

Symptoms of AIDS Related Opportunistic Infections and Their Effects on Human Body

Jeevani T

¹Department of Biotechnology, Acharya Nagarjuna University, India

Abstract

HIV viruses have long term effects for the immune systems and further develop a number of varied illnesses such as fever, diarrhea, tuberculosis, pneumonia and skin infections. This condition is termed as AIDS Acquired Immune Deficiency Syndrome. Once the immune system is sufficiently weakened, such infections will develop and produce any of a wide range of symptoms. Some can be very severe some may lead to various cancers. There is no exact prediction for these symptoms. HIV testing is the only source to diagnose. The most difficult aspect of HIV/AIDS is that though there are medicines, which can help with these illnesses but there is no vaccine and no cure for the HIV, so almost all the infected people become more and more ill and eventually die. It is important for every individual to know and understand about this infection.

Keywords: HIV; AIDS; Opportunistic infections; Tuberculosis; Pneumonia, Diarrhea; Helper T-cells; Neurological disorders; CD4+ T cells; Toxoplasmosis; Encephalopathy; *Cryptosporidium*; *Mycobacterium*; Candidiasis; Kaposi's sarcoma; Shingles

Abbreviations: HIV: System, Human Immuno-deficiency Virus, AIDS: Acquired Immune Deficiency Syndrome, CNS: Central nervous system; PML: Progressive Multifocal Leukoencephalopathy, CMV: Cytomegalovirus, MAC: Mycobacterium Avium Complex, HSV: Herpes Simplex Virus, STD: Sexually Transmitted Disease, NHL: Non-Hodgkin's Lymphoma, HHV: Human Herpes Virus, TB: Tuberculosis

Introduction

We live in an environment of microorganisms and at every moment an enormous number of them are entering body [1]. It is the immune system that normally fights off these microorganisms and keeps body healthy. But over the last fifteen years a new disease spread by a family of viruses called HIV [2] which has spread globally. HIV stands for Human Immunodeficiency Virus [3]. It has been given this name because of its long-term effect to attack the immune system of the body, making it weak and deficient. The virus has weakened the immune system so much that they develop a number of different illnesses such as tuberculosis [4], pneumonia, persistent diarrhea, and fever and skin infections. This condition is called AIDS Acquired Immune Deficiency Syndrome.

It is not possible to reliably diagnose HIV infection [5] or AIDS based on symptoms alone. HIV symptoms are very similar to the symptoms of other illnesses. So the only way to know for sure whether a person is infected with HIV is for them to have a test. HIV testing is the only way to know for sure if the person is infected or not. However there is an assortment of HIV symptoms that can be associated with a new HIV infection. Earlier HIV diagnosis, substance abuse treatment [6], avoidance of breastfeeding, and use of prenatal antiretroviral medications [7] are critical in eliminating perinatal HIV infections [8].

When HIV enters into person's blood it attaches itself to a special type of white blood cells called helper T-Lymphocytes. These Helper T-cells [9,10] are crucial in defending the body against many infections. During all this the person will have no symptoms. They look well and feel well. They may not know that they now have the virus, but could pass it on to someone else through having sex [11,12], or by sharing needles or syringes. Being HIV Positive [13] is not the same as having AIDS.

The HIV actually goes inside the white blood cells and lies their quietly. After 5 to 10 years the HIV virus tricks the cell to start making the viral proteins, this result in the formation of a huge number of viral particles inside the white cells and eventually the cells burst releasing thousands of new viruses in the blood. The released viruses infect new white cells. This cycle goes on and on, and eventually the immune system of the body gets affected. The use of combination of potent antiviral drugs leads to a reconstitution of the immune system [14].

Symptoms of AIDS are caused by the deterioration of the immune system and the decline of CD4+ T cells [15,16] which are the immune system's key infection fighters. As soon as HIV enters the body, it begins to destroy the cells. Eventually the infected person may lose weight and become ill with diseases like persistent severe diarrhea, fever, or pneumonia, or skin cancer [17]. He or she has now developed AIDS. There is no cure for HIV or for AIDS and so, it is almost certain that people diagnosed with AIDS will die. Some common symptoms include Diarrhea that lasts for more than a week, fever [18], Dry cough, Memory loss [19], depression and neurological disorders [20,21], Pneumonia, Profound unexplained fatigue, Rapid weight loss [22], Recurring fever or profuse night sweats, Red, brown, pink or purplish blotches on or under the skin or inside the mouth, nose or eyelids, Swollen lymph glands [23] in the armpits, groin or neck, White spots or unusual blemishes on the tongue, in the mouth, or in the throat.

