Prevalence of HBV among Hemodialysis patients in Mosul city, Iraq

Raid Michael Amen
Nursing Department , Technical Institute Mosul , Mosul , Iraq
Email : safferraed@Yahoo.com
(Received: 18 / 11 / 2012 ---- Accepted: 17 / 3 / 2013)

Abstract
Hemodialysis patients [HD] seem to be at considerable risk of infection, therefore the aim of this study was carried out to determine the seroprevalence of Hepatitis B Virus among hemodialysis patients living in the Mosul city of Iraq.
This study includes (70) patients , (43) Male and (27) Female, the age group ranged between less than 10 years to 60 years, and the mean age was 37.1 years, which was considerable percentage of HBV in patients above 50 years (7.1%), while the average percentage of HBV less than 50 age(2.24%). This study included age, gender, quantitative of blood pints transfusion, and episodes of big time spent on [HD] hemodialysis .
This study showed that male [HD] patients had higher HBV prevalence than females (14.2%, 4.2%) respectively. Hemodialysis patients are at high risk for viral hepatitis infections due to the higher number of blood transfusion sessions range about less 5 pints to more 20 pints, in our study the prevalence of HBV was increased significantly with increasing the number of blood units transfused . Duration long term dialysis was less 2 year and more than 10 years in 4.2% of HBV positive patients, (2-4) years and (8-10) years in 1.4% of cases, and (4-6) years and (6-8) years in 2.8% of them, the mean time of dialysis (5.4) years.
As well as it was used Enzyme Linked Immuno-Sorbent Assay (ELISA) technique to detect HB_sAg and confirm the positive results by used Polymerase Chain Reaction (PCR) to detect HBV-DNA.The result was showed (13) positive with HBV in hemodialysis patients by ELISA technique, but (12) positive with HBV-DNA by used PCR .
Key words : Hepatitis B Virus , Hemodialysis .

Introduction
Hepatitis B (HBV) and hepatitis C (HCV) viral infections are important causes of morbidity and mortality in haemodialysis patients and pose problems in the management of the patients in the renal dialysis units, because chronic renal failure patients do not clear these viral infections efficiently [1]. Hepatitis B virus (HBV) is a member of *Hepadnaviridae* and a major causative agent of chronic and acute hepatitis, liver cirrhosis and hepatocellular carcinoma [2].During 1970_s, HBV infection was recognized as agreat risk to hemodialysis patients [3], as HBV infection prevalence overcame 50% in some center [4]. Hepatitis B virus (HBV) can be detected in blood and derivatives as well as in saliva,semen,vaginal secretion and exudates from cutaneous ulcers [5]. Chronic hepatitis B diagnosis is based on the existence of hepatitis B surface antigen (HB_sAg) and HBV DNA in blood. HBV infection is less prevalent than hepatitis C virus (HCV) in dialysis units[6]. In Arab countries, the prevalence of chronic HBsAg positivity among HD patients ranged from 2% in Morocco, to 11.8% in Bahrain [7,8,9,10]. Also In Arab countries the prevalence of HCV antibodies among HD patients has been reported to range from 27% in Lebanon to 75% in Syria[11,12,13,14] HBV incidence in hemodialysis patients has dramatically decreased especially due to selection of blood donors, HB_sAg positive patients isolation during dialysis and routine vaccination of uraemic patients [15].

Objectives of study
The main objectives of this study were :-
1. This study aimed to evaluate the status of HBV infection among hemodialysis patients at the dialysis unit in Ibn-Sina hospital in Mosul city through out June to August 2010, to determine prevalence of this infection and the related risk factors.
2. To determine the association between viral hepatitis B and probable risk factors, such as episodes of long period hemodialysis, number of blood pints transfused .
3. To diagnose hepatitis B virus by used ELISA and confirmed the positive results by used PCR technique in this study .

