

## Hepatitis C Virus Infection Assessment Among Chronic Hemodialysis Patients in AL-Kadhmiya Teaching Hospital

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### ABSTRACT:

#### BACKGROUND:

Hepatitis C virus (HCV) has been recognized as an emerging problem in dialysis patients, and viral hepatitis remains a major hazard for both patients and medical staff of hemodialysis (HD) units.

The reported yearly incidence of anti-HCV antibody worldwide between HD patients ranges from 10.5% to 24%, while the prevalence of anti-HCV antibody among dialysis patients varies in different countries (5-85%) worldwide, and may exceed 95% in the Middle East

#### OBJECTIVE:

To assess the prevalence of anti-hepatitis C virus (HCV) among the hemodialysis unit in AL-Kadhmiya Teaching Hospital and to identify the risk factors of infection in relation to age, sex, blood transfusions and duration of dialysis

#### PATIENTS AND METHODS:

Across-sectional study was conducted in AL-Nahrain College of Medicine in AL-Kadhmiya Teaching Hospital in dialysis unit during the period from April 2008 to December 2010. 100 patients (58 male and 42 female their ages ranged from (15—75). are known cases of end stage renal failure on regular haemodialysis. All patients underwent a history and physical examination at baseline and investigations include blood urea nitrogen, creatinine, serum calcium, phosphorus, liver function test and screen for hepatitis C virus antibodies were tested by using Murex anti-HCV ELISA , Positive cases were confirmed by polymerase chain reaction

#### RESULTS:

The prevalence of HCV infection in patients in the dialysis unit was 41%. This study showed that there was an association between the history of blood transfusions, duration of the dialysis and kidney transplantation and the prevalence of HCV infection, (P.value <0.001.)

Although the levels of AST and ALT were higher in the positive HCV marker group, there was no statistically significant difference between them.

#### CONCLUSION:

HCV infection is high in hemodialysis unit in Alkadhmiya teaching hospital, HCV-related liver disease in patients on long-term dialysis often appears clinically mild, with only modest elevations in AST and ALT levels but most of them asymptomatic. Observation of appropriate preventive measures in the hemodialysis center is highly recommended.

**KEYWORDS:** hepatitis c virus , hemodialysis, antibodies

### INTRODUCTION:

Patients with chronic renal failure who are on haemodialysis (HD) have high prevalence of hepatitis C virus (HCV). They are among the highest risk groups for the acquisition of HCV infection. HCV infection leads to decreased graft and patient survival in renal transplant recipients.<sup>(1)</sup> With the increased facilities and improved techniques of hemodialysis (HD), patients with end-stage renal disease (ESRD) are living longer.

Consequently, the chance of acquiring infection is increased in these immunocompromised patients. Hepatitis C virus (HCV) infection is one of them, which is seen more frequently in HD patients than in the general population<sup>(2)</sup>.

The prevalence of HCV is particularly higher in the developing countries, it has become a major cause of increased mortality and morbidity in ESRD patients<sup>(3)</sup>

Hepatitis C virus (HCV) has been recognized as an emerging problem in dialysis patients, and viral hepatitis remains a major hazard for both patients and medical staff of hemodialysis (HD) units.<sup>(4)</sup>

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The reported incidence of anti-HCV antibody worldwide between HD patients ranges from 10.5% to 24%, while the prevalence of anti-HCV antibody among dialysis patients varies in different countries (5-85%) worldwide, and may exceed 95% in the Middle East.<sup>(5)</sup>

The extensive use of recombinant erythropoietin to correct renal anemia in HD patients resulted in a significant reduction in blood transfusions requirement.

However, previous studies have shown that de novo infections in single HD units may still occur in the absence of other parenteral risk factors.<sup>(6)</sup>

It has been suggested that infection could be transmitted from patient to patient in the hospital, and there is now indirect evidence that HCV infection occurs among HD patients during repeated dialysis procedures, but not through the equipment, probably due to procedural errors.<sup>(7)</sup>

Dual infection with HBV and HCV, though rare, occurs more frequently in certain risk groups. The risk is greater among the CRF patients due to the frequent exposure to blood from transfusions and extracorporeal circulation during haemodialysis. Immunization with HBV vaccine before beginning the dialysis will reduce infection of HBV and strict adherence to universal precautions in the dialysis units may help to decrease the prevalence of both infections among these high-risk patients.<sup>(8)</sup>

