

# Seroconversion of Hepatitis B and Hepatitis C among Hemodialysis Patients, Baghdad, 2015

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**Abstract:** Hepatitis C&B still the major problem in hemodialysis patients and the challenge continues in dialysis centers to prevent spread among patients and workers, the worldwide reported incidence of anti-HC antibody in dialysis center was range from 10.5% -24% yearly and the prevalence range 5-85%. Also, HBs-antigen had the same problem but with less incidence and prevalence. For the purpose of evaluating the seroprevalence and seroconversion of anti-HC antibody and HBs-antigen in Haemodialysis centers in Baghdad required action a retrospective incidence study from Nov. 2015 to Jan. 2016 on maintenance HD patients at hemodialysis centers in Al-kind, Al-Karama and Baghdad Hospitals. The data obtained from patients records of hospitals and we relied on laboratory test results for ELISA to determine the seroconversion and seroprevalence of anti-HC-antibody and HBs-Antigen. The study found the total prevalence of seropositive anti-HCV antibody in three centers were 251(28%), the seropositive patients of HBs-Ag were 14(2%) While the total seroconversion was 196 (21%) anti-HCV antibody and for HBs-Ag 4 (0.4%); so there was serious risk of nosocomial infection particularly for hepatitis C in the hemodialysis centers in Baghdad and AL -kindi while the problem with HBV was under control at same time The differences of seroconversion and seroprevalence of anti-HC antibody and HBs-antigen between the hospitals in the study may indicate to the level of infection control was applied in hospital.

**Key words:** Seroconversion, seroprevalence, hemodialysis, hepatitis.

## 1. Introduction

Infection by the HBV (Hepatitis B viruses) and HCV (Hepatitis C viruses) is the most common cause of nosocomial infection [1]. Transmission occurs mainly through direct contact with blood, utilization of intravenous drug, blood transfusions and/or haem component, sexual relation, direct transmission from infected mother to fetus.

High-risk groups may acquire the infection even they should also be vaccinated. They include: people who frequently require blood or blood products, dialysis patients, recipients of solid organ transplantations [1]. Infection by these two viruses may induce chronic hepatitis, which may progress to cirrhosis, and eventually to hepatocellular carcinoma [1].

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- Estimated 350 million people are chronically infected with hepatitis B, 8% of world population (defined as hepatitis B surface antigen positive for at least 6 months).

- More than 600,000 to 1 million persons die every year due to complications of hepatitis B, including cirrhosis and liver cancer.

- And 130-170 million people are chronically infected with hepatitis C, 3% of world population like HBV one of most global causes of chronic hepatitis, cirrhosis & liver cancer [1].

Patients receiving maintenance hemodialysis (HD) therapy are at increased risk for acquiring infections with HBV and HCV and have a higher prevalence of HBV and HCV than the general population [2, 3]. Recognition of the risk of nosocomial infection has resulted in recommendations that strict infection control procedures should be followed on HD units; patients with blood-borne virus infections should be

isolated from seronegative patients during dialysis and patients as well as staff should be vaccinated against hepatitis B [4-6].

The introduction of blood donor screening and a reduction in blood transfusions due to the availability of recombinant erythropoietin has significantly reduced the incidence of new HCV infections among HD patients in many countries [6, 7].

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 [6].

In Iraq:

- A national serological survey for HBV & HCV infections among the general population was performed in Iraq during 2005-2006 and revealed the prevalence of low endemicity (carrier rate 1.6-2% and 0.4%) respectively [8].

- Provides free access to maintenance HD for end-stage kidney disease through many centers, which work under national dialysis practice guidelines and infection control policies enforced by healthcare authorities, in order to be screened patient for HBV and HCV infection before the initiation of HD and monitored every 2-3 months thereafter [9]. Seropositive patients are dialyzed on dedicated machines either in an isolated area or alongside seronegative patients if space does not allow isolation [9].

### 1.1 Goal

Prevention of HCV and HBV infection among haemodialysed patients.

### 1.2 Objective

Measure prevalence of anti-HCV antibody and HBs-antigen; Measure rate seroconversion hepatitis B&C among hemodialysis patient.

## 2. Method

The study design was a cross-section of a descriptive

study and retrospective incidence study.

### 2.1 Study Site

Dialysis centers of Al-krama, Al-Kindi and Baghdad Teaching hospitals.

### 2.2 Study Sample Which Represent the Larger Centers in Baghdad

All patient on maintenances hemodialysis in these centers during August to December 2015 who have regular hemodialysis on machine due to the end stage of renal failure.

