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Prevalence of Hepatitis C Virus Antibodies In Haemodialysis Patients

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Abstract

We determined the prevalence of HBsAg and antibodies to hepatitis C virus (HCV Ab's) in 50 staff members (group I) and 64 patients, 25 patients on regular haemodialysis (HD) for less than one year (group II) and 39 patients on regular (HD) for more than one year (group III). Six patients were HBsAg positive, 2 (8%) of group II and 4 patients (10.3%) of group III respectively. As regards HCV 18 patients (72%) of group II and 39 patients (100%) of group III were positive, there was a significant increased positivity when compared both groups with control (p <0.001 & 0.0001) and there was a significant increase positivity in group III when compared with group II (p < 0.01). We conclude that the duration of dialysis is a more serious risk factor in HCV infection and liver enzymes elevation in patients on dialysis was related to HCV infection.

Introduction

TRANSMISSION of non A non B hepatitis (HCV) has been associated primarily with parenteral routes such as transfusion of blood and blood products, haemodialysis and intravenous drug use. Therefore, high risk groups for HCV parenterally transmitted are recipients of blood and blood products (e.g. Haemophilics), haemodialysis patients, drug abusers and more than 25% of the cases with sporadic hepatitis without obvious percutaneous exposure [1].

Outbreaks of HCV in many haemodialysis units were reported and the prevalence of HCV infection increased with the

duration of haemodialysis, moreover there is a high frequency of HCV seropositivity even in dialysis patients without blood transfusion [2,3,4].

Now HCV is the most common type of hepatitis in haemodialysis units [5].

The aim of our study is to evaluate the prevalence of HCV Ab's in patients on regular haemodialysis as well as its relation to liver affection, duration of haemodialysis and blood transfusion.

Subjects and Methods

This study included 114 subjects. They were classified into 3 groups:

Group I :

They were 50 clinically and sonografically free subjects from the medical staff working at Minia University Hospital. They have no history of blood or blood products transfusion.

Group II:

They were 25 patients under haemedialysis for a period less than one year.

Group III:

They were 39 patients under haemodialysis for a period more than one year.

All patients of group II and group III had a history of multiblood transfusions.

The control and the patient groups were subjected to the following:

A- Full clinical examination

B- Sonographic examination of the liver.

C- Laboratory investigations which included:

1. Liver function Tests:
   * AST & ALT [6].
   * Alkaline phosphatase [7].
   * Total protein and albumin [8].
   * Total and direct bilirubin [9].
2. HBsAg by ELISA. The kits were supplied by Hoechest Orient S.A.A.
3. HCV Ab's (NANBASE C-96) General Biological Anti-HCV EIA an enzyme Immunoassay kit for qualitative detection of antibodies to Hepatitis C virus in human serum or plasma, kits used were products of General Biologicals Corporation.

Sampling:

Five ml venous blood was withdrawn using a plastic disposable syringe under complete sterile conditions. Separation of serum was done by centrifugation of the blood sample for 10 minutes at 1500g (approx. 3000 rpm). The serum was separated and used for liver function tests and the remainder of serum was kept in screw capped tubes at-70°C till the time of assay of HBsAg and HCV Ab's.

Results

Clinical and Sonographic Examination of the Liver:

- In group I: no abnormalities.

- In group II: no abnormalities in 22 cases (88%), hepatomegaly in two cases

(8%) and liver cirrhosis in one case (2.6%).

- In group III: no abnormalities in 35 cases (89.7%), hepatomegaly in three cases (7.7%) and liver cirrhosis in one case (4%).

The results of liver function tests are presented in table (I). The results of HBsAg and anti HCV are presented in table (II) and Figs (1 and 2). Two cases (8%) of group II, 4 cases (10.3%) of group III were positive for HBsAg. These results were insignificant when we compare both diseased groups with control one and when we compare with each other.

As regard HCV Ab's (anti-HCV) 18 cases (72%) of group II, and 39 cases (100%) of group III were positive.

Table (1): Results of Liver Function Tests in Different Groups.

