WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.421
Volume 7, Issue 3, 129-135 Research Article ISSN 2278 – 4357

ANTIBODY RESPONSES OF HBV VACCINATION AMONG THE HAEMODIALYSIS PATIENTS IN AL-KHOMS TEACHING HOSPITAL, AL-KHOMS, LIBYA

Kamal Faraj Zaed[1]* and Aboubaker Alasga[2]

[1]Dept. of Microbiology, Higher Institute of Science and Medical Technologies, Al-khoms, Libya.

[2]Dept. of Laboratory Medicine and Immunology, Higher Institute of Science and Medical Technologies, Emsalata and Laboratory Medicine Specialist, Al-khoms Diabetic Center (KDC), Libya.

Article Received on
05 Jan. 2018,

Revised on 27 Jan. 2018,
Accepted on 17 Feb. 2018

DOI: 10.20959/wjpps20183-10999

***Corresponding Author**
Kamal Faraj Zaed
Dept. of Microbiology,
Higher Institute of Science and Medical Technologies,
Al-khoms, Libya.

ABSTRACT

Patients with Haemodialysis (HD) are at higher risk for acquiring Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) infections than the general population. Previous study shows that Libya is a developing country of approximately 6 million people, belongs to the intermediate endemicity countries to HBV. The aim of the present study was to observe the Antibody responses to HBV vaccination among the HD patients in Al-khoms Teaching Hospital, Al-khoms, Libya. Present study on Anti HBs among the HD patients result reveals the vaccination improves the immunity among the HD patients. Male with HD and vaccination have higher immunity than the female cases. Similarly, rural people with the same HD and HBV vaccination expressed higher antibody titre value than the urban cases. In addition, patients with more number of HD in a week give good immunity. Control of HBV infection is extremely important.

KEY WORDS: Titre value, HBV Vaccination, Haemodialysis patients, Antibody responses.

INTRODUCTION

Hepatitis B Virus (HBV) infection and its sequel are serious public health problems worldwide. It is estimated that more than 2 billion people are infected with HBV globally.

Among them, 350 million are chronically suffering, 15-25% of the chronic cases die even (McMahon, 2005). HBV infection is a major public health problem in the Middle East countries with an intermediate or high endemicity of HBV infection (Qirbi and Hall, 2001). Africa is among the highly endemic areas, but some countries in the north fall in the intermediate category, with an average rate of about 7%, whereas most regions of west and east Africa are highly endemic areas with chronic infection rates of 7−10% (Lavanchy, 2004).

Patients under Haemodialysis (HD) are in high risk with high titre value in the blood and other body fluids of infected patients (Cheng et al., 1997). Sometimes, long time HD pose to develop chronic HBV infection due to defective immune systems (Huan, 2002). The hepatitis B surface antigen (HBsAg) in serum is the first seromarker to indicate active HBV infection, either acute or chronic. Availability of hepatitis B vaccine for the prevention of the disease and multiple drugs for the treatment leads to its chronic status. Chronic HBV infection is a global major public health problem. Its prevalence and patterns of transmission vary greatly throughout the world. Individuals who have chronic HBV infection from birth have 15% to 30% lifetime risk for developing cirrhosis associated with hepatic decompensation and/or hepatocellular carcinoma, leading to premature death (Keeffe, 2007).

Dialysis staffs can transfer the virus to the patients through their unhygienic hands or contaminated instruments. Once transferred/infected to HD patients, 50 – 60% of cases are transformed to become chronic carrier for HBV which in turn have the possibility to infect other HD cases, medical staff and their family members (Margeridon et al., 2005). This risk of HBV infection is controlled or prevented by the host Humoral immunity against HBsAg or by vaccination. Fortunately, HBV vaccination is available in the market is from 1982. Libya, a developing country of approximately 6 million people, belongs to the intermediate endemicity countries to HBV (Elzouki, 2008). The aim of the present study was to observe the Antibody responses to HBV vaccination among the HD patients in Al-khoms Teaching Hospital, Al-khoms, Libya.

MATERIALS AND METHODS

The study was carried out among 80 Haemodialysis cases (49 male and 31 female) at Dialysis unit, Al-khoms Teaching Hospital, Al-khoms, Libya. The study was conducted between January 2017 and November 2017. All the patients were vaccinated with 40 µg of starter HBV vaccine at 1week and booster after a month. Screening for HBV surface

antibody (HBsAb) was performed by ELISA method (ANTI-HBs IEMA WELL RADIM kit) after completion of the vaccination schedule. Patients' responses to HBV infection were observed from the different time of HD, gender and locality of residence among the cases of after vaccination. HCV presence was noted by their previous history study. Titer >10 mIU/mL was considered to be seroprotective. Individuals with titer <10mIU/ml was advised as unprotective and advised to get the vaccine again.