### 2.3 Data Collection

Data had been collected from hospital recording using application form which contains the following variables: patient name, gender, age, date for first hemodialysis, date and result for first ELISA test for HBs-Ag and Anti-HCV antibody, date of seroconversion of result of ELISA test if it happens, the duration of used dialysis, associated diseases, discard the history of blood transfusion and surgery because unrecorded in Al-karama and Baghdad hospitals data type and organized in categories:

- (1) Gender categorized into male and female.
- (2) The duration on dialysis into; three years and more, two years, one year.
- (3) The patients according to the centers that dialysis in it.
- (4) The patients according to the result of ELISA .
  - Seronegative who was negative HBs-Antigen and negative ant-HCV antibody.
  - Seropositive hepatitis B who was positive HBs-Antigen and negative ant-HCV antibody.
  - Seropositive hepatitis C who was the positive anti-HCV antibody and negative HBs-antigen.
  - Seropositive hepatitis B&C who was the positive anti-HCV antibody and positive HBs-antigen
- (5) Laboratory standard for ELISA was used for every patient at dialysis every two to three months to screen on hepatitis B&C.

## 2.4 Data Analysis

Computerize data which were collected by IBM ver. Twenty-one (21) SPSS programs then analyze the data to extract the frequency distribution for selected variable was done.

## 2.5 Ethical Considerations

It is necessary for official authorization to use the hospital data which were obtained from the Baghdad Al-krakh, Al-Rusafa, and Medical city health directorates, MOH.

## 2.6 Result

### 2.6.1 Socio-Demographic Variable of Total Dialyzed Patients

All patients in three dialysis centers during the study were 886 patients with end stage renal diseases and on maintenances hemodialysis distribution as (473, 221 and 1,92) Al-Krama, Al-Kindi & Baghdad centers respectively. The mean age of study population was  $50.37 \pm 17.14$  years ranging from 17 to 77 years: they were 514 (58%) males and 372 (42%) females. The 95% confidence interval extends from 0.7927 to 0.8434 and male which had positive anti-HCV antibody 151 (60%) with ratio 1.5|10 and mean age was  $49.4 \pm 12$  years.

Hypertension was associated with renal dialysis patients with 786 (88%) of the total. The 95% confidence interval extends from 0.8645 to 0.9064.

Diabetic Mellitus was associated with dialysis patient with 112 (12%) of total. The 95% confidence interval extends from 0.1061 to 0.1500.

The current situations of HD centers [Table 1] during the study were, the total prevalence of

seropositive anti-HCV antibody in three centers was 251 (28%), the seropositive patients of HBs-Ag were 14 (2%) and both anti-HCV antibody and HBs-Ag positive were 8 (1%).

The number of patients who started hemodialysis with positive anti-HCV antibody was 84 patients distributed as 40, 18 & 24 for Al-Kindi, Al-Krama and Baghdad hospitals respectively, Table 2 shows the number and rate of seroconverting patients to positive anti-HCV from reminder patients who have negative anti-HCV at started hemodialysis was 21% for all patients in the study.

The number of patients started hemodialysis with positive HBs-Ag was 10 patients distributed as 6, 3 & 1 for Al-Kindi, Al-Krama and Baghdad hospitals respectively, Table 3 shows the number and rate of seroconverting patients to positive HBs-Ag from reminder patients who have negative HBs-Ag at started hemodialysis was 0.4%.

The number and rate of patients seroconverted to positive anti-HCV from patients who have negative anti-HCV and that used hemodialysis for three years and more continuously [Table 4] was 22.9%.

The number and rate of patients seroconverted to positive anti-HCV from patients who have negative anti-HCV and that used hemodialysis for two years continuously [Table 5] was 27%.

The number and rate of patients seroconverted to positive anti-HCV from patients who have negative anti-HCV and that used hemodialysis for one year and less continuously [Table 6] was 7.1%.

There were four patients had seroconverted to positive HBs-Ag, three in Baghdad centers and one in Al-Kindi Hospital. All of them used dialysis more than 3 years.

**Table 1 Current situation of HD centres during study represent the prevalence.**

Hospital	Total	Free of hepatitis		HCV-Ab + ve		HBs-Ag + ve		Both HCV-Ab + ve&HBs-Ag + ve	
		N	%	N	%	N	%	N	%
Al kindi	221	105	47%	106	48%	7	3%	3	1%
Al karama	473	432	91%	37	7.80%	3	1%	1	0.20%
Baghdad	192	76	40%	108	56%	4	2%	4	2%

**Table 2 The seroconverting of anti-HCV antibody to positive.**

Al-Kindi Hospital		Al-karama Hospital		Baghdad Hospital		Total	
<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
66	37%	19	5%	84	50%	196	21%

**Table 3 The seroconverting of HBs-Ag to positive.**

Al-Kindi Hospital		Al-karama Hospital		Baghdad Hospital		Total	
<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
1	0.5%	0	0%	3	1.6%	4	0.4%

**Table 4 The rate of seroconversion to anti-HCV antibody with patients using hemodialysis for past three years or more.**

	Freq. of patient who started dialysis with HCV-Ab-ve	Frequency of seroconversion to HCV-Ab+ve	Serconversion %	<i>p</i> -value
Al-Kindi	26	18	69.2%	0.00055
Al-Krama	217	3	1.2%	0
Baghdad	49	43	82.7%	1 statistical not significant
Total	292	64	22.9%	0

