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HIV and its Co-infection

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ABSTRACT

HIV Human immunodeficiency virus a subclass of retroviruses that causes the infection and supplementary AIDS. Acquired immunodeficiency syndrome AIDS is a syndrome alters the immune system and its illness makes human prone to the opportunistic infections and Cancer. HIV Infection can occur by Sexual contact, blood transfusion and contaminated or pre sterilized needles. HIV is basically Asymptomatic before it reached to the most critical stage of HIV infection i.e. AIDS. Studies represent that HIV may raise from apes to human in late 1800s. Without treatment a person can survive around 8 to 11 years depending upon the type of HIV subtypes.

INTRODUCTION

HIV is present within the body fluids as both virus that infect the immune cells and as a free virus particle. It infects vital cells that are present in the human immune system such as Macrophages, helper T cell and dendritic cells. This infection leads to the lower level of CD4+ T cells through various mechanisms including Apoptosis, pyroptosis, Viral killing infected cells. Lower level of CD4+ T causes the loss of Cell Mediated immunity and weakens the immunity in such a way that it is much more prone to opportunistic infections [1-7].

Co-infection occurs when a person is infected with one or more disease or viruses at the same time. In case of HIV affected peoples it is difficult to make their treatments because their immune system enables to fight against infection. These co-infections and opportunistic infections take the advantage of weak immune system that leads to cancer. As co-infection of HIV is most frequent i.e. Tuberculosis, Hepatitis C and B. Together these co infections is one of the leading cause of death among people. So in terms of treatment some unique strategies are adopted to facilitate the medication and to make the medication effective. There is a chances of co-existence of inflammatory bowel disease with HIV but it is seems rare. There are many of the opportunistic infections that mimic IBD and which lead to the misdiagnosis of disease [8-10]. The treatment which is used in IBD is can cause an increase rate of other infections and lymphoma as well.

HIV SUBTYPES

HIV type 1 HIV-1 and HIV type 2 HIV-2. As HIV type 1 HIV-1 this subtype is related with viruses found in apes gorilla and chimpanzee in western Africa. HIV type 2 HIV-2 related with viruses found in old world monkey. It is the most common and highly pathogenic strain of virus. HIV 1 is further subdivided into HIV-1 groups: M main, O outlier, and N non-M/non-O. These groups represents the autonomous transmission of SIV Simian immunodeficiency virus around 90% HIV-1 are classified into M main is distributed worldwide. As group O infections are mostly endemic and it represents 1-5% of all HIV-1 Infections [11-15]. Group N is identified in a small no. of individuals. HIV-1 group M main, is Further subdivided into the ten clades that are related with the groups of genetically related viruses. These subtypes also follow the geographic pattern.

TYPES OF CO-INFECTION

Tuberculosis: In poor nations, TB is one of the most common opportunistic infection associated with HIV and it is one of the leading causes of death among people with AIDS.

According to WHO, around 33 million peoples including adults and children's are infected with HIV worldwide, in which approx. 25% of which is co-infected with tuberculosis. Tuberculosis is globally the main cause of death among HIV-positive people. In case of co-infection with tuberculosis is similar to diagnosis of HIV in the whole population. The main difference lies terms of clinical symptoms, in case HIV-positive people tuberculosis can develop more frequently [16-20]. Including lungs and throughout the body.

Globally TB is one of the opportunistic infection For HIV infections. This infection is due to infection due to *Mycobacterium tuberculosis*, a pathogen that affects humans. Tuberculosis affects lungs but it also affects parts of body as well. This infection does not cause any symptom asymptomatic. TB and HIV infections are accordingly bound together from the early year's scenario. These can effects all type of diseases that can be correlate from its pathogenesis, medical representations and analysis of treatment. Moreover an increasing proportion of TB among the people living with HIV is a multidrug resistant MDR complicating management [21-25]. In recent years, a number of advances have been made in demonstrate the epidemiology of HIV co-infection which includes methods to diagnose and cure for HIV related TB. So that it can lower the rate of mortality in case of TB/HIV co infected patients. The risk of developing HIV tuberculosis co-infection TB is estimated between 26 and 31 times More in HIV positive people than among those which does not have HIV infection. In 2014, around 9.6 million cases of TB were obtained, in which a 1.2 million were infected with HIV infection as well. WHO approve 12 TB/HIV synergetic activities, which include Three I's for TB/HIV. The most current HIV co-infections occur in Brazil is: tuberculosis, hepatitis B and C [26-32]. These diseases are the main cause of death among people infected with HIV. Ensuring adherence for the treatment of HIV co-infection it is essential key step to being treated by health professionals and receiving appropriate information on concern and adverse reaction, counseling and proper Guidance in terms of medication stressing the importance of adherence, Supervised treatment in cases of HIV co-infection.