RESULTS AND DISCUSSIONS

HBV virus is distributed worldwide showing 9 genotypes. It has been observed that "A" component of HBV is common among all genotypes and that HBV with "D" genotype was found to be showing intrinsic resistance towards antiviral agents (Simmonds and Midgley, 2005).

Hepatitis B surface antigen (HBsAg)

A protein on the surface of hepatitis B virus; it can be detected in high levels in serum during acute or chronic hepatitis B virus infection. The presence of HBsAg indicates that the person is infectious. The body normally produces antibodies to HBsAg as part of the normal immune response to infection. HBsAg is the antigen used to make hepatitis B vaccine.

Hepatitis B surface antibody (anti-HBs)

The presence of anti-HBs is generally interpreted as indicating recovery and immunity from hepatitis B virus infection. Anti-HBs also develops in a person who has been successfully vaccinated against hepatitis B. A hepatitis B surface antibody test is used to check for immunity to HBV. A positive test means you are immune to hepatitis B. There are two possible reasons for a positive test. You may have been vaccinated, or you may have recovered from an acute HBV infection and are no longer contagious. Table 1 indicates that the titre value is more than 100mIU/ml in a person means, the person is protected for the HBV. Only 26% of the cases from the studied people are protected after primary vaccination. Most of the cases (38.8%) are not protected even after primary vaccination. This shows the weak immunity of the cases during HD. This result is also match with the result of Van Hattum, (1995). After booster, the percentage of protection is increased in among the protected (65%) cases. There is still uncertainty about the persistence of the vaccine induced protection and the need for revaccination among different authors (Mahawal et al., 2013).

Table 1: Anti-Hepatitis B surface antibody serum titre (AntiHBST) at primary and booster level.

Parameters	**Primary vaccination**		**After booster**	
Anti **HBST**	No.	%	No.	%
Unprotected (<10 mIU/ml)	47	58.8	06	30.0
Weak Protected (>10-100 mIU/ml)	12	15.0	01	05.0
Protected (>100 mIU/ml)	21	26.3	13	65.0
Total	80	100	20	100

Among the 80 cases included in this study, Male cases (30 numbers) are more with unprotected responses (<10mIU/ml) of titre value (Table 2). More or less similar and highly protected responses are noted in both genders. Study between rural and urban cases that undergo HD reveals that the cases from the rural have high responses to the vaccine with the indication of high immunity than the urban cases. This indicates the healthier life even with HD among the rural population.

Table 2: AntiHBST among gender, residence and Number of HD cases.

Parameters	**Unprotected (<10mIU/ml)**		**Weak Protected (10-100 mIU/ml)**		**Protected (>100 mIU/ml)**	
Gender	No.	%	No.	%	No.	%
Male	30	63.8	8	66.7	11	52.4
Female	17	36.2	4	33.3	10	47.6
Total	47	100.0	12	100.0	21	100.0
Residence						
Rural	22	46.8	6	50.0	12	57.1
Urban	25	53.2	6	50.0	9	42.9
Total	47	100.0	12	100.0	21	100.0
HCV						
Positive	7	14.9	2	16.7	3	14.3
Negative	40	85.1	10	83.3	18	85.7
Total	47	100.0	12	100.0	21	100.0
Hemodialysis per weak						
One time	3	6.4	0	0.0	2	9.5
Two times	9	19.1	1	8.3	3	14.3
More than two times	35	74.5	11	91.7	16	76.2
Total	47	100.0	12	100.0	21	100.0

Cases with the previous history of HCV study realise that the negative to HCV cases are more in all category like un-protective, weak protective and protective. Infections of HCV among the cases are common with the co-infection of HBV. Another study of the same table 2 indicates titre response increases with the number of times Haemodialysis in week duration.

16 cases have shown the result with highly protected or immunity. In some of the studies it was observed that antibody response rates increases with increasing length of time on dialysis but duration of dialysis has no association (Steketee et al., 1988). This association was also observed in the present study.

According to the centre for disease control and prevention's (CDC) advisory committee on immunization practices (ACIP), HBV immunization is recommended to all individuals preferably immediately after birth (CDC, 2011). Anti-HBsAg antibody titre more than 10 IU/L of blood indicates protective sero-conversion after vaccination. Previous research study has observed that individuals with titers above 100 IU/L remain protected for a very long time and may not require further doses of vaccine and that in vaccinated people with titres between 10 IU/L and 100 IU/L should be closely observed and a booster might be given to avoid future infection (Hattum, 1995). There are contrasting observations made by previous studies where in few studies recommend that a booster vaccine dose is not required in most vaccinated groups and that individuals could be protected for more than 10 years after vaccination (Su and chen, 2012).

It has been noted that 50% population who received immunization in the childhood were not having protective antibody titters signifying the importance of evaluating the antibody titters at least among the risk groups and those who have been vaccinated for more than 10 years. It has also been found that 78% of individuals vaccinated at birth were having protective antibody titters. Among those who were having protective antibody titres, only 45% had titres more than 100 IU/L.