**Table 5 The rate of seroconversion to anti-HCV antibody with patients using hemodialysis for past two years.**

	Fre. of patient who started dialysis with HCV-Ab-ve	Frequency of seroconversion to HCV-Ab+ve	Serconversion %	<i>p</i> -value
Al-Kindi	56	26	46.4%	0
Al-Krama	88	2	2.3%	0.0011
Baghdad	30	19	63.3%	0.04
Total	174	47	27%	0

**Table 6 The rate of seroconversion to anti-HCV antibody with patients using hemodialysis for past one years and less than year.**

	Fre. of patient who started dialysis with HCV-Ab-ve	Frequency of seroconversion to HCV-Ab+ve	Serconversion %	<i>p</i> -value
Al-Kindi	96	10	10.4%	0.01
Al-Krama	93	0	0%	0.000
Baghdad	63	8	12.7%	0.4 statistical not significant
Total	252	18	7.1%	00

### 3. Discussion

Despite the strict measures to prevent the spread of infection in hemodialysis units, it is still viral hepatitis is a clear threat in our country, especially viral hepatitis C that is considered low intensity in Iraq.

From an analysis of socio-demographic variable of total dialyzed patients, we can see that the average age ( $50.37 \pm 17.14$  years), ranges from 17 to 77 years, which make up the productive and effective category in the community and this adds a serious factor of the transmission of the virus and these observations are close to other studies that are conducted for the same

purpose [9-11].

As for gender, we saw that men who were on maintenances dialysis units are more likely than women (58% men) with ratio being 29:21, this also closes to other studies and this may be due to the fact that men are at greater social risk in our societies [8-10].

The number of patients who had hypertension associated with end stage of renal failure, was 786 (88%) and this may relate renal failure or a renal failure may aggravate hypertension this saw similar in many studies, the diabetes mellitus associated with chronic renal failure in 112 (12%) of total and diabetic may be responsible for renal failure [5].

The seroprevalence of HCV infection among dialysis patients generally varies between centers it was ranging 1-80% [12] this difference may relate to the demographic difference in the population and level of hygiene standard in centers and dialyses process itself [13]. Our study shows the total prevalence of seropositive anti-HCV antibody in three centers which was 251 (28%) and greater than the results of studies conducted in Nineveh (15.3%) and Basra (7.5%) but less than that reported in AL-Kadhimiya Teaching Hospital (36.8%) [9-11].

Although the three hospitals in our study lie within the same demographic population and same instructions dialysis process and hygiene system, the variances between seroprevalence were clearly higher in Baghdad hospital (56%) and lesser in Al-kramahospital (7.8%).

Our study was showing retrospective incidence of seroconversion seropositive anti-HCV antibody in three centers which were 21%, higher than that reported in European countries [12-15] and less than the result found in Egypt and Pakistan at same time we were found the differences between the hospitals in study that Al-Krama hospital recorded seroconversion (5%) nearly same that found in advance cantoris [14-16] while Baghdad hospital was recorded (50) higher than the result found in Egypt and Pakistan.

There was no statistical difference between male patients which had seropositive and female in the assessment of seroprevalence of HCV antibody ( $p$ -value = 0.3).

Logically, the length of the time period plays a key role in the patient with maintenance hemodialysis due to the increase in the number of exposure to a dialysis machine, which increase the chance to contact with other patients but this does not eliminate the preventive measures taken during the dialysis process and the personal hygiene of patient. Although our study was a cross-section with retrospective analysis the statistical significance was clear in total patients in the three hospitals and it was very clear in Al-krama hospital

which recorded the seroconversion of HCV antibody as fallow:

We can find the statistically significant increase in seroconversion of HCV antibody in total patients that on maintenance hemodialysis for three years duration and more than those who used dialyses in one year duration in the three hospitals, also there was increase in the rate of seroconversion of HCV antibody between patients two years duration on increase. This result was compatible with the result of the other studies which had been done in our country and neighbors countries [17, 18].

This applied to the rest of hospitals in the study with some exception in Baghdad hospital there was a decrease in the rate of seroconversion but without statistical significance. And this may be related to increasing of HCV antibody prevalence and decreases the number of new patients who joined in this center with negative HCV antibody.

As for hepatitis B, its shape is less but exists the seroprevalence of HBs-Ag 2% (14 patients) within the rest of the same study in other hospitals and the seroconversion of HBs-Ag was 0.4% (4). This low endemicity may be related to vaccine that all the patients and staff who work in dialysis centers had taken full course of HBV vaccine and the nature of virulence of HBV.

#### 4. Conclusion

The rate of seroconversion and seroprevalence were significantly different between the three centers in the study but it is considered higher in that which was recorded in general population

The differences of seroconversion and seroprevalence of HCV & HBV between the hospitals in the study may indicate the level of infection control was applied in hospital. The more stress the control of infection and strictly follow the instructions of standard dialyses center the less seroconversion, also indicated that hospital can reach the high standard for prevention of HCV & HBV.

The study indicates the importance of regular serological tests to the patient and staff, who work in dialysis centers.

The problem which arose from HBV was under control while the problem that arose from HCV was out of control.

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