### **PATIENTS AND METHODS:**

The study was performed in AL-Nahrain College of Medicine in AL-Kadhmiya Teaching Hospital in dialysis unit during the period from April 2008 to December 2010. one hundred patients (58 male and 42 female) involved in this study of different age group ranging from (15 to 70) years complaining of chronic renal failure on regular hemodialysis (five patients were transplanted previously and failed) each patient was subjected to hemodialysis for a period of 4 hours in two or three sessions per

week. using GAMBRO AK95S haemodialysis apparatus with polyflux™L dialyzer membrane with effective surface area range from 1.4 to 2.1m<sup>2</sup> and flow rate rang from 200 to 300 ml/min

Dialyzers were not reused and dialysis was performed with disposable kits, syringes, and needles. Disinfection of the dialysis machines was done routinely according to the recommendations of the manufacturer. Patients who were HCV-positive were dialyzed in a separate room .

All patients were subjected to full a history and physical examination at baseline and investigations include blood urea nitrogen, creatinine, serum calcium, phosphorus, hepatitis screen for hepatitis C virus antibodies were tested by using Murex anti-HCV ELISA . Positive cases were confirmed by polymerase chain reaction, screening was done before entry into dialysis programme, and every three month during the haemodialysis programme. Hepatitis B vaccine (engerix - B) was given in dosage schedule of 40 micro gm on day one, after one and two months and six month.

Predialysis venous blood samples from each patients were sent for liver function test (allanine aminotransferase(ALT), aspartate aminotransferase(AST),Alkaline phosphatase(ALP) , serum bilirubin) Serum albumin, Prothrombine time, partial thromboplastin time, and international normalize ratio( INR) were measured routinely by standard laboratory technique. The enzyme level was considered elevated when it was above 20 U/liter.

Statistical analysis was performed using chi-square test.  $p \leq 0.05$  is regarded as indicative of statistically significant difference.

### **RESULTS:**

Among the screened patients , 15 (15%) had HBV infection (proved by HBS Ag positive) alone and 41 (41%) had HCV infection , while eleven (11%) had dual infection of both viruses.

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**Table 1: Characteristics of the patients**

characteristics		percentage
Age in years	range	15—75 year
	mean	46±15
sex	male	58
	female	42
Duration of hemodialysis in month	1---6 month	8
	7---12 month	32
	13---18 month	20
	19---24 month	16
	25---30 month	4
	31---36 month	16
Percentage of infection	37---42 month	4
	Hepatitis C(anti HCV+)	30
	Hepatitis B(HBS Ag+)	15
	Both	11
	None	55
History of blood transfusion	Prevalence of hepatitis C	41
	positive	85
Route of haemodialysis	negative	15
	Double lumen	30
Treatment (interferon)	AV fistula	70
	positive	10
	negative	90

The development of cirrhosis and decompensation of liver function was not observed in HCV infected hemodialysis patients, only two patient develop hepatic coma.

Despite minimal biochemical evidence of disease, four patients, liver biopsy was done for them in

gastro-entrolgy center in Baghdad and ten patients receive pegylated interferon 180 µg per week for one year without clearance of the virus according to checking by polymerase chain reaction .

**Table 2: Comparison of clinical index in hemodialysis uremic patients With or without HCV infection**

variables	HCV positive n.41/100	HCV negative N. 59/100	P value
Age in years (mean±SD)	47±18	50±15	0.28
Gender male/female	23/18	32/27	0.51
Dialysis duration(weeks) (mean±SD)	116±39	72±32	<0.002
Blood transfusion	31/41	17/59	<0.001
Blood urea mmol/L (mean±SD)	27±9	24±7	0.85
Serum creatinine µmol/l	942±170	880±140	0.64
Kidney transplantation	4/5	1/59	<0.001

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**Table 3 :Comparison in liver function test in hemodialysis uremic patients with or without HCV infection.**