	Total Bil. mg / dL	Direct Bil. mg / dL	AST U / L	ALT U / L	ALP U / L	Prot. gm / dL	Album. gm / dL
Group I							
No. = 50							
Mean	0.34	0.13	7.9	8	5.6	7.4	4.1
S.D.	± 0.1	± 0.04	± 2.5	± 2.5	± 2.2	± 0.4	± 0.4
Group II							
No. = 25							
Mean	0.34	0.13	12.9	12.2	25.7	7.1	3.98
S.D.	± 0.06	± 0.04	± 5.3	± 9.3	± 19	± 0.8	± 0.76
P value	0.37	0.44	0.001	0.04	0.001	0.12	0.17
Group III							
No. = 39							
Mean	0.36	0.16	12.9	10.6	47.6	7.1	3.7
S.D.	± 0.28	± 0.22	± 9.3	± 12.4	± 39.1	± 0.9	± 0.7
P value	0.33	0.28	0.02	0.2	0.001	0.16	0.01
P value of *Group II ver Group III*	0.3	0.2	0.4	0.2	0.01	0.4	0.08

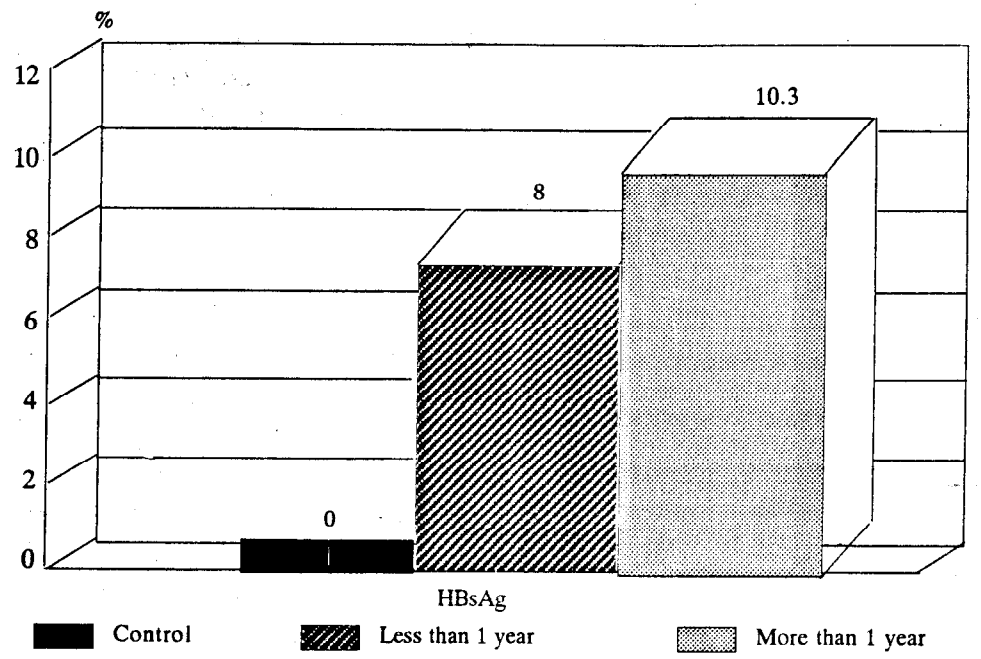

Fig (1) HBsAg in control and patients groups.

