire process of testing and results are kept confidential to give boost to individuals, couples, and families to learn about their HIV status in the convenience and privacy of their home environment. Home-Based HIV Testing and Counselling (HBHTC) allows rapid HIV tests that are most often used, so results are available for the client between 15 and 30 minutes,accompanied by counselling (for those who test positive) conducted with the informed consent of the person being tested. Diagnosis of HIV/AIDS, several types of tests can help physician to determine what stage of the disease.
These tests include:
Window period: There is a period of time between HIV infection and the appearance of anti-HIV antibodies that can be measured which is called "window period". Antibody tests may give false negative (no antibodies are detected despite the presence of HIV) results during the window period, an interval of three weeks to six months between the

time of HIV infection and the production of measurable antibodies to HIV sero-conversion.

CD4 count: CD4 cells are a type of white blood cell that's specifically targeted and destroyed by HIV. A healthy person's CD4 count can vary from 500 to more than 1,000. Even if a person has no symptoms, HIV infection progresses to AIDS when his or her CD4 count becomes less than 200.

Rapid or point-of-care tests: The rapid test is an immunoassay used for screening, and it produces quick results, in 20 minutes or less. Rapid tests use blood or oral fluid to look for antibodies to HIV. If an immunoassay (lab test or rapid test) is conducted during the window period (i.e., the period after exposure but before the test can find antibodies), the test may not find antibodies and may give a false negative result. All immunoassays that are positive need a follow up test to confirm the result.

ELISA (enzyme-linked immunosorbent assay): ELISA is set of blood tests used to diagnose HIV infection. ELISA test is performed by inserting a needle to draw blood. A positive result on the ELISA screening test does not necessarily mean that the person has HIV infection. Certain conditions may lead to a false positive result, such as Lyme disease, syphilis, and lupus.

Western Blot: A positive ELISA test is always followed by a Western blot test which confirm the HIV infection [1].

The presence of the abnormalities such as lymphadenopathy, splenomegaly (with or without hypo or hyperechoic lesions), hepatomegaly (with or without single or multiple focal lesions), gallbladder and bile duct abnormality, ascites, renal abnormalities with diffusely increased echogenicity were noted. The extrahepatic bile duct was identified at the level of the portal vein, where the hepatic artery crosses perpendicularly between them. Patient was asked to take several deep breaths and hold the inspiratory phase when bowel gas obscured a part of the suprapancreatic segment. In order to confirm the identification of vascular and ductal anatomy, Color Doppler sonography was used. Measurement of the common bile duct was done in the most distal aspect of the head of the pancreas. In this location, anteroposterior measurements from inner border to inner border were obtained [2].

Though the major target of the HIV virus is the immune system, the frequency of abdominal disorders in HIV/ AIDS patients has been reported to be second only to pulmonary disease. These abdominal manifestations may be on the increase, as the use of antiretroviral therapy has increased life expectancy and improved quality of life. Radiology plays a crucial role in the management of these patients. Patients with advanced HIV infection referred for radiographic examination of the gastrointestinal (GI) tract have a high incidence and a wide spectrum of abnormal findings. Radiologic tools (e.g. ultrasonography) serve both diagnostic and interventional roles, and assist in directing appropriate therapy. Computed tomography (CT) and magnetic resonance imaging (MRI) better characterise HIV-related abdominal diseases, but are expensive and unavailable in the typically impoverished, HIV-infected Indian subcontinent. Ultrasonography is an easy to perform, non-invasive, inexpensive and safe imaging technique that is invaluable in India, where AIDS is prevalent and where sophisticated diagnostic tools are not readily available.

The present study was planned with the fact that there is relative lack of literature and studies regarding USG findings in HIV infected patients in Indian subcontinent.

Methodology

The present study was planned in the Department of Radiology, Government Medical College, Betiah, Bihar. From Feb 2018 to April 2019.Total 50 HIV-positive patients were enrolled in the present study. The ultrasound scans were performed after an overnight fast of at least 12 hours with patients lying supine and using a 3.5–5.0 MHz frequency curvillinear probe on an ALOKA 1700-SSD ultrasound machine. Non-fasting patients, children, and patients with incomplete ultrasound examinations were excluded from the study. Two radiologists performed all sonographic examinations.

All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

Following was the inclusion and exclusion criteria for the present study.

Inclusion Criteria: Adult patients > 18 years of age with HIV infection confirmed with ELISA and Patients presenting to Radio-diagnosis Department for transabdominal ultrasonography.

Results & Discussion

Evaluation of the abdomen by ultrasound is the alternative tool to CT scan, producing cross-sectional images of high diagnostic quality. Although US does not provide a definitive diagnosis, it may show areas of abnormal anatomy and pathology that may facilitate achieving a tissue diagnosis or add further support to the decisions on commencing empirical treatment.