Opportunistic Infections

If a person infected with HIV does not take effective antiretroviral treatment [24,25] over time HIV will weaken their immune system, which will make them much more vulnerable to opportunistic infections. This causes significant morbidity in both developed countries, where presentation with advanced HIV infection is common, and also in developing countries [16].

Corresponding author: Jeevani T, Department Of Biotechnology, Acharya Nagarjuna University, Guntur, India, E-mail: jeevanithot@yahoo.co.in

Received October 25, 2011; **Accepted** December 13, 2011; **Published** December 20, 2011

Citation: Jeevani T (2011) Opportunistic Infections of Aids and Their Effects on Humans. J AIDS Clinic Res 2:132. doi:[10.4172/2155-6113.1000132](https://doi.org/10.4172/2155-6113.1000132)

Copyright: © 2011 Jeevani T. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Opportunistic infections are caused by germs that are around us all the time but which can normally be fought off by a healthy immune system. Once the immune system [27] is sufficiently weakened, such infections will develop and produce any of a wide range of symptoms. Some of these symptoms can be very severe. Certain cancers also become more common when the immune system is weakened. Symptoms of opportunistic infections common with AIDS include Coma, Coughing and shortness of breath, Difficult or painful swallowing, Extreme fatigue, Fever, Mental symptoms such as confusion and forgetfulness, Nausea, abdominal cramps and vomiting, Seizures and lack of coordination, Severe, persistent diarrhea [28], Severe headaches, Vision loss and Weight loss. Many opportunistic infections associated with AIDS causes serious illness and some may be prevented.

Opportunistic infections of brain

Cryptococcal meningitis: This is a yeast-like fungus infection that usually involves the brain and lungs, although it can affect almost any organ. It is an infection of the lining of the brain and spinal cord. It is not as common as some other opportunistic infections, but it can be deadly. The fungus that causes this condition is found in soil throughout the world [29]. It is most common in soil contaminated by bird droppings. This disease most often occurs when a person's CD4+ T cell count falls below 100 cells per cubic millimeter of blood [30]. Symptoms include headache, nausea, fever, fatigue, irritability, sensitivity to light, stiff neck, change in mental state, and hallucinations.

HIV-related encephalopathy: Encephalopathy [31] is a disease that alters brain function or structure, leading to problems with cognitive function, or mental processes, and memory. It is the infection of the CNS [32]. In people with HIV and AIDS, encephalopathy is usually caused by an infectious agent, such as a bacteria, virus or prion. Encephalopathy most often occurs when a person's CD4+T cell count falls below 50 cells per cubic millimeter of blood. Toxoplasma-seropositive patients who have a CD4+T cell count of less than 100 cells per cubic millimeter of blood should be treated with prophylaxis [33] to prevent developing encephalopathy.

Progressive Multifocal Leukoencephalopathy (PML): Progressive multifocal leukoencephalopathy is a rare disorder of the nervous system caused by a common human polyomavirus, JC virus [34]. It leads to the destruction of the myelin sheath that covers nerve cells. The myelin sheath is the fatty covering that acts as an insulator on nerve fibers in the brain. Symptoms include mental deterioration, vision loss, speech disturbances, and inability to coordinate movements, paralysis and ultimately coma. In rare cases, seizures may occur. This disease can occur when the CD4+T cell count falls below 200 cells per cubic millimeter of blood.

Toxoplasmosis: Toxoplasmosis is caused by infection with a ubiquitous intracellular protozoan parasite [35,36]. It is a condition which occurs when a parasite infects the brain. Symptoms include confusion or delusional behavior, severe headaches, fever, seizures and coma. It can affect the eye, causing eye pain and reduced vision. Toxoplasmosis most likely occurs when the CD4+ T cell count falls below 100 cells per cubic millimeter of blood. Preventative treatment usually with trimethoprim-sulfamethoxazole, also called Septra and Bactrim which may be administered when the CD4+ T cell count falls below 100 cells per cubic millimeter of blood.