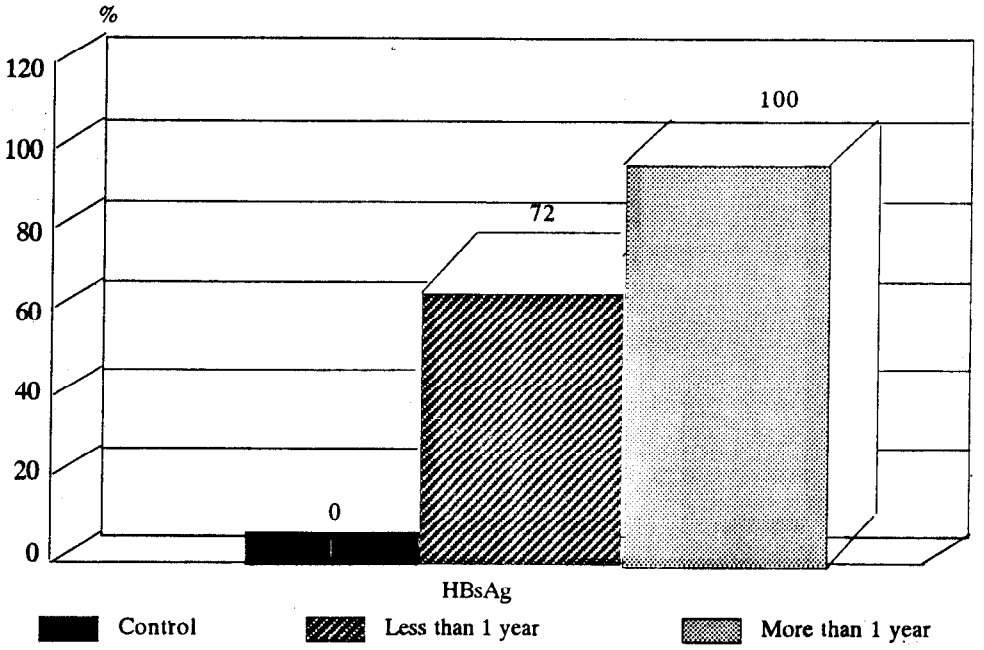

Fig (2) HCV Abs in control and patients groups.

There was significant increased positivity in group III when compared with control and group II ($p < 0.0001$ and $p < 0.01$ respectively). Also there was significant increased positivity in group II when compared with control one ($p < 0.001$).

All positive results for HCV-Ab's were above the cut off value documented in the instruction sheet supplied with Kit used.

Discussion

Since the introduction of the vaccination policy, serological tests and universal precaution standards, the number of new cases of hepatitis B among haemodialysis patients has been steadily decreasing [10]. Hepatitis C (which represents more than 90% of non-A, non-B hepatitis) is becoming the most common type of hepatitis. HCV infection may lead to serious complications including chronic hepatitis, liver cirrhosis and hepatocellular carcinoma [11], so early diagnosis and management is very important for prevention of these complications.

Table (2): Comparison between Results of HbsAg & HCV Antibody in Control & Patients Groups.

	HbsAg		HCV Ab's	
	+ ve	%	+ ve	%
Control Group: (no = 50)	0	0%	0	0%
Group II: (no = 25)	2	8%	18	72%
P value	NS		< 0.001	
Group III: (no = 39)	4	10.3%	39	100%
P value	NS		< 0.0001	
P value of Group II versus Group III	NS		< 0.01	

In our study, we obtained high prevalence of HCV Ab's among the patients group. Among group II (which represent haemodialysis patients for less than one year) anti-HCV Ab's were positive in 72% of them while in group III (patients under haemodialysis for more than one year) the prevalence was 100%. In contrast to these results are those of the control group (medical staff) who showed absence of seropositivity between them. So these results of patient groups are statistically highly significant when compared to the control group. Moreover, HCV Ab's seropositivity was significantly high in group III when compared to group II ($p < 0.01$).

This high prevalence of anti-HCV positivity among haemodialysing patients is in accord with the results of Capsa et al. [12], who found HCV Ab's seroprevalence in 91.7% of their haemodialysing patients while medical staff members were negative for anti-HCV Ab's, our results also come in agreement with those of Carrera et al.

[2] in Portuguese who recorded seropositivity for HCV Ab's in 68.9% of their dialysing patients.

However, our results were in disagreement with the results of Blakmore et al. [13], who found 1.2% only of their haemodialysing patients positive for HCV Ab's by using first generation assay and on using second generation test (2nd g a) seropositivity rises to 4.5%.

