PREVALENCE OF HEPATITIS B VIRUS MARKERS AMONG HIGH RISK GROUPS IN PALESTINE

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SUMMARY: Four hundred and twenty one sera samples collected during 1995 to 1997 from subjects at high-risk for HBV infections were tested for the presence of HBV markers. The subjects included kidney transplants (n=109), hemodialyzed patients (n=76), non-vaccinated healthcare workers (n=52) and blood transfusion dependent patients (n=80). Blood transfusion dependent patients include 60 thalassemic, 6 hemophilic and 14 sickle cell anemia patients.

HBsAg prevalence rates of 29.4%, 17%, 22.5% and 9.6% were observed among kidney transplant, hemodialysis, blood transfusion dependent patients, and non-vaccinated healthcare workers, respectively. HBeAg prevalence rates among HBsAg positive subjects of the previous groups were 43.8%, 76.9%, 38.9% and 0.0%, respectively. Our study indicates that 76.9% of HBsAg positive hemodialysis patients and 43.8% of HBsAg positive kidney transplant patients are highly contagious and constitute a high risk factor for the spreading of this infection. The prevalence rates of anti-HBc, previous infection rates of 56.9%, 50.0%, 37.9% and 17.3% were observed among kidney transplant, hemodialysis, blood dependent patients, and non-vaccinated healthcare workers, respectively.

These results show that HBsAg in these high risk groups is high and vaccination against HBV of these groups is recommended.

Key Words: HBsAg, HBeAg, anti-HBc, kidney transplant patients.

INTRODUCTION

Hepatitis B virus (HBV) remains a major global health problem. It is the major cause of liver disease and hepatocellular carcinoma. More than two billions individuals alive today, about one-third of the world's population have been infected at some time in their lives with the HBV, of whom approximately 400 millions are chronically infected carriers worldwide. Annual death rate exceeds a million among infected individuals (1). More than three-quarters of HBV infections occur in Asia, the Middle East and Africa. Although the prevalence of HBV carriers varies between countries in the same continent, it can be broadly classified into regions of high endemicity (HBsAg prevalence ≥8%), intermediate (HBsAg prevalence 2-7%) and low HBV endemicity (HBsAg prevalence <2%) (2).

Palestine is situated in area of intermediate endemicity, with HBsAg carrier rate about 4% (3,4). The objective of the present study was to determine the prevalence of serological markers of HBV infection among high risk groups in Palestine, a part of the world not previously surveyed.

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Table 1: Prevalence of HBsAg, HBeAg and anti-HBc markers among the studied groups.

Patients group	No. tested	No. (%) HBsAg +	No. (%) HBeAg +*	No. (%) Anti-HBc +
Kidney transplant	109	32 (29.4)	14 (43.8)	62 (56.9)
Hemodialysis	76	13 (17.1)	10 (76.9)	38 (50.0)
Blood transfusion dependent	80	18 (22.5)	07 (38.9)	30 (37.5)
Healthcare workers	52	05 (09.6)	00 (00.0)	09 (17.3)

*Among HBsAg positive

MATERIALS AND METHODS

Four hundred and twenty one sera samples collected during 1995 to 1997 from subjects at high-risk for HBV infections were tested for the presence HBV markers. The subjects included kidney transplants (n=109), patients undergoing hemodialysis (n=76), non-vaccinated healthcare workers (n=52) and blood transfusion dependent patients (n=80). Blood transfusion dependent patients include 60 thalassemic, 6 hemophilic and 14 sickle cell anemic patients.

Sera samples were analyzed for the various HBV markers using ELISA. HBsAg was detected using Monolisa anti-HBs ELISA kits (Sanofi Diagnostics Pasteur, France), anti-HBc and HBeAg were detected using Melotest anti-HBc ELISA kits (Melotec High Technology, Spain).

Statistical analysis

Statistical analysis was performed with the Statistical Software Programme (SAS). $P < 0.05$ was considered statistically significant.

RESULTS

Our data show that the prevalence rates of HBsAg were 29.4%, 17%, 22.5% and 9.6% among kidney transplant, hemodialysis, blood transfusion dependent patients, and non-vaccinated healthcare workers, respectively. Among HBsAg positive groups the prevalence rates of HBeAg were 43.8%, 76.9%, 38.9% and 0.0%, respectively. The prevalence rates of anti-HBc were 56.9%, 50.0%, 37.9% and 17.3% among kidney transplant, hemodialysis, blood dependent patients, and non-vaccinated healthcare workers, respectively (Table 1).

The prevalence of HBV markers among the various tested groups of blood transfusion dependent patients is shown in Table 2. The prevalence rates of HBsAg of 23.3%, 21.4% and 16.7% were observed among thalassemic, sickle cell anemic and hemophilic patients, respectively. HBeAg prevalence rates among HBsAg positive subjects of the previous groups were 42.9%, 33.3% and 0.0%, respectively. The prevalence rates of anti-HBc, previous infection rates of 40.0%, 21.3% and 50.0% were observed among thalassemic, sickle cell anemic and hemophilic patients, respectively.