Materials and methods
This study was carried out from June to August 2010 in hemodialysis unit in Ibn-Sina hospital in Mosul city, include 70 patients (43male and 27 female) , This demographic characteristics of the sample included age, gender, number of blood pints transfused, and period of time on [HD] hemodialysis , mean age of patients was(37.1) years. Ten ml of blood was taken from the patients and placed in plane blood tubes, it was left to stand at room temperature (20-25c·), to allow clot formation, then the sera were separated by centrifugation at 3000 rpm for 15 minutes, and divided into aliquots (250 µl) and stored at (-20c·) until examination .
Each aliquot of the serum used once to avoid thawing and freezing. All sera and reagent were allowed to stand at room temperature before use in the test .
Serological markers for HBV were determined with Enzyme Linked Immuno-Sorbent Assay (ELISA) , and used Polymerase Chain Reaction (PCR).
Detection of HBV and detection of HBsAg by Enzyme Linked Immuno-Sorbent Assay (ELISA) technique was used to screen all the samples, the tests done in blood bank in Mosul .

Hepanostika HBsAg Uni-Form II is an ELISA for qualitative determination of HBsAg subtype ad and ay in human serum samples.

The researcher followed the procedure and interpretation of result according the instructions of ELISA HBsAg confirmatory test .

Hepanostika HBsAg Uniform II confirmatory reagent was used for confirmation of HBsAg in specimens, the researcher followed the procedure and interpreted the results according to the manufactures instruction.

HBV-DNA$_s$ of cases included in the study were quantitatively evaluated by PCR method, used Iran-Cinnagen company to detect HBV-DNA by PCR , we followed the procedure and interpreted the results according to the manufactures instruction.

HBV-DNA Detection

It was assayed on serum sample, using Polymerase Chain Reaction (PCR) kit from Cinnagen Company (IRAN). The results were interpreted according to the manufacturer's instructions (figure1).

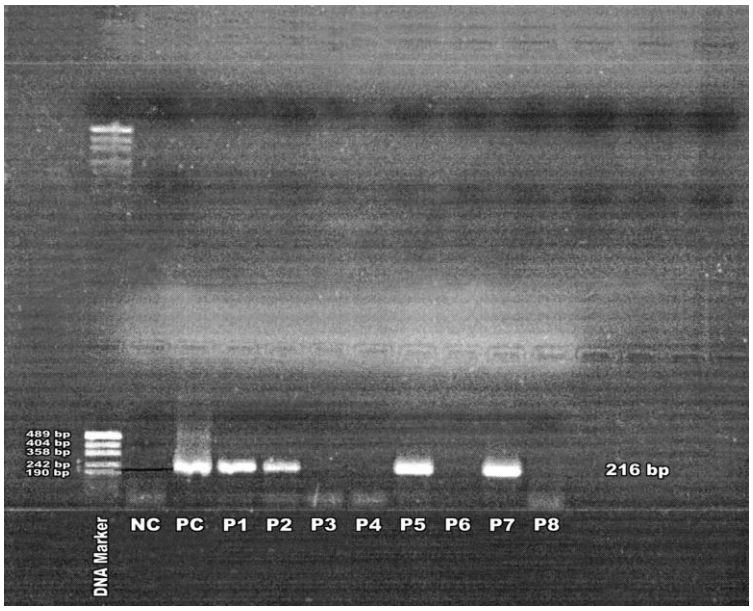

Fig.(1) verification of the PCR product on agarose.

*** DNA marker is a mixture of fragments with known size to compare with the PCR fragments.**
*** NC: Negative control.**
*** PC: Positive control the PCR fragment length 216bP.**

Results and Discussion

Table (1) demonstrates that the prevalence of HBV increased as the age increased, from another side, detection of the disease either by using ELISA or by using PCR also increased as the age of patients increased. However, there wasn't any case of disease under 10 years of age .

Table(1) Distribution of HBV infection in hemodialysis patients according to age .