Opportunistic infections of eyes

Cytomegalovirus (CMV): Infection with cytomegalovirus (CMV), a member of the herpes virus family and is very common [37].

Although this virus can affect the entire body, it commonly affects the eye's retina, causing blurry vision and in severe cases, blindness. Other common symptoms include chronic diarrhea and nerve problems. It is most likely to occur when a person's CD4+ T cell count falls below 100 cells per cubic millimeter of blood.

Opportunistic infections of gastrointestinal tract

Cryptosporidiosis: Cryptosporidiosis is a diarrheal disease caused by microscopic parasites, *Cryptosporidium*, that can live in the intestine [38] of humans and animals and is passed in the stool of an infected person or animal [39]. This is a parasite [40] that can cause chronic diarrhea. Other symptoms include stomach cramps, nausea, fatigue, weight loss, appetite loss, vomiting and dehydration. This infection is difficult to treat and there is no definitive effective treatment. Symptom control and treatment of HIV are necessary.

Mycobacterium Avium Complex (MAC): Mycobacterium avium complex is an opportunistic infection caused by species of Mycobacterium that can produce severe illness in people with advanced AIDS but rarely affects others [41]. The risk of disseminated MAC (DMAC) is directly related to the severity of immunosuppression [42]. This is a bacterial infection that can cause persistent fever, night sweats, fatigue, weight loss, anemia, abdominal pain, dizziness, diarrhea and weakness. The bacterium that causes this infection is found in water, dust, soil and bird droppings. This disease most likely occurs when the CD4+T cell count falls below 50 cells per cubic millimeter of blood. Preventive treatment, usually with azithromycin, is administered when CD4+ T cells are less than 50 cells per cubic millimeter of blood.

Opportunistic infections of genitals

Candidiasis: Candidiasis, also known as a "yeast infection" or VVC [43]. Candidiasis is an infection caused by the candida fungi also known as a yeast infection. This is one of the most common HIV-related fungus infections. It can affect the entire body, but most commonly occurs in the mouth, called thrush, or vagina. An overgrowth of yeast in the vagina can cause irritation, itching, burning and thick white discharge [44].

Herpes Simplex: Herpes simplex virus (HSV) is the predominant cause of genital herpes and has been implicated in HIV infection and transmission [45,46]. This virus causes genital herpes, which are painful blisters in the genital area, or cold sores. Severe conditions are more common in the advanced stage of AIDS. Both men and women have alike symptoms which include Itching or tingling sensations in the genital or anal area, pain when passing urine over the open sores especially in women, headaches, backache, flu-like symptoms, including swollen glands or fever [47].

Human Papilloma Virus (HPV): This condition is considered the most common sexually transmitted disease (STD) in the United States [48,49]. It can cause warts on the anus, cervix, esophagus, penis, urethra, vagina and vulva. Studies have shown that certain types of HPV [50] can contribute to the development of cervical and anal cancer. Individuals with HIV and AIDS are at increased risk for developing precancerous and cancerous lesions.

Opportunistic infections of liver

Liver Disease: Liver disease is one of the leading causes of death among AIDS patients, especially liver disease [51] caused by the hepatitis B [52,53] and hepatitis C virus. HIV individuals have mild hepatitis to significant liver failure with its associated morbidity and mortality [54]. Many drugs used in the treatment of HIV and AIDS can

cause liver disease [55] or hepatitis. It is important that patients infected with hepatitis receive treatment and follow-up care.

Opportunistic infections of lungs

Coccidiomycosis: Coccidioidomycosis is a fungal infection. This infection is caused by inhaling an infective fungus called *Coccidioides immitis*, found mainly in contaminated soil in the southwestern United States, Mexico, Central America and parts of South America [56]. The lungs are most commonly affected by this infection. In severe cases, it can involve the kidneys, lymph system, brain and spleen. Symptoms include cough, weight loss and fatigue. Meningitis [57] is a common complication when left untreated.