HBV had a high prevalence among dialysis patients and health care professionals in the 1970's (Public Health Laboratory Services, 1976). In many parts of Europe, universal precautions, reduced use of blood products, and erythropoietin (Epo) treatment played an important role in reducing the prevalence of HBV to less than 5% among dialysis patients (Kohler, 1994). With the introduction of hepatitis B vaccine in the 1980s, it was hoped that HBV would be eliminated from the dialysis population. Although HBV has not been eradicated yet, the vaccine has helped to reduce the incidence further, but with suboptimal efficacy in patients with chronic renal failure.

A national serological survey for HBV and HCV infections among the general population was performed in Libya during 2003 and revealed prevalence of 2.2% and 1.2% for HBV and

HCV, respectively. Other local surveys reported that the rate of HBsAg positivity among blood donors ranged from 1.3% to 4.6% (Elzouki, 2008), while the rate of HCV antibodies was 1.2% (Daw et al., 2002).

CONCLUSION

Present study on Anti HBs among the HD patients result reveals the vaccination improves the immunity among the HD patients. Male with HD and vaccination have higher immunity than the female cases. Similarly, rural people with the same HD and HBV vaccination expressed higher antibody titre value than the urban cases. In addition, patients with more number of HD in a week give good immunity. Anyhow, the authors recommend, HBV vaccine status and the presence of protective antibody titres should be regularly evaluated in high risk groups including the haemodialysis patients and health care workers and a booster dose vaccine are given to prevent future HBV infection and related complications.

REFERENCES

1. **Centers for Disease Control and Prevention** (CDC). Immunization of health-care personnel: recommendations of the Advisory Committee on Immunization Practices (ACIP). [Accessed 2011 Nov 25]. Available from: URL: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6007a1.htm
2. **Cheng CH, Huang CC, Leu ML, Chiang CY, Wu MS and PC Lai** Hepatitis B vaccine in hemodialysis patients with hepatitis C viral infection. *Vaccine*, 1997; 15(12-13): 1353–1357.
3. **Daw MA, Elkaber MA, Drah AM, Werfalli MM, Mihat AA and Siala IM** Prevalence of hepatitis C virus antibodies among different populations of relative and attributable risk. Saudi Med J., 2002; 23(11): 1356–1360.
4. **Elzouki AN** Hepatitis B infection in Libya: The magnitude of the problem. Libyan J. Infect. Dis., 2008; 2: 1-4.
5. **Hattum VJ** Hepatitis B vaccine: simple and effective. Ned Tijdschr Tandheelkd., 1995; 102(5): 182-184.
6. **Huan CC** Hepatitis infection in haemodialysis patients. Nephrology, 2002; 7: 101-109.
7. **Keeffe EB** Current issues in the management of hepatitis A and B. Gastroenteral and Endoscopy News, 2007; 5: 75-83.
8. **Kohler H** Hepatitis B immunization in dialysis patients- is it worth-while? Nephrol Dial Transplant., 1994; 9: 1719-1720.

9. **Lavanchy D** Hepatitis B virus epidemiology, disease burden, treatment, and current and emerging prevention and control measures. J. Viral Hepatitis, 2004; 11(2): 97-107.
10. **McMahon BJ** Epidemiology and natural history of hepatitis B. Semin Liver Dis., 2005; 25: S3-S9.
11. **Mahawal BS, Bhai N, Kataria VK, Gulati N and I Chandola** Estimation of Anti Hbs antibody titer in adults during 5-10 years period following three doses of vaccine. IOSR Journal of Pharmacy and Biological Sciences, 2013; 7(1): 20-23.
12. **Margeridon S, Lachaux A, Trepo C, Zoulim F and AA Kay** Quasi-monoclonal anti-HBs response can lead to immune escape of 'wild-type' hepatitis B virus. J Gen Virol., 2005; 8: 1687-1693.
13. **PBHLS** (Public Health Laboratory Service). Hepatitis B in retreat from dialysis units in United Kingdom in 1973. Br Med J., 1976; 26:1579-1581.
14. **Qirbi N and AJ Hall** Epidemiology of hepatitis B virus infection in the Middle East. *East Mediterr Health J.*, 2001; 7(6): 1034–1045.
15. **Simmonds P and S Midgley** Recombination in the genesis and evolution of hepatitis B virus genotypes. J Virol., 2005; 79: 15467-15476.
16. **Steketee RW, Ziarnik ME and JP Davis** Seroresponse to hepatitis B vaccine in patients and staff of renal dialysis centers. Am J Eptoemlol., 1988; 127: 772-782.
17. **Su TH and PJ Chen** Emerging hepatitis B virus infection in vaccinated populations: a rising concern? Emerging Microbes & Infections., 2012; 1(9): e27.
18. **Van Hattum J** Hepatitis B vaccine: simple and effective. Ned Tijdschr Tandheelkd., 1995; 102(5): 182-184.