Age group/Years	Tested HB$_s$Ag by ELISA		Tested HBV DNA by PCR	
	Positive	Percentage%	Positive	Percentage%
>10	0	0%	0	0%
10-20	1	1.4 %	1	1.4 %
20-30	1	1.4 %	1	1.4 %
30-40	3	4.2 %	2	2.8%
40-50	3	4.2 %	3	4.2 %
50-60	5	7.1 %	5	7.1%
Total count	13	18.4 %	12	17%

The result of present study explained that there was no any HBV positive hemodialysis patients less than 10 years, this result was in agreement with other study for the decrease of HBV infection in dialysis patients despite implementation of universal precaution is a result of advent of recombinant human erythropoietin and HBV vaccination in last years [16].

A statistically significant relationship was found between HBV and age of the patients, as patients more than 50 years old were found more susceptible to HBV than less 50 years because, a partial

immunosuppressant in hemodialysis patients resulting in a poor antibody response to Hepatitis viruses' infection [17].

The table (2) showed that male hemodialysis patients(43/70) had higher HBV prevalence than females(27/70), the percentage of infection with HBV among males was 14.2%,while among female was 4.2% by ELISA technique, but the percentage of infection were 2.8% among females by using PCR technique to detect HBV-DNA ,as shown in table (2) and Fig.2.

Table (2) Distribution of HBV infection in hemodialysis patients according to gender.

Gender	Tested HB_sAg by ELISA		Tested HBV DNA by PCR	
	Positive	Percentage%	Positive	Percentage%
Male	10	14.2%	10	14.2%
Female	3	4.2 %	2	2.8%
Total count	13	18.4%	12	17%

The present study indicated that male [HD] patients had higher HBV prevalence than females. This may be related to the fact that males in Iraq are more socially active than female. Furthermore , they are more exposed to male-related risk factors for HBV than females due to their work (e.g. hair dressing and circumcision). This result is in agreement with study in general population of Lebanon[18] and in Gaza strip, Palestine[1].

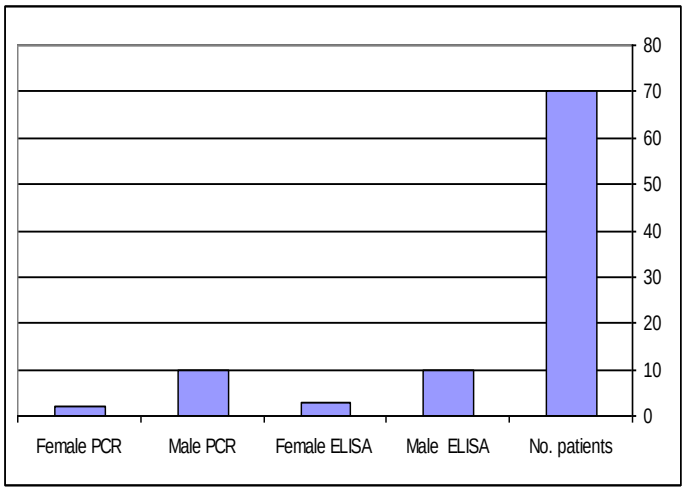

Fig.2 Distribution of HBV infection in hemodialysis patients according to gender by ELISA and PCR.

Figure (3) presents that, the prevalence of HBV was increased with increased the number of blood pints transfused to patients, with a reference that patients received less than five pints of blood didn't get a disease and others were as (5-10 pints:1.40%; 10-15 pints:2.80%; 15-20 pints: 4.20% and more than 20 pints : 8.50%) .

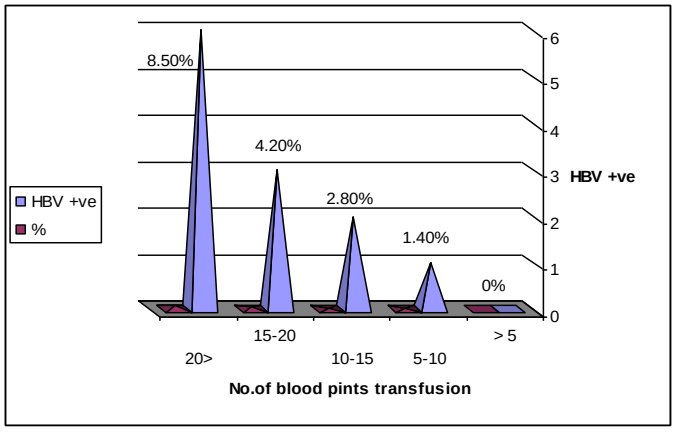

Fig (3) Percentage of infection with HBV according to the number of blood pints transfusion by PCR.