Hepatitis C: Hepatitis C HCV is considered one of the biggest epidemics globally as it infects peoples more than 170 million worldwide, according to the data of World Health Organization WHO. Around 30% of the people are also infected with HIV. Among those people who have HIV and Hepatitis C co-infection may also have a history of drug previous or current drug use, psychological and alcohol use, psychiatric disorders especially depression, which threaten the process of treatment and worsen side effects [33-36]. General Treatment consists of weekly injections of medications, Side effects include psychological symptoms and mental disturbances such as depression, anxiety, reduced concentration, irritability.

It is more difficult to preserve the immune system during Hepatitis C infection and HIV as well. This can advance the progression to AIDS which leads to death. In chronic infections it can also result in progression to cirrhosis liver damage and liver cancer. Current scenario: World Health Organization WHO reported in 7 March 2016 It was estimated that around 2.3 million people living with HIV are also co infected with hepatitis C virus HCV globally Of these around 1.3 million, are people who inject drugs PWID [37-39]. The study also raise an issue that HIV-positive people are 6 times more likely than people to that of HIV uninfected are more prone to HCV infections pointing that it need improvement in the services of HIV and HCV. Globally HIV and HCV infections are major public health problems, which includes of transmission and co-infection of other disease as well. Globally, there are around 37 million people infected with HIV, among those 115 million people are infected with chronic HCV infection [40-45]. In studies very little is known about the HIV/HCV transmission. WHO confide the study to inform an update of its guidelines on co-infections and commencement of antiretroviral therapy this is used to informed the screening and treatment of HIV co-infection including HCV in a global scenario.

Hepatitis B: Hepatitis B co-infection among people with HIV-positive increases five to six times chances of developing cirrhosis and chronic state of liver. People who have HIV and Hepatitis B

Co-infection must take precaution to prevent the transmission of viruses [40-45]. Treatment is similar to that of AIDS, involving antiviral medication. Reactions that may arise through taking this medication are the same as those experienced with Hepatitis B around 5 and 10% of people with HIV positive are also infected with hepatitis B virus which is often called co-infection. Without treatment there are fewer chances to clear hepatitis B infection if a person is acquired with HIV co-infection. People with HIV/hepatitis B co-infection can have faster liver damage and may not respond as well to hepatitis B treatment. As compared to other co-infection Hepatitis B does not assume to make HIV disease worse.

For most of the people infected With HIV along with hepatitis B, treatments are generally effective and save as well. Generally, people with HIV and hepatitis B co-infection are recommended to take HIV treatment. Antiretroviral treatment is beneficial for the people having co-infection as viral load of HIV is undetectable and it will restore the immune function which results in to slower liver disease progression. In UK Current guidelines it is recommend that all people with HIV positive and HBV as co-infection should start HIV treatment using a process which contains tenofovir and lamivudine [46-52]. These drugs are active against both HIV and hepatitis B. Once HIV treatment is started, it is important. Treatment should not be stopped so that it will cause the liver damage. Some people with

HIV and hepatitis B co-infection may experience epidemic liver inflammation after the treatment of HIV. This is called immune reconstitution inflammation syndrome IRIS. It may happen when HIV treatment starts to replace immune system, which then shows a better response to the existing infections like hepatitis B. generally this type of responses are common among those people who start HIV treatment when their immune system is already weakened and lower level of CD4+ T cell count. There is no specific treatment is required for this, but it requires a continuous monitoring by Doctor [53-60]. People with HIV/HBV co-infection are prone to infections because during treatment antiretroviral drugs can also cause liver side-effects or chronic state of liver. In few cases HIV drugs can cause serious liver toxicity. Due to which , people with impaired liver functioning due to hepatitis B may not be able to process HIV medications properly. Few drugs require some dose adjustments, while others drugs should not be used by people with chronic liver disease.

Cytomegalovirus: Early in HIV epidemic, In United States cytomegalovirus CMV was a major cause of mortality in patients affected with AIDS. Epidemiologic studies shows that through 1992 half of HIV-positive patients eventually developed CMV as a co-infection which includes central nervous system disease ,esophagitis and pneumonia .With the effective advent of treatments like antiretroviral treatment ART there has been a sudden decline in the occurrence of CMV infection in AIDS patients [61-65]. It is approximately 5-10% of previous estimation. Diagnosis is based on clinical evaluation but it often requires tissue biopsy viral inclusions evidences and inflammation. This is one of the common herpes viruses which do not affect the healthy immune system as it remains in dormant state. If in Case of HIV it weakens the immunity in such a way that it is much more prone to opportunistic infections then the virus resurfaces and it may cause to, digestive tract, lungs, eyes and other organs as well. Detection of CMV inclusions, antigens, or nucleic acids in situ is preferred methods for making a diagnosis of CMV end-organ disease. Generally anti-viral medications are preferred such as Ganciclovir, cidofovir and foscarnet are used in case of CMV infection

