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Prevalence of Hepatitis C Virus (HCV) Antibodies in Patients with Schistosomaisis

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Summary :

This study comprised 850 subjects from three villages in the Gezira area in the central regain of the Sudan. Faeces and urine specimens collected from the above subjects were examined for *Schistosoma mansoni* and *S.heamatobium*. One hundred and six individuals were confirmed positive, 49 (46.2%) with *S.mansoni*, 50 (47.2%) were infected with *S.heamtobium* and 7 (6.6%) with mixed infection. Of the 106 serum samples obtained from schistosoma-infected subjects and 100 serum samples from control subjects were tested by ELISA, 33 (31.1%) and 4 (4%) were found reactive for HCV antibodies respectively. These results showed strong association between schistosomaisis and HCV, which may suggest that schistosoma infection is a cofactor in HCV infection in patients with Bilharsiasis. A further study of large population size is highly recommended in order to draw a conclusion in the association between HCV and schistosoma infections.

Introduction:

Hepatitis C Virus is a major public health problem worldwide, affecting several hundred millions people with considerable morbidity and mortality in humans[1]. The virus may rarely cause acute symptomatic infection; however it is characterized by its high level of chronicity, which may predispose the patient to liver cirrhosis and eventually to hepatocellular carcinoma. [2,3] It has been clearly indicated that schistosoma infection progresses to chronic liver disease. Various studies carried out globally suggested a role for schistosomaisis in the pathogenesis of HCV and the sequalae that follow [4.5]. In Egypt, the origin of the HCV epidemic has been attributed to intravenous schistosomiasis treatment in rural areas in the 1960s to 70s. HCV antibody prevalence was 18.5% (448/2,425) [6] . Also,in Egypt proved to be the prevalence of HCV antibodies increased from 2.7% in those <20 years of age to more than 40% in males aged 40-54 years[7].

In Kingdom of Saudi Arabia, among 39 cases of bilharziasis patients 7(17.9%) were found to have evidence of HCV antibodies[8]

In Gezira state of central Sudan, the prevalence of HCV reactive antibodies were 2.2% detected among schistosomiasis cases[9]

The aim of this study is to explore the association of *S.mansoni* and *S.haematobium* infections with HCV. And to establish the seroprevalence of HCV in the study area, as well as age as a risk factors in HCV and schistosoma-infection.

Material and Methods:

The study area comprises three villages in the Gezira State, 187 kilometers south of khartoum, namely Wad El Fadni, El Kidawa, and El–Tadamon Villages.

The total study population was 850 subjects distributed as follows:300 khalwa school students from Wad El Fadni, 400 subjects from El kidawa (El Maktab and El Hilla), 150 school children from El Tadamon.

Faeces and urine samples were obtained from all participants and examined for *Schistosoma mansoni* ova. A total of 106 subjects were found to be positive for *S. manoni* by keto-Katz method. Blood specimens were collected from schistosoma-positives subjects, sera were separated and stored at – 20 DC till time for testing.

Indirect IgG ELISA (Novum Diagnostic a GMBH) was performed on the 106 test serum samples

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and 100 sera from reference control subjects those who were negative for schistosoma[4]. The mean absorbance value (MA) of each test and control serum was calculated. The cut-off value (Co) was calculated as follows: Co = MA + 0.4.

Results:

In El – Kedawa- El hilla, 200 subjects age 9-25 years (mean age 14 years) were examined, 16 (80%) were positive for *S.mansoni*, 4 (2%) for *S. haematobzum*. The prevalence of HCV antibodies was 8 (50%) in S. mansoni,1 (25%) in *S. haematobium* Patients.

In El Kidawa-El Maktab, 200 subjects aged 11 to 67 years, (mean age 23 years) were examined, 13 (6.5%) were positive for *S. mansoni*, 8 (4%) for *S. haematobium*, and 1 (0.5%) with mixed. *S. mansoni* and *S. haematobium* Infection. The Prevalence of HCV antibodies was 5 (38.5%) in *S.mansoni*.3 (37.5%) in *S.haematobium* patients. The subjects with mixed infection were all positive for HCV.

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Table (1) Distribution of Schistosomiasis by location:

Location	No. of examined subjects	No. of infected subjects						Total	%
		S.mansoni	%	*S.haematobium*	%	*S.mans & S.heat*	%		
Geneid-kediwa-Hilla	200	16	8.00	4	2.00	0	0	20	10.00
Geneid Elmaktab	200	13	6.5	8	4.00	1	0.5	22	11.00
Wad Elfadni	300	14	4.66	28	9.33	2	0.66	44	14.65
Total	850	49	5.76	50	5.88	7	0.82	106	12.47

Table (2) Prevalence of hepatitis C virus antibodies in sera of infected subjects with Schistosomiasis

Location	Infected with Schistosomiasis	HCV antibodies			
		Negative		positive	
		No	%	No	%
Geneid-kediwa-El Hilla	20	11	55	9	45
GENEID ELMAKTAB	22	13	59.09	9	40.90
ELTADAMON	20	19	95	1	5
WAD ELFADNI	44	30	68.18	14	31.81
TOTAL	106	73	68.86	33	31.13

Table (3) Prevalence of hepatitis C virus antibodies in sera of infected subjects with Schistosomiasis

