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Schistosomiasis and hepatitis B co-infection

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Abstract:

Background: *Schistosomiasis is a significant health problem in Sudan and other countries in Africa, Asia and South America, with an infection rate of one in 30 individuals. Data on Schistosomiasis, Hepatitis B virus (HBV) co-infection are scarce; however, there is a high prevalence in countries where schistosomiasis is endemic. As elimination of schistosomiasis and (HBV) is a global target, there is a need for supplementary tools, such as vaccination, to confer long-term prevention.*

Methods: *A systematic search was performed in Sennar state (Sudan). The data was collected from 149 school student. In the period from 2013–2016, urine and blood analysis were done to test HBV and schist soma egg , master sheet containing these finding and personal data was performed, and analyzed by SPSS program.*

Results: *The study showed that 13% were suffering schist soma infection 25% of them co infected with hepatitis B. On the other hand 11% of all cases had hepatitis B infection 29% of them with schist soma infection, in respect the correlation between them it is significant.*

Conclusion: *It is clear this study is in line with universal studies in the field in that there were significant co infection between schist soma and hepatitis B, but there is controversy regarding the*

effects of HBV on schistosomiasis and vice versa. Vaccination might be a solution to the area of schistosomiasis.

Key words: Schistosomiasis, HBV, HCV, Hepatotropic, Vaccine, Adjuvant

INTRODUCTION

Schistosomiasis is a parasitic infection that is second to malaria in prevalence and affects about 200 million people in over 70 countries with an infection rate of one in 30 individuals [1,2].

Schistosomiasis is a complex tropical disease caused by Schistosoma species, of which Schistosoma haematobium, S. mansoni, and S. japonicum are the most common [3]. The diverse clinical patterns of this infection depend on the interplay of numerous factors, such as nutritional status, and co-infections [4-5]. Often, disease progresses to an advanced stage, called hepatosplenic schistosomiasis (HSS), which is frequently seen in endemic areas and is characterized by portal hypertension that may lead to gastrointestinal bleeding [6,7].

Concurrent infection between hepatitis B virus (HBV) and schistosomiasis is often observed in countries where schistosomiasis is endemic and might cause chronic liver inflammation [8]. S. haematobium and HBV co-infection pathogenesis remains cotraversal. This review was conducted to address the gap of knowledge regarding the above mentioned co-infections Epidemiology of co-infection with schistosomiasis, HBV in countries where schistosomiasis is endemic such as Egypt, a high prevalence of HBV and S. mansoni co-infection has been described ranging from 19.6 to 33.0% [9,10]. The prevalence of co-infection among the general population in Brazil is 15.8% [11]. In Yemen a group of researchers reported a relationship between S. haematobium and hepatitis B, but no correlation between S. mansoni infection and HBV or HCV [12]. It is understandable that hepato-splenic schistosmiasis renders

patients at risk of getting HCV owing to the involvement with the risk factors for both HBV and HCV such as history of treatment with parenteral treatment for schistosomiasis unsterile syringes during mass campaigns, blood transfusion, surgical and endoscopic interventions [10,13-14].

IMMUNOLOGY OF SCHISTOSOMIASIS AND HEPATITIS B OR C CO-INFECTION

Wahib et al., demonstrated the co-infection of HBV and/or HCV in 120 patients with hepatosplenic schistosomiasis was associated with a marked depression in cell mediated immune responses [15]. Furthermore, Edwards et al., described the effects of hepatotropic virus co infection during the Th2-dominated granulomatous phase of Schistosomal infection. They used lymphocytic choriomeningitis virus (LCMV) as a model for hepatotropic viruses, and demonstrated the induction of a strong LCMV-specific T cell response, with infiltration of large numbers of LCMV-specific interferon (IFN)-γ-producing CD8+ cells into the liver. This can lead to the down regulation of Th2 cytokine production that is dominant during S. mansoni infection and expeditious hepatotoxicity related morbidity. Moreover, livers of coinfected mice were highly susceptible to viral replication, which correlated with a reduction in intrahepatic type I IFN responses following virus infection [15-16].

Impact of co-infection with schistosomiasis and HBV on the individual disease course Chronic infections with hepatotropic viruses, such as HBV, can lead to liver cirrhosis, and an expected synergistic effect might exacerbate hepatic pathology during concomitant infections of HBV and schistosomiasis. Epidemiological studies were performed to investigate schistosomiasis/HBV co-infections, as no suitable animal models exist. A number of studies proposed an increased susceptibility to HBV caused by schistosomal

infections (especially the severe hepatosplenic form)[17,18]. However, this could be explained by the frequent need of schistosomiasis patients for blood transfusion, especially on considering the poor infection control measures in countries where this disease is endemic. In contrast, other studies rejected the thesis stating any relationship between schistosomiasis and HBV [19,20].

Woodchucks are susceptible to infection with both schistosoma and woodchuck hepatitis virus (WHV) [21]. Because HBV and WHV descend from the same family (family Hepadnaviridae), a concomitant infection of schistosomes and WHV in woodchucks might be a suitable animal model for concomitant infection in humans. However, there was no impact of schist soma infection on WHV serum markers [22]. HBV replication was inhibited in transgenic mice [23] during schistosomal infection, where the antiviral effects of schistosomes related to IFN-γ and nitric oxide. Thus, most published studies have found no association between schistosomiasis and worsening of HBV infection [24]. In contrast, other studies described a poor prognosis of HBV when associated with hepatosplenic schistosomiasis [28,29,25]. Interestingly HBV vaccines (both 1st and 2nd generation) can mount an immune response in schistosomiasis patients; however, reduced responses to vaccination were seen in hepatosplenic schistosomiasis [30,26,27].

