

EDITORIAL

Prevalence of Hepatitis-B and Hepatitis-C viruses among HIV infected subjects attending Wad Medani VCT/ART centre, Gezira State, Sudan

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Abstract:

Objectives: This is a descriptive, prospective, cross-sectional, hospital based study to determine the prevalence of Hepatitis B Virus and Hepatitis C Virus among Human Immunity deficiency Virus infected subjects in the Gezira State of central Sudan.

Materials and Methods: The study was carried out on HIV infected subjects attending Wad Medani VCT/ART centre from Dec. 2010 to March 2011. Epidemiological and demographic characteristics were recorded and participants were interviewed for risk factors of viral hepatitis infection. Blood samples were then collected and tested for HBsAg and HCV antibodies.

Results: A total of 50 subjects were screened with a mean age of 36.39 ± 13.57 , 52% were males, HBsAg and HCV antibodies were reactive in 8% and 0% (none) of the studied group, respectively.

Conclusion: This study shows that the prevalence of HBV/HIV co-infection is consistent with both regional and global rates, while HCV/HIV co-infection is low in the studied group.

ملخص:

الأهداف: تحديد شيوع الإصابة بالتهاب الكبد الحموي ب (HBV) و ج (HCV) وسط المرضى المصابين بحمى عوز المناعة المكتسب (HIV) بولاية الجزيرة وسط السودان.

المرضى و الوسائل: هذه دراسة وصفية توقعية مقطعية مبنية على المستشفى. أجريت الدراسة في المرضى المصابين بحمى عوز المناعة المكتسب المترددين على مستشفى ودمدني مركز VCT/ART في الفترة بين ديسمبر 2010م و حتى مارس 2011م الميزات الوبائية والملاح السكانية رصدت و تمت معاينة المشاركين لمعرفة عوامل الخطورة للإصابة بحمى الكبد. جمعت عينات الدم و تم فحصها للمضاد المناعي HBsAg و مضاد حمى ج HCV .

النتائج: مجموع 50 حالة تم مسحها بمتوسط عمر 36.39 ± 13.57 . نسبة ذكور كانت 52% من الحالات. مضادات HBsAg و HCV كانت متفاعلة في 8% و 0% (لا يوجد) على التوالي.

EDITORIAL

الخلاصة: أوضحت الدراسة شيوع الإصابة بالتهاب الكبد الحموي ب HBV وسط المصابين HIV تتماشى مع معدلات شيوع الإصابة الإقليمية و العالمية . بينما الإصابة الحمى الكبدية ج (HCV) كان ضعيف في المجموعه المدروسة.

Key Words: Hepatitis B/HIV co-infection, Hepatitis C/HIV co-infection, risk factors.

Introduction:

In June 1981, the first cases of what was later called acquired immunodeficiency syndrome (AIDS) in the United States were reported in Morbidity and Mortality Weekly Report (*MMWR*)⁽¹⁾. The prevalence of co-infection with either Hepatitis C Virus or Hepatitis B Virus varies depending on the patient's risk factors for HIV acquisition⁽²⁾. Over two billion people worldwide have evidence of previous or current hepatitis B virus (HBV) infection. Risk factors for infection include blood transfusion, sexual intercourse, intravenous drug abuse, vertical and horizontal transmission of the virus⁽³⁾. Sudan is classified among countries with a high hepatitis B surface antigen (HBsAg) endemicity of more than 8%⁽⁴⁾. The few studies on HCV infection in Sudan demonstrated a low seroprevalence ranging from 2.2% in the Gezira State⁽⁵⁾, an area endemic with schistosomiasis to 4.8% in patients with schistosomal periportal fibrosis. Genotype 4 was the commonly isolated⁽⁶⁾. There are no previous studies on HBV/ HCV co-infection in HIV infected patients, in Central Sudan. So the objective of this study was to determine the prevalence of Hepatitis B Virus (HBV) and Hepatitis C virus (HCV) among Human Immunodeficiency Virus (HIV) infected subjects.

Materials and Methods:

Study population:

The study was conducted in Wad Medani Voluntary Counseling and Testing (VCT)/Antiretroviral Therapy (ARV) Centre which is located in Wad Medani Teaching Hospital. Wad Medani is the capital of Gezira State, which covers 8,901 Squares Kilometers, with a population of 3,750,000(2009 Census). The centre was established in 2005 as a voluntary counseling and testing centre(VCT), it provides: confidential testing and counseling for clients and suspected cases, health care, treatment and follow-up. In January 2006, the centre started to provide antiretroviral therapy (ART).