Hemodialysis [HD] patients are at high risk for viral hepatitis infections due to the high number of blood transfusion session, prolonged vascular access and the potential for exposure to infected patients and contaminated equipment [19,20] .

A significant risk of cirrhosis development and decompensation of liver function is observed in HBV and HCV infected hemodialysis patients [21].This is in agreement with a previous study in Brazil [22] and other study in USA [23],while another study in Jordan showed no relationship[24].

Duration long term of dialysis was less than 2 years and more than 10 years in 4.20% of HBV positive patients, (2-4) years and (8-10) years in 1.40% of cases, but (4-6) years and (6-8) years in 2.80% of them,as shown in Fig. 4.

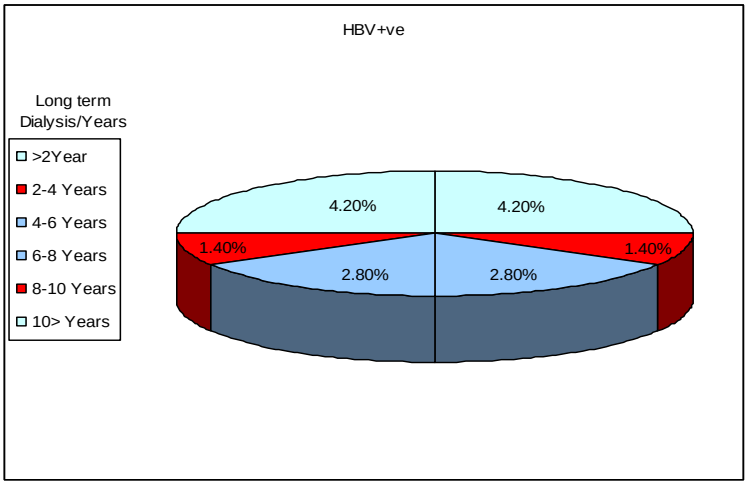

Fig. (4) The percentage of HBV DNA from patients on long term dialysis by PCR.

Hemodialysis patients are a high risk population for HBV infection. On the other hand,immunodeficiency may be the cause of the high prevalence in this population. Patients under long-term and continous hemodialysis sessions are under high risk of being infected with HBV [25].

Finally we found 18.4% prevalence of HBV in hemodialysis patients by ELISA technique, which was lower than reach 17% prevalence HBV-DNA by PCR, the result was showed 13 positive of HB_sAg in hemodialysis patients by ELISA but, 12 positive of HBV-DNA by PCR the variation of results indicate the PCR –based testing offers great sensitivity and specificity and plays a decisive role in infection follow up and tailoring individualized treatment [26].

Hemodialysis [HD] patients seem to be at considerable risk of infection, because HBV is mainly transmitted via parenteral routes, hemodialysis seem to be at considerable risk of acquiring HBV infection. Despite control and prevent hepatitis B still seems to be a major concern in medical centers with HD facilities hemodialysis-specific infection-control practices and to hepatitis B vaccination, HBV controlled in some dialysis centers .

On the other hand ,HBV infection remain concern in some countries, HBV infection outbreaks still remain a major problem a failure in control of nosocomial infection occurs[27], or due to contamination of dialysis machine with HBV and inappropriate sterilization of instrument using during the process of dialysis or the patients may be used immunosuppressive drugs or renal transplantation from infected donors with HBV,or transmitted the disease from health care worker staff by needles and instrument[28,29,30, 31].

The prevalence of HBV infection with dialysis units in developing countries appears higher (2-20%) , this percentage was agreement with my result based on relatively several reports[32] .