Histoplasmosis: Histoplasmosis is a fungal infection. This infection almost always involves the lungs, although other organs may be affected [58,59]. The fungus that causes this condition is found in southern parts of the United States and South America. It is usually found in soil contaminated with bird droppings and must be inhaled to cause infection. Signs and symptoms include high fever, weight loss, respiratory complaints, an enlarged liver, spleen, or lymph nodes, depressed production of white cells, red blood cells and platelets [60] from the bone marrow and life-threatening, unstable, low blood pressure. This occurs most likely when the T-CD4+ cell count is less than 50 cells per cubic millimeter of blood [61].

Pneumocystis Carinii: *Pneumocystis carinii* is a eukaryotic microorganism that is found worldwide which causes immunosuppression [62]. This condition occurs when a fungus infects the lungs. Symptoms may include fever, cough, difficulty breathing, weight loss, night sweats and fatigue. It is most likely to occur when the CD4+ T cell count falls below 200 cells per cubic millimeter of blood. Preventative treatment may be administered when the CD4+ T cell count falls below 200 cells per cubic millimeter of blood.

Pneumonia: People with AIDS are at risk for recurrent bacterial pneumonia [63]. Bacteria can infect the lungs, which may lead to problems ranging from a mild cough to severe pneumonia. Recurrent pneumonia is most likely to occur when the CD4+ T cell count falls below 200 cells per cubic millimeter of blood.

Tuberculosis (TB): This is a serious, and often deadly, bacterial infection that primarily infects the lungs. TB [64] is transmitted when a person with active TB coughs or sneezes, releasing microscopic particles into the air. If inhaled, these particles may transmit the condition. Once infected by TB, most people remain healthy and develop only latent infection. People with latent infection are neither sick nor infectious. However, they do have the potential to become sick and infectious with active TB. It can occur at any CD4+ T cell level but especially when the CD4+ T cell count falls below 350 cells per cubic millimeter of blood.

Opportunistic infections of lymphatic system

Non-Hodgkin's Lymphoma (NHL): Non-Hodgkin's lymphoma [65] is a disease in which tumors [66] develop from white blood cells in the lymphatic system. It is another common disease associated with AIDS. High grade non-Hodgkin's lymphoma continues to be the second most common neoplasm in people with HIV. CD4+ T lymphocyte count falls below 100 cells per cubic millimeter of blood [67,68]. The most common sign of non-Hodgkin's lymphoma is a painless swelling in one or more of the lymph nodes of the neck, collarbone region, armpits or groin.

Opportunistic infections of mouth and throat

Candidiasis: This is the most common HIV-related fungus

infection. It can affect the entire body, but most commonly occurs in the mouth (thrush) or vagina. An overgrowth of yeast causes white patches on gums, tongue or lining of the mouth, pain, difficulty in swallowing and loss of appetite. Candida in the esophagus, trachea, bronchi or lungs is AIDS defining.

Opportunistic infections of skin

Kaposi's sarcoma: This is the most common AIDS-related cancer [69]. In people with AIDS, Kaposi's sarcoma [70] is caused by an interaction between HIV, a weakened immune system, and the human herpesvirus-8 (HHV-8). It causes reddish-purple lesions that usually appear on the skin. They also can appear on the lymph nodes, mouth, gastrointestinal tract and lungs. The lesions first appear on the feet or ankles, thighs, arms, hands, face, or any other part of the body. They also can appear on sites inside the body. The tumors [71] most often appear as bluish-red or purple bumps on the skin. They are reddish-purple because they are rich in blood vessels.

Shingles: Shingles, or herpes zoster, is a common illness [72]. Shingles are caused by a reactivation of the chicken pox virus. The herpes zoster virus is a rare but potential cause of acute motor weakness [73]. It may cause a painful rash or blisters that follow the path of nerve i.e. during sensation on the nerve paths along which the virus is travelling. Rash is typically accompanied by a fever and enlarged lymph nodes. Two to three days after the pain has begun, a typical rash appears small blisters on red, swollen skin. The rash usually reaches its peak after three to five days. Then, the blisters burst and turn into sores.

Conclusion

AIDS may lead to several infections and diseases which are harmful as well as opportunistic. All the illnesses and conditions can also be found in people with other problems of the immune system, unrelated to HIV or AIDS. Therefore being diagnosed with any of these illnesses or conditions, by themselves, does not specifically indicate HIV infection or AIDS. So in order to get well knowledge about this controversy HIV testing is important. Opportunistic diseases are actually an entire group of diseases. Because these illnesses most often appear when the immune system is damaged, they are not usually associated with recent HIV infection but usually occur years after infection. Immunodeficiency was positively associated with all cancers examined except prostate cancer among HIV-infected compared with HIV-uninfected individuals, after adjustment for several cancer risk factors. Antiretroviral therapy initiation to maintain high CD4 levels might reduce the burden of cancer.

