Asian Journal of Medical Sciences 1(2): 54-56, 2009
ISSN: 2040-8773

Submitted Date: July 07, 2009 Accepted Date: July 28, 2009 Published Date: September 10, 2009

Efficiency the Application of Hbv Vaccination Program to Clinical Laboratory Workers Against Hepatitis B Infection in Karbala-Iraq

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Abstract: An efficiency of vaccination program in one of Iraqi providences was investigated for clinical laboratory staffs who consider an important group of health care workers by detecting probable infection with hepatitis B virus among these workers. Vaccines against hepatitis B were the most effective tool in preventing the transmission of Hepatitis B virus. Seven health care units of Karbala-Iraq were investigated for the efficiency of vaccination program among its clinical laboratory workers. After analyzed of blood by ELISA assay, all of laboratory workers gave negative results and only two technician males at AL-Hussein general hospital revealed positive with IgG anti-HBsAg. More than half numbers (51.7% males and 58.9% females) of workers were vaccinated with complete three doses of HBsAg vaccine and others were revealed variable numbers of doses receiving. In conclusion, negative results of HBV infection in clinical laboratory workers dose not prevent the possibility presence of defective in application of vaccination program in their health care units.

Key words: Clinical laboratory worker, Karbala, HBV, vaccination

INTRODUCTION

Hepatitis B is a serious and common infectious disease of the liver. It affecting millions of people throughout the world and more than 2000 million people alive today have been infected with hepatitis B virus (HBV) at some time of their lives. Of these, about 350 million remain infected chronically and become carriers of the virus (WHO, 2002). Chronic infection with hepatitis B virus results in 5000 annual deaths in the United States from cirrhosis and hepatocellular carcinoma (Lin and Kirchner, 2004).

Although exposure risk is reduced significantly by the availability of a vaccine, HBV is a well-recognized occupational risk for all health care workers involved in handling blood products, body fluids and clinical waste (Gilling-Smith *et al.,* 2005). During 1993, an estimated 1450 workers became infected through exposure to blood and serum-derivative body fluids and data indicated that 5%-10% of HBV-infected workers became chronically infected (IHCW *et al.,* 2006). Additionally, Webb and colleagues (Webb *et al.,* 2005) described three recent outbreaks of HBV infection in United States among residents in long-term-care facilities.

Vaccines against hepatitis B were introduced in the early 1980s (WHO, 2002). Thus, vaccination is the most effective tool in preventing the transmission of HBV. The main composition of vaccines is the surface antigen of HBV (HBsAg) that produced by two different methods: Plasma derived or Recombinant DNA (Centers for Disease Control and Prevention, 1998). During 1990-2004, overall incidence of repeated acute hepatitis B in United States declined 75%: From 8.5 to 2.1 per 100,000 populations due to apply of routine vaccination (ACIP, 2005). Hepatitis B vaccine is usually given as a serious of 3 or 4 shots. This vaccine series gives long-term protection from HBV infection, possibly lifelong (Centers for Disease Control and Prevention, 2007).

Vaccination of all health care personnel with immune status verified by regular 5-yearly anti-HBV antibody checks is now well-accepted practice throughout Europe (Bonanni and Bonaccorsi, 2001). Iraq has introduced hepatitis B vaccine within their national immunization programs according to the recommendation of WHO/EPI (WHO, 2002).

An efficiency of vaccination program in one of Iraqi providences was investigated for clinical laboratory staffs who consider an important group of health care workers by detecting probable infection with hepatitis B virus among these workers.

MATERIALS AND METHODS

The bloods of 85 males (19-61 years) and 39 females (23-47 years) of clinical laboratory staffs in seven health care units of Karbala city-Iraq were collected in December 2008 (Table 1). Fresh serums of collected bloods were analyzed by ELISA assay using Bechman coulter instrument (AD 340, Australia). IgM and IgG of anti-HBV were determined using anti-HBsAg kit (Biomérieux-Hepanostika-HBsAg ultra, France). Data about employee dates of involved laboratory staffs were collected in questionnaire design.

Statistical analysis: Results data were statistically analyzed by using two-way variance of analysis (ANOVA) with less significant difference (L.S.D.) at $P<0.05$.

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Table 1: Number of clinical laboratory workers in Health care units of Karbala city.

No.	Health care units	Males	Females	Total No.
1	Pediatric hospital	12	3	15
2	AL-Hyndia hospital	14	6	20
3	AL-Hussein general hospital	21	7	28
4	Obstetrics and Gynecology hospital	6	8	14
5	Central bank	26	5	31
6	Public health center laboratory	1	9	10
7	AL- Hussenyia care unit	5	1	6
	Total No.	85	39	124

RESULTS

Investigation of infection with HBV among vaccinated health care workers may give distinct indicator for the efficiency of vaccine application.