Study design and technique:

The study was a descriptive, prospective, cross-sectional hospital based. It was carried out in the period from the 23rd of December 2010 to the 19th of March 2011. All clients and patients who were positive for HIV (having their blood tested by ELISA, Biorex, UK) coming for regular follow-up, making a total of 50 cases, were included in the study. Two of them were on Highly Active Antiretroviral Therapy (HAART). Those who were negative for HIV were excluded from the study. All patients had their blood tested for HBsAg by ELISA (Fourth generation, Biorex, UK). All patients had their blood tested for the presence of HCV Abs by ELISA.

Statistical analysis:

Demographic and clinical data including the laboratory results were collected by a questionnaire. Data were analyzed by using the Statistical Package for Social Sciences (SPSS) version 11. The χ^2 test with Yates correction was used to compare proportions. Odd ratios (OR) with 95% confidence intervals

EDITORIAL

(95%CI) were calculated either directly or by the Mantel-Haenszel's methods for stratified OR. Results were tabulated and presented in simple percentage forms.

Ethical Clearance:

An informed consent was obtained from all study subjects or from the parents when children were tested, as well as permission from the State Coordinator of SNAP. Ethical clearance for the study was then obtained from Ethical Clearance Committee of the Faculty of Medicine, University of Gezira.

Results:

A total of 50 cases were enrolled in the study, 26(52%) were males, 24(48%) were females, and 3(6%) were children, with an age range between 3-65 years and a mean age of 36.39±13.57. Most of the study subjects 43(86%) lie between 16-55 years. (Table1). 21(42%) were married, 13(26%) were single and 16(32%) were either widowed or divorced. The majority of the study subjects 30(60%) were coming from central Sudan, 6(12%) from the west, 5(10%) from the East and the rest 5(10%) were from Northern Sudan. When the World Health Organization (WHO) staging system was applied: 29patients (58%) were found to have WHO stage III disease, 16(32%) were stage IV disease, 3(6%) were stage I disease and 2(4%) had stage II disease. (Table 2). Risk factors for acquisition of HBV were found to be insignificant (Table 3). Screening for Hepatitis C Antibodies among study subjects, was negative by ELISA. Hepatitis B surface Antigen (HBsAg) was found to be positive in 4 patients (8%) by ELISA.

Table (1): Showing the distribution of patients according to the age (N=50)

Age group	Male	Female	Total	Percent
1-15	3	-	3	6
16-25	2	4	6	12
26-35	8	6	14	28
36-45	7	10	17	34
46-55	4	2	6	12
56-65	2	2	4	8

EDITORIAL

Table (2): Showing the distribution of patients according to WHO staging system (N=50)

Stage	Total	Percent%
WHO I	2	4
WHO II	2	4
WHO III	28	56
WHO IV	22	36
Total	50	100

Table (3): Demographic Criteria of 50 subjects screened for hepatitis B Virus markers.

Variable	Male	Number tested	HBV markers reactive%	OR	P value
Surgery	No	34	2	2.286	0.383
	Yes	16	2		
Blood transfusion	No	41	4	-	0.44
	Yes	9	0		
Dental treatment	No	32	3	0.569	0.544
	Yes	18	1		
Sacrificiaion	No	10	2	4.75	0.174
	Yes	40	2		
Tattooing	No	45	3	3.5	0.353
	Yes	5	1		

Table (4): Age group of 50 subjects screened for HBsAg by ELISA

Age group	ELISA	
	+ve	-ve
1-15	0	3
16-25	1	5
26-35	2	12

EDITORIAL

36-45	0	17
46-55	1	5
56-65	0	4
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Total	4	46
%	8%	92%
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Discussion:

Sudan National AIDS Program (SNAP), has conducted a national survey in the year 2002 that showed the followings: Sudan is the most severely affected country in North Africa and the Middle East with an estimated 500,000 people living with HIV/AIDS, and mostly in need of antiretroviral therapy (ART). Despite the fact that the epidemiological data is limited, it is believed that the country is in the early stages of a generalized HIV/AIDS epidemic, with an almost exclusively heterosexual transmission pattern. The adult prevalence rate of HIV/AIDS has been estimated at 1.6%, with specific population group prevalence rates ranging from 0.5% to 2.5% in the northern part of the country.