Candidiasis: Candidiasis is among people suffering with HIV is common. It causes infection with a thick white coating on the mucous membranes mouth, tongue, vagina and esophagus which is often called as a candida esophagitis. People with HIV positive are prone to Candidiasis but it is more dangerous if the CD4 counts of less than 200 cells/mm³ [66-70] .If A persons is having HIV infection then Mucocutaneous candidiasis may occur in three forms: 1.Oropharyngeal, Esophageal, and vulvovaginal disease. Oropharyngeal candidiasis OPC was among the initial symptom of HIV-induced immunodeficiency to be recognized and it affects only the majority of persons having an untreated HIV infection. From several decades OPC will be one of the common seniteial infections for the opportunistic illnesses, as it indicates the advancement of HIV disease. Although it is not associated with severe morbidity, it is one of the clinically significant candiasis. Severe OPC may interfere with the administration of medications and it will spread to the esophagus. Esophageal candidiasis is one of the most common infections where antiretroviral therapy ART is given in combination which is a routine part of the standard care. Vulvovaginal candidiasis is a major concern for women suffering with HIV infection, as the relationship of vulvovaginal candidiasis with HIV infection remains unclear [71-75].

Cryptococcal meningitis: Meningitis is a life-threatening inflammation of the membranes and fluid which lines the brain and spinal cord meninges. It is one of the common central nervous system infections which are associated with HIV. It is mainly due to fungus which is present in soil. Cryptococcal meningitis affects around 10 percent of people suffering with AIDS [76-78]. The first symptoms of this infection are usually fatigue, fever, vomiting, nausea, and headache. Cryptococcal meningitis may cause a person to become confused and have memory loss. If it remains untreated, it may result into a coma and death. This may also lead to increased risk of stroke over time in patients less than 55 years of age.

Cryptosporidiosis: Cryptosporidium is an intestinal protozoan parasite. Which causes intestinal diseases in humans? Mostly immune compromised patients like HIV are more prone to chronic and fatal diarrhea. While Cryptosporidium was discovered in 1907, it was not till 1976 that the It was first reported in human cases and in Early 1980s it became prevalent parasite which is widely recognized as a human pathogen [79-85]. As , reports shows that cryptosporidiosis is one of the original AIDS-defining illnesses and relates with the increase rate of morbidity.

Type of Cancers

Kaposi's sarcoma: is a kind of tumor of the blood vessel walls, this cancer is common in people which are infected with HIV. Kaposi's sarcoma usually appears as pink cutaneous lesions on the skin face and mouth. This cancer may affect the internal organs, which includes the lungs and digestive tract.

Lymphomas: Is a type of cancer that appears in lymph nodes this effect the white blood cell. The most common symptoms includes the swelling of the lymph nodes in your neck, armpit.

CONCLUSION

From years, many of the worlds leading HIV/AIDS researchers, practitioners, and physicians will converge on the seventh International AIDS Society Conference which is based on Pathogenesis, Treatment, and its Prevention. The major content of this issue is to reflect the key issues related to HIV and its Co-infection. Which can be related by its articles, monitoring and its treatment so that we can cure the the HIV Co-infection. One of the key issues of

the discussion is co-infection [86-92]. HIV/AIDS not only enables opportunistic infection which rarely infect human beings to cause disease, it can also worsen the expression of other pathogens which includes tuberculosis, Hepatitis C, Hepatitis B, Cytomegalovirus, Candidiasis, Cryptococcal meningitis, Cryptosporidiosis. For example, tuberculosis is one of the active diseases in people which are infected with HIV, and infections with hepatitis B and hepatitis C viruses are one of the infections that may lead to severe liver damage. So the prevention is necessary for the people infected with HIV and its co-infection as well as it is essential to prevent the disease so that it will decrease the mortality rate.

AIDS is one of the epidemic infections; it has contributed to a global re-emergence in tuberculosis. It is estimated that around 34 million people infected with HIV today, is more a third which are also infected tuberculosis as well. Globally, tuberculosis is one of the co-infection that report for 25% of death rate which is due to AIDS. In Asia, the proportion is of mortality is around 40%. So it is no wondering that co-infection with and HIV/AIDS has received so much attention from the global health community [93-100]. Efforts and resources has been made so that there will be an improvement in terms of diagnostic and treatment approaches related with co-infection, because these infection shows the close association with the HIV. So, for all co-infections have, received sufficient attention, which shows the substantial correlation with this disease.

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