Test		Anti HCV –V	Anti HCV +V	P value
ALT normal<20u/L	Normal	٧٢	٦٨	0.85
	Elevated	28	٣٢	
AST normal< 20 u/L	Normal	74	69	0.43
	Elevated	26	31	
ALP normal< 92 u/L	Normal	85	74	0.14
	Elevated	15	26	
TSP (normal)< 17µmol/l	Normal	77	68	0.42
	decreased	23	32	
S.Albumin Normal( 36—52g/l)	Normal	29	44	0.29
	decrease	71	56	
Total bilirubin Normal(5----17µmol/l)	Normal	90	83	0.52
	Elevated	10	17	
PT	Normal	47	38	0.37
	Elevated	53	62	
PTT	Normal	٥٥	88	0.01
	Elevated	45	12	
INR	Normal	42	32	0.31
	Elevated	58	68	

ALT=allanine aminotransferase, AST=aspartate aminotransferase , ALP=alkaline phosphotase, TSP=total serum protein, PT=prothrombine time, PTT=partial thromboplastin time, INR=international normalize ratio.

### DISCUSSION:

Patients on chronic HD have a high risk of acquiring HCV and HBV infections. Transfusions of unscreened blood, duration of dialysis and nosocomial transmission within HD units are implicated as the main transmission routes of HCV and HBV infections in HD patients.<sup>(9)</sup>

Hepatitis C virus infection has been reported from different parts of the world as a common infection in ESRD patients on dialysis. In this study, we observed a high prevalence of HCV antibody (41%) among HD patients in the Alkadymia Teaching Hospital in hemodialysis unit.

This prevalence (41%) is higher than in USA, Croatia, Japan, Casablanca, Iran, Jordan, Kenya, Saudi Arabia, Hong Kong<sup>(10)</sup>

The reported anti-HCV seropositivity since 1999 ranges from low (1.9%) in the Slovenia to high (80%) in Senegal. HCV seroprevalence in the HD population was 59% in Bosnia and Herzegovina, 6.8% in Belgium, 16.3% in France, 6.1% in Germany, 10%–29% in Greece, 22.5%–32.1% in Italy, 75% in Moldavia, 3.4% in the Netherlands, 11% in Sweden, 7%–23.3% in the USA, 4% in the UK, 20.5% in Libya, 71% in Kuwait, 23.7% in Sudan, 19% – 41.7% in Tunisia, 8.4%–43.2% in Brazil, 6.7% in Mexico, 59.3% in Peru, 3.5% in Puerto Rico and 13.2% in Iran<sup>(11)</sup>

No statistically significant relationship was found between HCV and patient sex (p = 0.51) and age (p = 0.28) in this study.

This study showed that there was an association between the history of blood transfusions, duration of the dialysis and kidney transplantation and the prevalence of HCV infection, P.value was significant <0.001.

In our research, although the levels of AST and ALT were higher in the positive HCV marker group, there was no significant difference between them.however, only(31%&26) patients showed increased enzyme levels elevated above normal and these findings are in agreement with published data.<sup>(12)</sup>

For hemodialysis patients, Herrine et al<sup>(13)</sup> revised cutoff values for AST (18 U/L) and ALT (16 U/L), which had better sensitivities.

In the HCV infected group, the mean values of AST (18.4 U/L) and ALT (17.6 U/L) exceeded this criteria, which has important clinical implications in providing benefits of earlier detection and possible prevention of chronic hepatic deterioration.<sup>(14)</sup>

Because of cellular immune status disturbances, it is hard to eliminate HCV from hemodialysis patients.<sup>(15,16)</sup>

But in this study, HCV-related liver disease in patients on long-term dialysis often appears clinically mild, with only modest elevations in AST and ALT levels

Suggested strategies to control HC

V transmission in hemodialysis units include strict adherence to

universal precautions, careful attention to hygiene, sterilization of dialysis machines and routine serologic testing and surveillance for HCV infection. Antiviral therapy with interferon alpha is recommended for selected categories of HCV-infected hemodialysis patients and kidney transplant candidate,

with proper disinfection procedures, combined with increasing awareness among the HD staff and patients that their blood/body fluids are potentially infective in spreading HCV infection to others, may reduce the spread of HCV infection in the dialysis units.

### CONCLUSION:

HCV infection is high in hemodialysis unit in Alkadhiya teaching hospital, HCV-related liver disease in patients on long-term dialysis often appears clinically mild, with only modest elevations in AST and ALT levels but most of them asymptomatic. Observation of appropriate preventive measures in the hemodialysis center is highly recommended.

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