Location	Total infected with Schistosomiasis	HCV antibodies			
		positive	%	Negative	%
Geneid-kediwa-El Hilla	16	8	50	8	50
GENEID ELMAKTAB	13	5	38.5	8	61.5
ELTADAMON	6	1	16.6	5	83.3
WAD ELFADNI	14	4	28.5	10	71.5
TOTAL	49	18	36.7	34	63.3

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Table (4) Prevalence of hepatitis C virus antibodies in sera of infected subjects with Schistosomiasis

Location	Total infected with Schistosomiasis	HCV antibodies			
		positive	%	Negative	%
Geneid-kediwa-El Hilla	4	1	25	3	75
GENEID ELMAKTAB	8	3	37.5	5	62.5
ELTADAMON	10	0	0	10	100
WAD ELFADNI	28	10	35.7	18	64.3
TOTAL	50	14	28	36	72

Table (5) Prevalence of hepatitis C virus antibodies in sera of infected subjects with Schistosomiasis

Location	Total infected with *Schistosoma mansoni & haematobium*	HCV antibodies			
		positive	%	Negative	%
Geneid-kediwa-El Hilla	0	0	0	0	0
GENEID ELMAKTAB	1	1	100	0	0
ELTADAMON	4	0	0	4	100
WAD ELFADNI	2	0	0	2	100
TOTAL	7	1	14.3	6	85.7

Table (6) Prevalence of hepatitis C virus antibodies in sera of infected subjects with Schistosomiasis

HCV	Total infected with *S.mansoni*		HCV antibodies		Total
	No	%	No	%	
Positive	33	31.1	4	4.0	37
Negative	73	68.9	96	96	169
Total	106	100.0	100	100	206

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In El- Tadamon, 150 school children aged 10 to 15 years (mean age 12 years) were examined, 6 (4%) were positive for *S.mansoni*. 10 (6.6%) for *S.haematobium* and 4 (2.6%) had mixed infection. The prevalence of HCV antibodies were 1 (16.6%) in *S.manasoni*-infected subjects.

In Wad El.Fadni, 300 Khalawi students age 10 to 70 years.(mean age 17 years) were examined for schistosoma, 14 (4.6%) were positive for *S.mansoni*, 28 (9.3%) for *S.heamatobium* and, 2 (0.6%) had mixed infection. The Prevalence of HCV antibodies was 4 (28.5%) in *S.mansoni*, 10 (35.7%) in *S.haematobium* subjects (Tables 1-6).out of 100 schistosoma, non-infected subjects, 4 were positive for HCV antibodies. All anti- HCV reactive samples were repeatedly tested.

Discussion:

The infection level of *S.mansoni* and *S.haematobium* in this study population appeared to be overall similar (5.67% and 5.88%), but is remarkably high in Wad El Fadni Village, which is located in the old Gezira Scheme, West of the Blue Nile (Table1).

This is probably due to the geographic location of Wad El Fadni in the old Gezira Scheme, which already known to be hyperendemic for schistosomaisis.

The overall prevalence of anti-HCV in schislosomaisis patients (31.1%) is considered high in comparison to that in the control group. The high incidence of anti-HCV in the two parts of El-kidiwa village (40.9%) compared to the incidence in El-Tadamon (4%) is difficult to justify. (Table2). However, the demographic factor may be the reason,

The average incidence of HCV antibodies among *S.mansoni* patients is high (63.3%) , however the incidence (83.3%) in El T'adamon is even higher, that may be due to the small number of samples tested (Table3).

The incidence of HCV in subjects with *S.haematobium* is remarkably high (100%) in El-Tadomon, however the overall incidence of anti-HCV is slightly higher (72%) than that in S, mansion infected subjects (Table4).

The seroprevalence of HCV in individuals co-infected with both schistosoma species is significantly high (100%) in El Tadoman and Wad El Fadni Villages. The over all incidence of HCV in this mixed population is higher (85.7%) than in those infected with a single species of schistosoma. This is clearly due to the small number of samples tested (Tables 5) .

The present study support other studies indicating that, the HCV. incidence is higher in schistomaisis patents than those non-infected with schistosoma, with some variation in the prevalence rate. In a study carried in the Nile Delta Region of Egypt, where HCV prevalence is the highest in the world " The HCV incidence is fairly comparable (41%) with that in the present the study (31.8%)[5-9].

An other study among the Brazilian population infected with *S.mansoni* showed a lower level (24%) of HCV seroprevalence0 [10],

In regions of Africa, where malaria is endemic, malarial immune complexes may contribute to anti-HCV false positivity, which is probably attributable to anti-nuclear and other autoantibodies [11]. False positivity has been found in bot weakly and strongly reactive sera[12]. This is expected in an endemic malarial African country such as the Sudan [13].

Our results were based on ELISA screening only (Other assays should have been performed). The reactive specimens should be retested by a supplementary assay such as recombinant immune blot assay (RIBA) and confirmed by polymerase chain reaction (PCR). However, assay other than ELISA are not available in the Gezira State, which justifies the use of ELISA only.

On the whole this study highlighted the importance of HCV pathogenecity and its association with schistosomasis in Gezira region, and therefore warranted further research in the relationship between HCV and schistosomaisis.

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