References

1. Thavasi R (2011) Microbial Biosurfactants: From an Environmental Application Point of View. J Bioremed Biodegrad 2: 104e.
2. AR, Lackman-Smith C (2009) Prevention of Human Immunodeficiency Virus Type 1 Transmission by Pharmaceuticals Targeted to Host Proteins Required for Virus Infection? Consideration of Farnesyl Thiosalicylic Acid, a Ras Inhibitor. J Antivir Antiretrovir 1: 72-75.
3. Moanna A, Skarbinski J, Kalokhe AS, Rimland D, Rouphael NG (2011) Primary Human Immunodeficiency Virus Infection and Rhabdomyolysis. J AIDS Clinic Res 2: 119.
4. Abdool Karim SS, Naidoo K, Grobler A, Padayatchi N, Baxter C, et al. (2011) Integration of antiretroviral therapy with tuberculosis treatment. N Engl J Med 365: 1492-501.
5. Guha P, Sardar P (2011) Prevalence of Paediatric HIV Infection in Eastern India-First report. J AIDS Clinic Res 2: 127.
6. Doukas N, Cullen J (2010) Recovered Addicts Working in the Addiction Field: How do Substance Abuse Treatment Agencies Work with Substance Abuse

- Relapse among Addiction Counsellors who are in Recovery? J Addict Res Ther 2: 106.
7. Lipshultz SE, Mas CM, Miller TL, Cordero C, Dauphin D, et al. (2011) The Effects of Fetal and Childhood Exposure to Antiretroviral Agents. J AIDS Clinic Res S2: 001.
8. Whitmore SK, Taylor AW, Espinoza L, Shouse RL, Lampe MA, et al. (2011) Correlates of Mother-to-Child Transmission of HIV in the United States and Puerto Rico. Pediatrics.
9. Talaber G, Perl A (2011) SLE: a Metabolic Disease of T Cells? Rheumatology 1: e103.
10. Tan DBA, Yong YK, Tan HY, French M, Kamarulzaman A, et al. (2010) Characteristics of Natural Killer Cells in Malaysian HIV Patients Presenting with Immune Restoration Disease After ART. J AIDS Clinic Res 1: 102.
11. Finlayson TJ, Le B, Smith A, Bowles K, Cribbin M, et al. (2011) HIV risk, prevention, and testing behaviors among men who have sex with men--National HIV Behavioral Surveillance System, 21 U.S. cities, United States, 2008. MMWR Surveill Summ 60: 1-34.
12. Vandevanter N, Duncan A, Raveis VH, Birnbaum J, Burrell-Piggott T, et al. (2011) Continued Sexual Risk Behaviour in African American and Latino Male-to-Female Transgender Adolescents Living with Hiv/Aids: A Case Study. J AIDS Clinic Res S1: 002.
13. Corrêa RB, Schmidt FR, Silva MLCF, Costa FHR, Rosso AL, et al. (2010) Holmes' Tremor in an HIV Positive Patient Worsened by Immune Recovery Inflammatory Syndrome (IRIS). J AIDS Clinic Res 1: 105.
14. Pineda JA, Alcamí J, Blanco JR, Blanco J, Boix V, et al. (2011) Hot Immunological Topics in HIV Infection. J AIDS Clinic Res 2: 118.
15. Nogueira LM, Santos M, Ferreira LC, Talhari C, Rodrigues RR, et al. (2011) AIDS-associated paracoccidioidomycosis in a patient with a CD4+ T-cell count of 4 cells/mm³. An Bras Dermatol 86: 129-132.
16. Achhra AC, Zhou J, Dabis F, Pujari S, Thiebaut R, et al. (2010) Difference in Absolute CD4+ Count According to CD4 Percentage between Asian and Caucasian HIV-Infected Patients. J AIDS Clinic Res 1: 101.