Non-parametric one way ANOVA for the prevalence of HBsAg among the studied groups indicate statistically significant difference with a P value of 0.027, such differences in favour of hemodialysis followed by kidney transplant, thalassemic, sickle cell anemic and hemophilic, respectively. ANOVA for the prevalence of anti-HBc indicate a significant difference in the prevalence of this marker with a P value of 0.0001, such differences were in favour of hemophilic followed by thalassemic, sickle cell anemic, hemodialysis and kidney transplant patients, respectively.

Table 2: Prevalence of HBsAg, HBeAg and anti-HBc markers among blood dependent patients.

Groups	No. tested	No. (%) HBsAg +	No. (%) HBeAg +*	No. (%) Anti-HBc +
Thalassemic patients	60	14 (23.3)	06 (42.9)	24 (40.0)
Sickle cell anemic patients	14	03 (21.4)	01 (33.3)	03 (21.4)
Hemophilic patients	06	01 (16.7)	00 (00.0)	03 (50.0)
Total	80	18 (22.5)	07 (38.9)	30 (37.5)

*Among HBsAg positive

DISCUSSION

Hepatitis B infection is endemic in the Middle East region (5). Surveys of hospital employees and routine tests in blood banks at Palestinian hospitals showed HBsAg seropositivity rate of approximately 4% (3,4). Studies on Palestinian population seem to indicate that Palestine is situated in an area of moderate endemicity for HBV. International records of WHO (2), support this finding.

Screening for HBsAg has been started in early 1970s in most developed countries (6). It has been introduced as a routine test in blood banks of Palestinian area (West Bank) only since 1988. Such situation may contribute to the increased risk of receiving contaminated blood and could account for high prevalence rate (22.5%) of HBsAg seropositivity observed among subjects with previous history of blood transfusion including thalassemic, hemophilic and sickle cell anemic patients. This value is much higher than the rate of 3.5% found among multi-transfused patients in Jordan (7).

The prevalence rates of HBsAg of (29.4%) and (17.1%) were observed among kidney transplant and hemodialysis patients, respectively. The high prevalence of HBV in these patients probably reflects acquisition of HBV infection after entry into chronic dialyse therapy in a country that is intermediate endemicity for HBV. These values are much higher than the rate of 4.7%, 1.63% and 2.2% found among chronic hemodialysis patients in the Italy, Switzerland and Spain, respectively (8-10), which is much lower than the rate of 45% found among hemodyalisis patients in Brazil (11). Contaminated dialysis machines, other equipments and environmental surfaces were accused in spreading of HBV among these patients (11-14). Furthermore, hemodialysis patients are immunosuppressed; which may lead to increase their susceptibility to infections and could explain the observed high frequency among hemodialysis patients (15-16). The finding of a high prevalence of HBV infection in hemodialysis patients is of major importance for the planning of future preventive measures.

HBsAg prevalence rate of 9.6% was observed among non-vaccinated healthcare workers. These patients were at high risk of occupational exposure to blood and other secretions of HBV infected subjects (16-19). The prevalence rate of HBsAg among Palestinian healthcare workers (9.6%) is lower than Israel (24.4%) (19) and Portugal (16.8%) (20). This finding might be explained by their exposure to other risk factors such as drug abuse and sexual transmission. This value is higher than Pakistan (2.4%) (21), Greece (2.66%) (22) and Italy (0.4%) (23).

Based upon HBeAg status, HBsAg positive hemodialysis patients showed the highest prevalence rate (76.9%) followed by kidney transplant patients (43.8%). Thus, indicating that subjects among these groups are highly infectious, and most likely to be a risk factor for the spreading of the disease. Although HBsAg positive patients are isolated on separate dialysis machines, but this protective measure is inadequate. In hemodialysis units, routine screening is planned to be carried every three months for this group of patients and HBsAg is the only used marker for screening. According to this strategy, some HBsAg positive subjects may escape diagnosis as they might be in the window period or at early stages of infection and HBsAg is below the level of detection.

In our study, the prevalence rates of anti-HBc were in agreement with the findings of high HBsAg prevalence rate among these high risk groups. In addition, the high proportion of subjects positive for anti-HBc alone also argues in favour of the infection having occurred in the relatively distant past.

These results reflect the situation of the high risk groups within this country and they may be contributing to the mapping of hepatitis B viral infection prevalence in this area. HBsAg in these high risk groups is high and vaccination against HBV of these groups is recommended and will play an important role in the prevention and control of hepatitis B infection.

REFERENCES

1. World Health Organization: World Health Report: Geneva: WHO, 1999.

2. Margolis HS, Alter MJ, Hadler SC : Hepatitis B: evolving epidemiology and implications for control. Semin Liver Dis, 11:84-92, 1991.