Conclusions

1. Immunization with HBV vaccine before beginning the dialysis will reduce infection of HBV, and isolation of infected individuals, another strict adherence to universal precautions in the dialysis units may help to decrease the prevalence of HBV infections among these high risk patients .
2. The prevalence of HBV among hemodialysis patients, in Mosul indicates a causative relation between HD and hepatitis viruses transmission, therefore extremely careful observation of preventive infection control measures is essential to limit Hepatitis viruses' transmission in HD center .
3. Blood testing for trans implementation of universal precaution in dialysis units is strongly recommended, as well as, the use of dedicated infected patient has led to a decreasing trend of HBV infection .
4. Periodic surveillance among patients of HBV for identified early to reduce the risk of long term complication like cirrhosis.

References

1. A.Y. El-Ottol, A. A. Elmanama and B. M. Ayesh. Prevalence and risk factors of hepatitis B and C viruses among haemodialysis patients in Gaza strip, Palestine.Virology Journal 2010, 7 (210) : 1-7.
2. N. Neisi, M. Makvandi, and AR Samarbaf-Zadeh. A study on genotypes of hepatitis Bvirus among hemodialysis patients in Khuzestan province . Jundishapur J Microbi 2011, 4 (2): 65-70.
3. SM.Alavian, K. Bagheri-Lankarani, M.Mahadavi-Mazdeh, S. Nourozi, Hepatitis B and C in dialysis units in Iran:Changing the epidemiology. HemodialInt 2008, 12(3) 378- 82.
4. RA.Garibaldi, JN. Forrest, JA. Bryan, BF. Hanson, WE. Dismukes. Hemodialysis –associated hepatitis. JAMA. 1973, 225(4) : 384-9.
5. E. Goffin, Y. Pirson,van Y persele de Strihou C. Implications of chronic hepatitis B or hepatitis C infection for renal transplant candidates .Nephrol Dial Transplant 1995, 10 (6) : 88-92.
6. C. Oesterreicher, C. Muller. HBV and HCV genome in peripheral blood mononuclear cells in patients undergoing chronic hemodialysis. Kidney international.1995, 48 : 1967- 1971.
7. K. Boulaajaj, Y. Elomari, B. Elmaliki, B. Madkouri, D. Zaid, N. Benchemsi. Prevalence of hepatitis C, hepatitis B and HIV infection among haemodialysis patients in Ibn-Rochd university hospital. Casablanca Nephrol Ther. 2005,1(5) : 274-284.
8. M.Al Hijazat, Y. Ajlouni. Hepatitis B infection among patients receiving chronic hemodialysis at the royal medical services in Jordan. Saudi J Kidney Dis Transpl. 2008, 19 (2) : 260-267.
9. LA. Khan, SA. Khan. Prevalence of hepatitis B and C markers in patients on maintenance hemodialysis in Najran. Saudi Med J. 2001, 22 (7) : 641-642.
10. WY. Almawi, AA. Qadi, H. Tamim, G. Ameen, A. Bu-Ali, S. Arrayid, MM. Abou Jaoude. Seroprevalence of hepatitis C virus and hepatitis B virus among dialysis patients in Bahrain and Saudi Arabia. Transplant Proc. 2004, 36 (6) : 1824-1826.
11. RE. Naman, I. Mansour, S. Klayme, G. Khalil.Hepatitis C virus in hemodialysis patients and blood donors in Lebanon. J Med Liban. 1996, 44 (1) : 4-9.
12. S. Bdour. Hepatitis C virus infection in Jordanian haemodialysis units serological diagnosis and genotyping. J Med Microbiol. 2002, 51(8) : 700-704.