17. Jones N, Colver GB (2011) Skin Cancer Nurses - A Screening Role. J Clin Exp Dermatol Res 2: 130.
18. Mentzer A, Karalliedde J, Williams H, Guzder R, Ranja babu K (2010) Backache with Fever: A Unique Presentation of Advanced HIV Infection. J AIDS Clinic Res 1: 104.
19. Avila J (2011) A Possible Role for GSK3 in the Impaired Neurogenesis and Memory Loss Associated with Alzheimer's Disease and Aging. J Alzheimers Dis 1: 102e.
20. Rady MY, Verheijde JL, Potts M (2011) Quality Palliative Care or Physician-assisted Death: A Comment on the French Perspective of End-of-life Care in Neurological Disorders. J Clin Res Bioeth 2: 102e.
21. Yu L, Ma J, Ma R, Zhang Y, Zhang X, et al. (2011) Repair of Excitotoxic Neuronal Damage Mediated by Neural Stem Cell Lysates in Adult Mice. J Cell Sci Ther 2: 109.
22. Mungrue K, Roper LA, Chung T (2011) Assessment of Weight Loss in the Management of Patients with Type 2 Diabetes Mellitus in Primary Care in Trinidad. J Diabetes Metab 2: 120.
23. Verma D, Agarwal K, Wadhwa M, Shukla S, Prakash O (2011) T-Cell Lymphoblastic Lymphoma/Leukemia of Tenon's Capsule of Eye: An Unusual Presentation. J Clin Experiment Ophthalmol 2: 189.
24. Johnstone-Robertson SP, Hargrove J, Williams BG (2011) Antiretroviral therapy initiated soon after HIV diagnosis as standard care: potential to save lives? HIV AIDS (Auckl) 3: 9-17.
25. Thomas Kerr WS (2011) HIV Treatment as Prevention and the Role of Applied Social Science Research. J AIDS Clinic Res 2: 102e.
26. Seddon J, Bhagani S (2011) Antimicrobial therapy for the treatment of opportunistic infections in HIV/AIDS patients: a critical appraisal. HIV AIDS (Auckl) 3: 19-33.
27. Tapia-Paniagua ST, Reyes-Becerril M, Ascencio-Valle F, Esteban MÁ, Clavijo E, et al. (2011) Modulation of the Intestinal Microbiota and Immune System of Farmed Sparus aurata by the Administration of the Yeast Debaryomyces hansenii L2 in Conjunction with Inulin. J Aquac Res Development S1: 012.
28. Amare B, Tafess K, Ota F, Moges F, Moges B, et al. (2011) Serum Concentration of Selenium in Diarrheic Patients with and without HIV/AIDS in Gondar, Northwest Ethiopia. J AIDS Clinic Res 2: 128.
29. Bicanic T, Harrison TS (2005) Cryptococcal meningitis. Br Med Bull 72: 99-118.
30. Anekthananon T, Manosuthi W, Chetchotisakd P, Kiertiburanakul S, Supparatpinyo K, et al. (2011) Predictors of poor clinical outcome of cryptococcal meningitis in HIV-infected patients. Int J STD AIDS 22: 665-670.
31. Monpoux F, Pitelet G, Richelme C, Boutté P (2008) A case of acquired encephalopathy in a child. A cause that we thought had disappeared. Arch Pediatr 15: 1769-1771.
32. Christian E, Thorsten R HIV-1 associated Encephalopathy and Myelopathy. HIV encephalopathy 647-654.
33. Marzi A, Feldmann H, Geisbert TW, Falzarano D (2011) Vesicular Stomatitis Virus-Based Vaccines for Prophylaxis and Treatment of Filovirus Infections. J Bioterr Biodef S1: 004.