3. Nashef L, Thalji A : Hepatitis B serology among the Palestinian population. Ann Trop Pediatr, 12:321-325, 1992.

4. Al-Refai WA : Seroepidemiology of hepatitis B virus in the population of the Northern parts of Palestine. Master's thesis, Faculty of Graduate Studies, An-Najah National University, Naplus, Palestine, 1996.

5. Fraser GM, Fraser D, Chazan R, Chattah F, Quastel MR : Hepatitis B infections in a chronic hemodialysis unit in a country where hepatitis B is endemic: a prospective study. Am J Epidemiol, 3:500-505, 1987.

6. Belshe RB : Text book of Human virology. 2nd ed. USA, Mosbey-Year Book, Inc, pp 719-731, 1991.

7. Al-Sheyyab M, Batieha A, El-Khateeb M : The prevalence of hepatitis B, hepatitis C and human immune deficiency virus markers in multi-transfused patients. J Trop Pediatr, 47:239-242, 2001.

8. Ambuhl PM, Binswanger U, Renner EL : Epidemiology of chronic hepatitis B and C among dialysis patients in Switzerland. Schweiz Med Wochenschr, 130:341-348, 2000.

9. Fabrizi F, Di Filippo S, Marcelli D, Guarnori I, Raffaele L, Crepaldi M, Erba G, Locatelli F : Recombinant hepatitis B vaccine use in chronic hemodialysis patients. Long-term evaluation and cost effectiveness analysis. Nephrology, 72:536-543, 1996.

10. Lopez-Alcorocho JM, Barril G, Ortiz-Movilla N, Traver JA, Bartolom and Eacute J, Sanz P, et al : Prevalence of hepatitis B, hepatitis C, GB virus C/hepatitis G and TT viruses in predialysis and hemodialysis patients. J Med Virol, 63:103-107, 2001.

11. Souza KP, Luz JA, Teles SA, Carneiro MA, Oliveira LA, Gomes AS, Dias MA, Gomes SA, Yoshida CF, Martins RM : Hepatitis B and C in the hemodialysis unit of Tocantins, Brazil: serological and molecular profiles. Mem Inst Oswaldo Cruz, 98:599-603, 2003.

12. Cendoroglo Neto M, Manzano SI, Canziani ME, Silva AE, Cirenza LF, Sesso Rde C, Ajzen H, Draibe SA : Environmental transmission of hepatitis B and hepatitis C viruses within the hemodialysis unit. Artif Organs, 19:251-255, 1995.

13. Horl WH : Neutrophil function and infections in uremia. Am J Kidney Dis, 33 :xlv-ii, 1999.

14. Ware AJ, Gorder NL, Gurian LE, Douglas C, Shorey JW, Parker T : Value of screening for markers of hepatitis in dialysis units. Hepatology, 3:513-518, 1983.

15. Johnson D, Flemming S : The use of vaccine in renal failure. Clin Pharmacokine, 22:434-446, 1992.

16. Al-Sohaibani MO, Al-Sheikh EH, A-Ballal SJ, Mirghani MA, Ramia S : Occupational risk of hepatitis B and C infections in Saudi Medical staff. J Hosp Infect, 31:143-147, 1995.

17. Hofmann F, Kralj N, Beie M : Needle stick injuries in health care-frequency, causes and preventive strategies. Gesundheitswesen, 64:259-266, 2002.

18. Mahoney FJ, Stewart K : Progress toward the elimination of hepatitis B virus transmission among health care workers in the United States. Arch Intern Med, 157:2601-2605, 1997.

19. Weiss Y, Rabinovitch M, Cahaner Y, Noy D, Siegman-Igra Y : Prevalence of hepatitis B virus markers among hospital persons in Israel: correlation with some risk factors. J Hosp Infect, 26:211-218, 1994.

20. Marinho RT, Moura MC, Pedro M, Ramalho FJ, Velosa JF : Hepatitis B vaccination in hospital personnel and medical students. J Clin Gastroenterol, 28:317-322, 1999.

21. Aziz S, Memon A, Tily HI, Rasheed K, Jehangir K, Quraishy MS : Prevalence of HIV, hepatitis B and C amongst health workers of Civil Hospital Karachi. J Pak Med Assoc, 52:92-94, 2002.

22. Koulentaki M, Ergazaki M, Moschandrea J, Spanoudakis S, Tzagarakis N, Drandakis PE, Spandidos DA, Kouroumalis EA : Prevalence of hepatitis B and C markers in high-risk hospitalized patients in Crete: a five-year observational study. BMC Public Health, 1:17, 2001.

23. Baldo V, Floreani A, Dal Vecchio L, Cristofoletti M, Carletti M, Majori S, Di Tommaso A, Trivello R : Occupational risk of blood-borne viruses in healthcare workers: a 5-year surveillance program. Infect Control Hosp Epidemiol, 23:712, 2002.

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