Therefore, further studies are needed to determine conclusions regarding co-infection schistosomiasis and HBV.

THE PROBLEM

Sennar is an agricultural state, rich in canals and lakes, because of that most of the population have schistsoma infection during their life's, This study tried to touch concomitant infections of HBV and schistosomiasis, their expected synergistic Effect that might exacerbate hepatic

pathology and the need for supplementary tools, such as vaccination, to confer long-term prevention.

METHODS:

A systematic search was performed in Sennar state (Sudan). The data was collected from 149 healthy school student all were children i.e less than 12years old. In the period from 2013–2016, urine and blood analysis were done to test HBV and schist soma egg , master sheet containing these finding and personal data was performed, and analyzed by SPSS program

Objective

The main objective of this research is to study concomitant infections of HBV and schistosomiasis.

RESULTS

Table (1) sex

Cumulative Percent	Valid Percent	Percent	Frequency		
48.3	48.3	48.3	72	male	Valid
100.0	51.7	51.7	77	female	
	100.0	100.0	149	Total	

Table 2 age

Cumulative Percent	Valid Percent	Percent	Frequency		
22.1	22.1	22.1	33	less than 10	Valid
78.5	56.4	56.4	84	10-12	
100.0	21.5	21.5	32	more than 12	
	100.0	100.0	149	Total	

Table 3 schist soma

Cumulative Percent	Valid Percent	Percent	Frequency		
13.4	13.4	13.4	20	yes	Valid
100.0	86.6	86.6	129	no infection	
	100.0	100.0	149	Total	

Table (4) hepatitis B

Cumulative Percent	Valid Percent	Percent	Frequency		
88.6	88.6	88.6	132	no infection	Valid
100.0	11.4	11.4	17	yes	
	100.0	100.0	149	Total	

Table (5) SCHISTO * HB Crosstabulation

Count

	HB			
Total	yes	no infection		
20	5	15	yes	SCHISTO
129	12	117	no infection	
149	17	132	Total	

Figure (1) SCHISTO * HB Crosstabulation

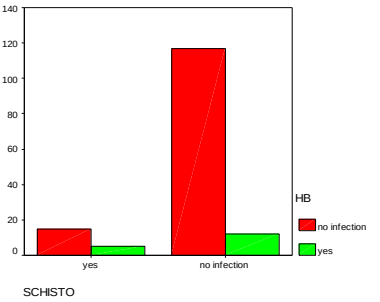

Table (6) SEX * HBCorrelations

SEX	HB		
-.075	1	Pearson Correlation	HB
.361	.	Sig. (2-tailed)	
149	149	N	
1	-.075	Pearson Correlation	SEX
.	.361	Sig. (2-tailed)	
149	149	N	

Table (7) AGE * HBCorrelations

AGE	HB		
.068	1	Pearson Correlation	HB
.413	.	Sig. (2-tailed)	
149	149	N	
1	.068	Pearson Correlation	AGE
.	.413	Sig. (2-tailed)	
149	149	N	

Table (5) SCHISTO * HB Correlations

HB	SCHISTO		
-.168(*)	1	Pearson Correlation	SCHISTO
.040	.	Sig. (2-tailed)	
149	149	N	
1	-.168(*)	Pearson Correlation	HB
.	.040	Sig. (2-tailed)	
149	149	N	

* Correlation is significant at the 0.05 level (2-tailed).

DISCUSSION

The total number of school children selected for this study was 149cases of both genders (52% were female, and 48% were male table 1), 22% of them their age less than 10years old, 57% from 10 to 12years old and 21% more than 12 years old (table 2). The study showed that 13% were suffering schist soma infection 25% of them co infected with hepatitis B (table 3, table 5, and figure 1). On the other hand had 11% of all cases had hepatitis B infection 29% of them with schist soma infection (table 4, table 5 and figure 1).

In respect to correlation test between the hepatitis B virus infection and gender no significant relationship between them(table 6), it is same for hepatitis and age (table 7), but it is significant positively in correlation between hepatitis B infection and schist soma infection with Sig. (2-tailed) is 0.04 (table 8), this in line with Du H he found that high (58.4%) prevalence of HBV was among Chinese patients with chronic schistosomiasis (31) and Al-Shamiri who mentioned a strong

relationship between schistsoma hematopium and HBV co-infection in Yemen population(12).

RECOMMENDATION

1/ mass treatment for all people in high endemic area of schistosoma especially those living near damp lakes, canals and annual autumn lakes.
2/HBV vaccination to same groups of high endemic area of shistomiasis as a high risk patient
3/ routine screening and investigations for HBV infection amongst schistosma infection patients.
4/more research and studies to detect the exact route of co-transmission of schistosoma and HBV infection in low risk individuals (least sexual activity, and minimum blood transfusion children)

CONCLUSION

This study was conducted in Sennar state (Sudan), on 149 school student, in the period from 2013 -2016. The goal of this research is to study concomitant infections of HBV and schistosoma hematopium.

The study showed that 13% were suffering schistsoma infection 25% of them co infected with hepatitis B. On the other hand 11% of all cases had hepatitis B infection 29% of them with schist soma infection, in respect the correlation between them it is significant. This study recommended that mass treatment for all people in high endemic area of schistosoma infected patients and HBV vaccination to them.

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