34. Tavazzi E, Ferrante P, Khalili K (2011) Progressive multifocal leukoencephalopathy: an unexpected complication of modern therapeutic monoclonal antibody therapies. Clin Microbiol Infect 12: 1776-1780.
35. Osunkalu VO, Akanmu SA, Ofomah NJ, Onyiaorah IV, Adediran AA, et al. (2011) Seroprevalence of Toxoplasma gondii IgG antibody in HIV-infected patients at the Lagos University Teaching Hospital. HIV AIDS (Auckl) 3: 101-105.
36. Ebert EC (2011) Gastrointestinal Manifestations of Churg-Strauss Syndrome. J Gastrointest Digest Sys 1: 101.
37. Mehrkhani F, Jam S, Sabzvari D, Fattahi F, Kourorian Z, et al. (2011) Cytomegalovirus co-infection in patients with human immunodeficiency virus in Iran. Acta Med Iran 49: 551-555.
38. El-Tawil AM (2011) Gender and the Pathogenesis of Gastrointestinal Diseases: The Role of Steroid Sex Hormones in the Development. J Steroids Hormon Sci 2: 0e2.
39. Erhabor O, Obunge O, Awah I (2011) Cryptosporidiosis among HIV-infected persons in the Niger Delta of Nigeria. Niger J Med 20: 372-375.
40. Faye B, Tine RC, Ndiaye JL, Kintega C, Manga NM, et al. (2010) Impact of Intestinal Parasites on Intensity of HIV Infection in Senegal. J Antivir Antiretrovir 1: 11-12.
41. Hawkins CC, Gold JW, Whimbey E, Kiehn TE, Brannon P, et al. (1986) Mycobacterium avium complex infections in patients with the acquired immunodeficiency syndrome. Ann Intern Med. 105: 184-188.
42. El-Khatib Z, DeLong AK, Katzenstein D, Ekstrom AM, Ledwaba J, et al. (2011) Drug Resistance Patterns and Virus Re-Suppression among HIV-1 Subtype C Infected Patients Receiving Non-Nucleoside Reverse Transcriptase Inhibitors in South Africa. J AIDS Clinic Res 2: 117.
43. Ray A, Ray S, George AT, Swaminathan N (2011) Interventions for prevention and treatment of vulvovaginal candidiasis in women with HIV infection. Cochrane Database Syst Rev 8: CD008739.
44. Graver MA, Wade JJ (2010) Growth and Acidification by Vaginal Lactobacilli in Anaerobic Liquid Medium Over the pH Range 5.5 - 8.0. J Bacteriol Parasitol 1: 102.
45. Lee AJ, Ashkar AA (2011) Herpes simplex virus-2 in the genital mucosa: insights into the mucosal host response and vaccine development. Curr Opin Infect Dis.
46. Svensson A, Almqvist N, Chandy AG, Nordström I, Eriksson K (2010) Exposure to Human Herpes Virus Type 6 Protects Against Allergic Asthma in Mice. J Allerg Ther 1: 101.
47. Blyta Y, Kocinaj A, Ferizi M, Gerqari A, Ahmeti N (2011) Multiforme Erythema, In Child, After Repeated Herpes Simplex Infections – Case Presentation. J Clin Exp Dermatol Res 2: 127.
48. Carter MW, Kraft JM, Hatfield-Timajchy K, Hock-Long L, Hogben M (2011) STD and HIV Testing Behaviors Among Black And Puerto Rican Young Adults. Perspect Sex Reprod Health 43: 238-246.
49. Hu Y, Liang S, Zhu J, Qin G, Liu Q, et al. (2011) Factors Associated with Recent Risky Drug Use and Sexual Behaviors among Drug Users in Southwestern China. J AIDS Clinic Res 2: 120.
50. McBee WC Jr, Gardiner AS, Edwards RP, Lesnock JL, Bhargava R, et al. (2011)