There are no published reports on the prevalence of hepatitis B virus (HBV) and hepatitis C virus (HCV) among human immunodeficiency virus (HIV) positive subjects in Sudan, . However, the relationship between infections with these hepatitis viruses and human immunodeficiency virus (HIV) has not been clarified.⁽⁷⁾

A total of 50 participants, who met the selection criteria, were enrolled in the study. HIV infection among females was found to have nearly the same percentage as in males. This is similar to the global epidemiological statistics, despite the initial description of the disease among men who have sex with men (MSM) in the United States, more than 80 percent of infections occur through heterosexual transmission, and over 50 percent of all HIV-infected people in the world are women.⁽⁸⁾

Children were not excluded from HIV infection. In this study 3 (6%) were children, this pool in the global epidemics of HIV among children. Globally, as of December 2005, approximately 2.3 million children were living with human immunodeficiency virus (HIV) infection; 570,000 children died secondary to HIV-associated disease during 2005 alone. (WHO/UNAIDS Geneva, Switzerland, 2002). Most of the study subjects 43 (86%) were in the age group between 16 -55 years, and 4 of them (8%) were above 56 years, and this result is nearly similar to the epidemiological facts about HIV, as it is most common among adults and children.⁽⁹⁾

World Health Organization (WHO) staging system, showed that most of the patients 29 (58%) were WHO stage III and 16 (32%) were stage IV, which were considered the late stages of the disease. This late presentation is probably due to

lack of health education, patients self referral and the problem of the social stigma, as well as to the behavior of the disease itself, as it mimics many other diseases that make it a late suspicion.

Risk factors for HIV acquisition among the study population showed a significant heterosexual behavior among 87.8%. This is consistent with the local data (SNAP), and nearly similar to the regional rates for HIV acquisition in sub-Saharan countries. In a study performed of more than 4000 men and

EDITORIAL

women from Rwanda and Zambia who underwent voluntary counseling and testing for HIV, an estimated 55 to 93 percent of new heterosexually acquired HIV infections among adults occurred within serodiscordant marital or cohabiting relationships⁽¹⁰⁾. Little is known about the overall prevalence of male same-sex behaviors in African societies, although there has been a surge in research in this area⁽¹¹⁾. All HIV-infected patients should have serologic testing for HBV, and vaccination should be initiated in patients who have no evidence of prior exposure⁽¹²⁾. Early vaccination is recommended in such patients because HIV-infected patients with a low CD4 count have a decreased response to immunization.^(13, 14, 15, 16)

In Sudan, HCV seroprevalence ranges from 2.2% in the Gezira state, an area endemic with schistosomiasis⁽⁵⁾ to 4.8% in patients with schistosomal periportal fibrosis⁽⁶⁾. In this study, hepatitis C turned to be negative by ELISA. This result has no similar one in this country, but nearly similar results were obtained in African countries. HCV/HIV co-infection was found to be 1% in Kenya⁽¹⁷⁾, 5.8% in Nigeria⁽¹⁸⁾, and 5% in Malawi⁽¹⁹⁾. Despite that Sudan is classified among countries with a high hepatitis B surface antigen (HBsAg) endemicity of more than 8%⁽⁴⁾. The only study on HBV and human immunodeficiency virus (HIV) co-infection was carried out in 1987 on 593 subjects who practiced high risk behavior, including sexual promiscuity. Although the study showed a high prevalence of HBV markers (80%), none of the subjects was HIV-positive⁽⁷⁾. In this study hepatitis B surface Antigen (HBs Ag) was found to be positive in 4 patients (8%) by ELISA. This remains within the national and regional (sub-Saharan) limits, where chronic HBV affects approximately 10 percent of HIV-infected patients worldwide⁽¹⁹⁾. A study of 16,248 HIV-infected patients in the United States has shown the prevalence of chronic HBV to be eight percent among unvaccinated participants⁽²⁰⁾. Recent studies from neighboring African

countries reported HBV/HIV co-infection in 6% of a studied population in Kenya⁽¹⁷⁾, 9.2% in Nigeria⁽²¹⁾, and 20.4% in Malawi⁽²¹⁾. Those who tested negative for HBs Ag, need to do further tests, like HB core antibodies and viral DNA. Isolated anti-HBc is more common in patients with underlying HIV infection than in the general population^(22, 23). Among those who tested positive for HBs Ag, 3 (11.5%) were males, and 1 (4.2%) was a female, representing a higher rate of co-infection among males in contrast to females. This is consistent with other studies, that have shown markers of prior HBV infection are more common in men who have sex with men (MSM) and injection drug users^(20, 24), but this is not the case in both IVDU and MSM as the risk factor of co-infection was found to be (0%) for IVDU, and was almost exclusively heterosexual in this study.

Conclusion:

It can be concluded that the prevalence of HBV/HIV co-infection is consistent with both regional and global rates, while HCV/HIV co-infection is only very near to the regional rates. HIV infected subjects should be screened for hepatitis B and hepatitis C, because it plays an important role in the course of the disease and treatment. Those who are seronegative for hepatitis B should receive hepatitis B vaccine.

EDITORIAL

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EDITORIAL

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