A variety of abnormal abdominal sonographic findings were seen in patients, which is consistent with the observation made by Blessing Ose-Emenim Igbinedion et al. [3] that out of 300 HIV patients which they reviewed 256 showed sonographic abnormalities in about 85.3% of the patients. The major sonographic findings included splenomegaly, hepatomegaly, enlarged kidneys, lymphadenopathy, ascites, pancreatitis and bowel thickening. These sonographic abnormalities though are non-specific to a particular pathogen or disease entity, such findings with right clinical correlation and laboratory workup can help the treating physicians to arrive at a correct diagnosis which leads to better patient care and treatment.

Most common finding in our study was splenomegaly. The frequency of splenomegaly is comparable with that recorded by Yee et al, [4] in which 45% of their patients had splenomegaly compared with 32% in our study. The reason for slightly more incidence of splenomegaly can be malaria, septicaemia, typhoid, schistosomiasis, portal hypertension, haemolytic anaemia and tropical splenomegaly which are quite common in Indian subcontinent. Splenic granulomas presenting as multiple small hypoechoic areas and sometimes small coarse calcifications were seen in patients. Both Splenomegaly and Splenic Granulomas showed significant correlation with CD4 counts as both conditions are more prevalent with decreasing immunity status (Decreased CD4 counts) and increased incidence of opportunistic infections (Tuberculosis, Fungal) and Neoplasms (Lymphoma).

Table 1: Age Group and No. of Patients

Age Group	No. of Patients
20 – 30 years	13
31 – 40 years	24
41 – 50 years	3
51 – 60 years	5
61 – 70 years	5
Total	50

Table 2: Abnormal Findings and Frequency in Patients

Abnormal Findings	Frequency	Percentage (%)
Hepatomegaly	23	46
Fatty infiltration	15	30
Hepatic abscess	1	2
Lymphadenopathy	24	48
Splenomegaly	16	32
Splenic abscess	5	10
Ascites	11	22
Ascites with septations	4	8
Bowel wall thickening	4	8
Gall Bladder wall thickening	4	8
Calculus with cholecystitis	2	4
Acalculous cholecystitis	2	4
Cervicitis/Fluid in POD	2	4
Bulky pancreas	2	4
Bulky pancreas with dilated MPD and peripancreatic collection	1	2
Bulky pancreas with peri pancreatic lymphadenopathy	1	2
Testicular abscess	2	4
Renal parenchymal disease	2	4
Pyocele	1	2
Cystitis	1	2
Gluteal abscess	1	2

Ultrasound is valuable in the assessment of lymph nodes, with a 3.5 MHz. transducer; deep lymph nodes can be evaluated. Ultrasound allows assessment of location, number and sizes of pathological lymph nodes. It also permits evaluation of their shape, presence or absence of hilum/mediastinum. The lymph nodes recorded in our study were greater than 1 cm, mostly oval shaped with an echogenic hilum and a narrow symmetric cortex suggesting that they were benign. An ultrasound guided fine needle aspiration could have further characterized these nodes, but this could not be carried out in our centre because of unavailability of appropriate needles.

US offers a cheap avenue of diagnosing opportunistic infections in HIV. In 2003, Uygur-Bayramicli et al. showed that the most common abdominal US findings in HIV patients were ascites and hepatomegaly [6]. It had been earlier documented that microabscesses of the liver and spleen in AIDS patients could be detected with 5-MHz US [6]. There have been several publications on US findings in tuberculosis with HIV [7-8]. Tarantino et al. reported the radiological features and the value of fine needle aspiration biopsy of the lymph nodes and spleen in AIDS patients with disseminated mycobacterial infection [9]. Porcel-Martin et al. documented the utility of abdominal US in detecting focal splenic lesions in patients with AIDS [10].

Pancreas and biliary tract are reported to be the frequent sites of infectious, inflammatory and neoplastic diseases in patients with HIV infection. However, the symptoms of pancreaticobiliary involvement may be relatively mild so thus their prevalence is probably underestimated. Imaging findings of HIV-associated pancreaticobiliary disorders is important, because at times, involvement of these organs may be the only suggestion for establishing the diagnosis of AIDS [11]. Although the utility of US has been tried to be highlighted for the evaluation of visceral involvement and lymphadenopathy, it is prudent to remember that the use of US often needs to be supported by other appropriate diagnostic tools [12].

Conclusion

Abdominal ultrasonography is an excellent and sensitive modality for routine screening of HIV infected patients. The provision and availability of sufficient clinico-pathologic data in the future would improve the quality of ultrasonographic diagnosis and treatment in these patients. Physicians should exploit this widely available and relatively affordable technology in the management of HIV/AIDS patients with abdominal symptoms.

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