13. J. Hachicha, A.Hammami, H. Masmoudi, M. Ben Hmida, H. Karray, M. Kharrat, F. Kammoun, A. Jarraya. Viral hepatitis C in chronic hemodialysis patients in southern Tunisia, prevalence and risk factor. Ann Med Interne 1995, 146 (5) : 295-298.
14. AS. Abdulkarim, NN. Zein, JJ. Germer, CP. Kolbert, L. Kabbani, KL. Krajnik, A. Hola, MN. Agha, M. Tourogman, DH. Persing. Hepatitis C virus genotype and hepatitis G virus in hemodialysis patients from Syria: identification of two novel hepatitis C virus subtypes. Am J Trop Med Hyg. 1998, 59 (4) : 571-576.
15. F. Fabrizi, F. Poordad, P. Martin. Hepatitis C Infection and the patients with end-stage renal disease. Hepatology 2002, 36 (1) : 3-10.
16. S. Telaku, H. Fejza,Y. Elezi and T. Bicaj . Hepatitis B and C in dialysis units in Kosova. Virology Journal 2009, 6 (72) : 1-9.
17. SE. Goldbloom, WP. Reed. Host defenses and immunologic alterations associated with chronic hemodialysis .Ann Intern Med. 1980, 93(4) : 597-613.
18. W. Kalaajieh, M. Deeaoui, A. Chbani-Rima. Epidemiology of acute hepatitis B infection in Lebnon.Med Mal Infect 2002, 32 (7) : 382-386.
19.CM.Meyers, B SeefL, CO.Stehman-Breen, JH.Hoofnagle . Hepatitis C and renal disease: an update. AM J Kidney Dis . 2003, 42(4) : 631-657.
20. F. Fabrizi, AF. de Vecchi, G. Como, G. Lungi, p. Martin, De novo HCV infection among dialysis patients:a prospective study by HCV core antigen ELISA assay. Aliment pharmacol Ther. 2005, 21 (7) : 861-869.
21. TV. Antonova, EV. Kostereva, MY. Kunznecova, OI. Kubar. Viral hepatitis C in hemodialysis. Epi North 2001, 2 (3) : 42-4.
22.SU.Busek,EH.Baba,HA.TavaresFilho,L.Pimenta, A.Salomao,R.GC.Correaoliveira,Oliveira. Hepatitis C and Hepatitis B Virus infection in Different Hemodialysis Units in Belo Horizonte,Minas Gerais,Brazil. Mem Inst Oswaldo Cruz. 2002, 97 (6) : 775-778.
23. M. de Medina, M. Ashby, V. Schluter , M. Hill, B. Leclerq, JP. Pennell, LJ. Jeffers, KR. Reddy, ER. Schiff, G. Hess, GO. Perez . Prevalence of hepatitis C and G virus infection in chronic hemodialysis patients. Am J Kidney Dis. 1998, 31(2) : 224-226.
24. M. Al Hijazat,Y.Ajlouni . Hepatitis B infection among patients receiving chronic hemodialysis at the royal medical services in Jordan. Saudi J Kidney Dis Transpl 2008, 19 (2) : 260-267.
25. Z. R. Khameneh,N. Sepehrvand. Survey of Hepatitis B Status in Hemodialysis patients in a Traning Hospital in Urmia,Iran. Saudi J Kidney Dis Transpl 2008,19 (3) : 466-469.
26. A. A.Qadi, H. Tamim, G. Ameen, A. Bu-Ali, S.Al-Arrayed, N.A. Fawaz and W.Y .Almawia. Hepatitis B and hepatitis C virus prevalence among dialysis patients in Bahrain and Saudi Arabia: A survey by serologic and molecular methods. Association for Professionals in Infection Control and Epidemiology, Inc.. 2004, 32(8) : 493-495.
27. M .Mahdavimazdeh, SM .Hosseini-Moghaddam, SM .Alavian, H .Yahyazadeh. Hepatitis B infection in Hemodialysis patients in Tehran province, Iran. Journal of Hepatitis Monthly 2009, 9 (3) : 206-210.
28. T.Allander, C. Medin, SH. Jacobson, L. Grillner & MA. Persson. Transmission of hepatitis C virus by