The cause of the high prevalence of HCV Ab's positivity among our patients is the fact that haemodialysing patients are subjected to many risk factors. First is the deficiency in the immune system of uraemic patients, 2nd is the virus may diffuse in the dialysis envirnoment or persist in equipment despite regular sterilization. Thirdly, an important factor is the blood transfusion, to which they are frequently in need. The hazard of all of these factors is increased by time of haemodialysis.

In our study, the policy of blood transfusion was the same in the two patients groups (all are multiblood transfused), so the duration of haemodialysis is related strongly to the high prevalence of HCV Ab's positivity.

This is in agreement with results of Mondelli et al. [14] who used the same technique, First Generation Assay (1st g a EIA technique) and confirm by using a Second Generation Assay. They found 55% of their haemodialysing patients positive for HCV Ab's by 2nd ga while using 1st ga revealed positivity of 31%. Duration of dialysis with blood transfusion correlated with prevalence of HCV infection.

The results obtained by Sheu et al. [15] in Taiwan were 47.2% seropositivity in their haemodialysis patients. They used 2nd generation anti-HCV immunoassay and the polymerase chain reaction (PCR) to detect HCV, RNA. Also Al-Nasser et al. [16] found in a Saudi prevalence of 45.5% of anti-HCV in their haemodialysis patients, also they found that blood transfusion and the duration of dialysis were the major risk factors related to HCV infection. Gimmaria et al. [4] found seropositivity of 52.9% to HCV Ab's using 2nd generation test.

In our study co-infection with hepatitis B virus was demonstrated in 10.5% out of 57 anti-HCV reactive patients, (8% of group II and 10.3% of Group III), increased mean serum aminotransferases activity were documented in these patients. Also high levels of serum liver enzymes (ALT, AST and alkaline phosphatase) were demonstrated in all anti-HCV positive patients.

While in results obtained by Muller et al. [17] co-infection with HCV was documented in 41% out of 123 haemodialysing patients that are positive for HCV Ab's with high levels of ALT.

Moreover, Al-Nasar et al. [16] found 75.7% of their haemodialysing patients having HBV markers. This high incidence of HBV in these patients may be due to

the fact that this region was hyperendemic for HBV as the controls also have high rate of infectivity with HBV.

However, Ayoola et al. [18] found that anti-HCV positivity among their haemodialysing patients was unrelated to positivity of HBV markers or elevated levels of serum ALT. Also, Sheu et al. [14] found that HBsAg status was carried on 125 haemodialysis patients in Taiwan.

As regard liver affection in our patients 8% out of 25 cases of group II and 7.7% out of 39 cases of group III proved to develop hepatomegaly, while 2.6% of group II and 4% of group III are shown to have liver cirrhosis. As these patients proved to be negative for HBV, so HCV is implicated in these cases which develop liver disease, this goes with results of Ruffatti et al. [19] who studied liver diseases among patients in their dialysis unit. They found that among patients who have developed liver disease, HCV proved to be the major causative agent in 66% of them, the other factor was blood transfusion, which plays an important role in liver disease in haemodialysis patients.

In contradiction to El-Ghoneimy et al. [20] who related liver affection in haemodialysis patients to causes other than HCV as autoimmune processes involving the liver or bilharziasis

As blood transfusion and time of haemodialysis are proved to be the major risk factors for HCV infection, and as our patients are all multiblood transfused, so our results strongly suggest that duration of dialysis augments the effect of all other risk factors beside being a major risk factor by itself as regard HCV infection, which was also concluded by Al Zanaty et al. [21].

In conclusion, our results strongly support a preventive programme for HCV similar to that for HBV regarding both blood banks and heamodialysis units.

- Screening of HCV antibodies among dialysis units must be a routine.

- Treatment of anaemia in hemodialysis patients with (erythropoietin) to decrease frequency of blood transfusion.

- Blood should be screened for HCV antibodies before transfusion to hemodialysis patients.

- Separate haemodialysis units for HCV patients.

- Nurses and medical staff undergo routine examination for HCV.

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