- MicroRNA Analysis in Human Papillomavirus (HPV)- Associated Cervical Neoplasia and Cancer. J Carcinogene Mutagene 1: 114.
51. Lins Kusterer LEF (2011) Oral Diseases and Liver Pre and Post-Transplantation Disorders. J Transplant Technol Res S1: 001.
 52. Mata RC, Mira JA, Rivero A, López-Cortés LF, Torres-Tortosa M, et al. (2010) Nevirapine-based Antiretroviral Therapy is Associated with Lower Plasma Hepatitis C Virus Viral Load among HIV/Hepatitis C Virus-Coinfected Patients. J AIDS Clinic Res 1: 110.
 53. Mukherjee S (2009) Antiviral Therapy for Hepatitis B in Preand Post-liver Transplant Patients. J Antivir Antiretrovir 1: 17-27.
 54. Sidiq H, Ankoma-Sey V (2006) HIV-related liver disease: infections versus drugs. Gastroenterol Clin North Am 35: 487-505.
 55. Nellithady GS, Anila K, Kumar KK, Kaveri H (2010) Lack of Association of Chronic Liver Disease in Patients with Oral Lichen Lanus. J Carcinogene Mutagene 1: 113.
 56. Furrer H, Chan P, Weber R, Egger M (2001) Increased risk of wasting syndrome in HIV-infected travellers: prospective multicentre study. Trans R Soc Trop Med Hyg 95: 484-486.
 57. Kumar GSS, Venugopal AK, Selvan LDN, MarimuthuA, Keerthikumar S, et al. (2011) Gene Expression Profiling of Tuberculous Meningitis. J Proteomics Bioinform 4: 98-105.
 58. Roy D, Guha P, Bandyopadhyay D, Sardar P, Chatterjee SK (2011) Pancytopenia with Hemophagocytic Syndrome Associated with Histoplasmosis in Acquired Immunodeficiency Syndrome: Description of 2 Case Studies and Literature Review. J AIDS Clinic Res 2: 115.
 59. Ehui E, Doukouré B, Kolia-Diafouka P, Aoussi E, Koffi E, et al. (2011) Intestinal Histoplasmosis with Histoplasma duboisii in a Patient Infected by HIV-1 in Abidjan (Ivory Coast). J AIDS Clinic Res 2: 125.
 60. Gentile P, Scioli MG, Orlandi A, Cervelli V (2011) Review: Application of Platelet-Rich Plasma in Hard Tissue Defects. J Tissue Sci Eng S2: 001.
 61. Orsi AT, Nogueira L, Chrusciak-Talhari A, Santos M, Ferreira LC, et al. (2011) Histoplasmosis and AIDS co-infection. An Bras Dermatol 86: 1025-1026.
 62. Javed F W, Naseem A Ansari (2004) Pneumocystis carinii Infection. Arch Pathol Lab Med 128: 1023-1027.
 63. Norcross EW, Sanders ME, Moore QC 3rd, Marquart ME (2011) Pathogenesis of A Clinical Ocular Strain of Streptococcus pneumoniae and the Interaction of Pneumolysin with Corneal Cells. J Bacteriol Parasitol 2: 108.
 64. Saran R, Das G (2011) Tuberculosis the Ancient Disease Needs Intervention of Modern Tools. Mycobact Diseases 1: e103.
 65. Nigam A, Singh AK, Singh SK, Singh N, Singh N, et al. (2011) Primary Mammary (Non-Hodgkin) Lymphoma of Breast: A Case Report. J Cancer Sci Ther 3: 173-175.
 66. Gayed IW, Wahba H, Wan D, Joseph U, Murthy R (2010) Effect of Y-90 SIR-Spheres Therapy for Multiple Liver Metastases in a Variety of Tumors. J Cancer Sci Ther 2: 43-46.
 67. Powles T, Matthews G, Bower M (2000) AIDS related systemic non-Hodgkin's lymphoma. Sex Transm Infect 76: 335-341.
 68. Riley JM, Jenrette JM, Gordon L, Milligan L, Zauls AJ, et al. (2011) Progression of Nodular Lymphocyte-Predominant Hodgkin's Lymphoma to a High-Grade Lymphoma. J Cell Sci Ther S2: 001.
 69. Asiimwe F, Moore D, Were W, Nakityo R, Campbell, et al. (2011) Clinical outcomes of HIV-infected patients with Kaposi's sarcoma receiving non-nucleoside reverse transcriptase inhibitor-based antiretroviral therapy in Uganda. HIV Med.
 70. Essadi I, Sbitti Y, Ichou M, Errihani H (2011) The Role of Chemotherapy in the Treatment of Kaposi's Sarcoma. J Cancer Sci Ther 3: 145-148.
 71. Tsipursky MS, Churgin DS, Conway MD, Peyman GA (2011) A Review of Photodynamic Therapy for Intraocular Tumors. J Anal Bioanal Techniques S1: 001.
 72. <http://www.nfid.org/pdf/factsheets/varicellaadult.pdf>
 73. Sprenger De Rover WB, Alazzawi S, Hallam PJ, Hutchinson R, Di Mascio L (2011) Herpes zoster virus: an unusual but potentially treatable cause of sciatica and foot drop. Orthopedics 34: 965-968.