Transfer an infected individual to anew dialysis unit. Nephron. 1996, 73 : 110.
29. S. Yerly, R. Quadri, F. Neyro, KP. Barbe & L. Perrin. Nosocomial outbreak of multiple blood- borne viral infection. J. Infect. Dis. 2001, 184 : 369-372.
30. E. Delarocque- Astagnead, N.Baffoy, V. Thiers, & N. Simon . Outbreak of hepatitis Cvirus infection ia hemodialysis unit: potential transmission by the hemodialysis machine. Infect. Control. Hosp. Epidemol. 2002, 23:328-334.
31. V. Diordjevic, K.Stojanovic & V. Stefanoric . Prevention of nosocomial transmission of hepatitis C infection in hemodialysis unit. Aprospective Study. Int. J. Artif-Organ, 2005, 23 : 181-188.
32. F.Fabrizi, P. Messa, P. Martin. Hepatitis B virus infection and the dialysis patient. Semin Dial. 2008, 21 (5): 440-446.

انتشارا لتهاب الكبد الفايروسي نمط (ب) لمرضى الديلزة الدموية في مدينة الموصل

رائد ميخائيل أمين

قسم التمريض ، المعهد التقني / موصل ، الموصل ، العراق

(تاريخ الاستلام: 18 / 11 / 2012 ---- تاريخ القبول: 17 / 3 / 2013)

الملخص

مرضى الديلزة الدموية معرضون للإصابات بشكل خطير، ولهذا السبب الهدف من الدراسة هو تحديد انتشار التهاب الكبد الفايروسي نمط ب لمرضى الديلزة الدموية في مدينة الموصل . شملت الدراسة (70) مريضا، (43) ذكور و (27) إناث ، حيث تراوحت المجاميع العمرية بين اقل من 10 سنوات والى 60 سنة ،كان معدل العمر هو (37.1) سنة، حيث كانت أعمار أعداد المرضى أكثر من 50 سنة بنسبة (7.1%) أعلى من أعمار أعداد المرضى دون 50 سنة بنسبة (2.24%) . تضمنت الدراسة العمر ، الجنس ،أعداد أكياس الدم المنقولة ، وكذالك الفترة الزمنية للديلزة الدموية.

في دراستنا تبين بان نسبة انتشار التهاب الكبد الفايروسي نمط ب لمرضى الديلزة الدموية عند الذكور هي أعلى مما هو عند الإناث بنسبة % 14.2 ذكور و% 4.2 إناث .

مرضى الديلزة الدموية ذات عرضة بشكل خطير للإصابة بالتهابات الكبد الفايروسي اعتمادا على الأعداد الكبيرة من أكياس الدم المنقولة التي تعطى للمرضى ، والتي تراوحت اقل من (5) أكياس إلى أكثر من(20) كيس، ومن خلال بحثنا وجدنا هناك زيادة معنوية في نسبة انتشار التهاب الكبد الفايروسي نمط ب مع زيادة أعداد أكياس الدم المنقولة. ومن خلال الفترة الزمنية للديلزة الدموية التي يتعرض لها المريض عند اقل من 2 سنة والى أكثر من 10 سنوات كانت النسبة % 4.2 لانتشار التهاب الكبد الفايروسي نمط ب،بينما الفترة الزمنية من (2–4) سنوات و (8–10) سنوات. كانت النسبة % 1.4 من الحالات وكذالك الفترة الزمنية من (4–6) سنوات و (6–8) سنوات كانت نسبة الإصابة % 2.8 ومعدل الفترة الزمنية للديلزة هو 5.4 سنة .

بالإضافة إلى استخدامنا تقنية الاليزا لتحديد الستضد حيث تم تأكيد النتائج الموجبة باستخدام تقنية التفاعل التضاعفي لسلاسل الدنا ، وكانت النتيجة هي (13) حالة موجبة لمرضى الديلزة الدموية بطريقة الاليزا بينما (12) حالة موجبة لمرضى الديلزة الدموية بطريقة التفاعل التضاعفي لسلاسل الدنا .