Among 124 clinical laboratory workers, 51.7% males and 58.9% females were vaccinated with triple doses of HBsAg vaccine; 14.1% males and 7.6% females were received two doses; and 9.4% males and 5.1% females were received one dose. The other 24.7% males and 28.2% females didn't receive any dose of vaccine (Table 2). These results indicated that the application of vaccination program in Karbala health car units was frequently variable in efficiency. After analyzed of blood by ELISA assay, all of laboratory workers gave negative results and only two technician males at AL-Hussein general hospital revealed positive with IgG anti-HBsAg which may related to vaccine response. Employee dates of these staff when they spend in their work places were ranged from 4 months to 28 years.

DISCUSSION

Postvaccination testing for antibody to hepatitis B surface antigen (anti-HBs) may give indicator for vaccine response in health care workers who have blood or patient contact and are at ongoing risk for injuries with sharp instruments or needle sticks (IHCW *et al.,* 2006). The risk for acquiring HBV infection from occupational exposures is dependent on the frequency of percutaneous (i.e., puncture through the skin) or mucosal (i.e., direct contact with mucous membrane) exposure to infectious blood or to body fluids that contain blood (ACIP, 2005; Centers for Disease Control and Prevention, 2007).

Hepatitis B vaccine can prevent hepatitis B infection and the serious consequences of this infection, including liver cancer and cirrhosis (Centers for Disease Control and Prevention, 2007). However, the duration of vaccine induced immunity is uncertain but it is definitely long term (> 15 years) (WHO, 2002).

The program of vaccination against HBV applied in health care units of Iraq is based on three doses of HBsAg vaccine; six months between each two doses. In Karbala, more than half numbers of clinical laboratory workers were received the complete three doses. Meanwhile, laboratory workers in pediatric hospital didn't receive any dose of HBV vaccine despite high percentage level of children was infected with HBV than other age groups. This may be related to delay supplying of HBV vaccine or to newly employee of most laboratory staffs in this hospital. However, the frequently variation in numbers of HBV vaccine doses receiving by laboratory workers may sufficient to prevent infection with hepatitis B virus when none of these workers showed any recently positive results. Two of technicians have IgG anti-HBsAg which may result from vaccine response. These results may support the scales of WHO (< 2 %) that considered Iraq country has low prevalence of hepatitis B (WHO, 2002). Antibodies to HBV induced by vaccine is declining gradually over time and less than or equal to 60% of persons who initially respond to vaccination could be loosen detectable antibodies over 12 years (IHCW *et al.,* 2006). At present, there is no recommendation for the administration of booster doses of HBV vaccine (Hollinger and Liang, 2001).

In conclusion, negative results of HBV infection in clinical laboratory workers dose not pause the presence of

Table 2: Numbers of Clinical laboratory workers vaccinated with HbsAg

	Vaccinated Males					Vaccinated females				
Health care units	Un vaccinated	One dose	Two doses	Triple doses	Total No.	Un vaccinated	One dose	Two doses	Triple doses	Total No.
Pediatric hospita	112 ** △ (100%)	_	_	_	12 (14.1%)	3 △ (100%)	_	_	_	3 (7.6%)
AL-Hyndia hospital	5 (35%)	_	1 (7.1%)	8 ** (57.1%)	14 (16.4%)	6 ** (100%)	_	_	_	6 (15.3%)
AL-Hussein general hospital	4 (19%)	5 (23.8%)	2 (9.5%)	10** △ (47.6%)	21 (24.7%)	2 (28.5%)	2 (28.5%)	1 (14.2%)	2 (28.5%)	7 (17.9%)
Obstetrics and Gynecology hospital	_	_	_	6 (100%)	6 (7%)	_	_	_	8** (100%)	8 (20.5%)
Central bank	_	3 (11.5%)	8** (30.7%)	15** △ (57.6%)	26 (30.5%)	_	_	1 (20%)	4 △ (80%)	5 (2.8%)
Public health center laboratory	_	_	_	1 (100%)	1 (1.1%)	_	_	1 (11.1%)	8** (88.8%)	9 (23%)
AL- Hussenyia care unit	_	_	1 (20%)	4 (80%)	5 (5.8%)	_	_	_	1 (100%)	1 (2.5%)
Total No.	21 (24.7%)	8 (9.4%)	12 (14.1%)	44 (51.7%)	85 (68.5%)	11 (28.2%)	2 (5.1%)	3 (7.6%)	23 (58.9%)	39 (31.4%)

** Significant differences among health care units at $P<0.05$, △ : Significant differences among vaccine doses at $P<0.05$

defective in application of vaccination program in health care units of Karbala, especially when large numbers of these workers didn't vaccination with complete doses. For recommendation, full doses of vaccine must administrate to those workers for protecting themselves from possible infection with hepatitis B virus.

ACKNOWLEDGEMENT

The authors would like to thank all staffs of public health center- department of virology-Karbala for their assistant in performing the analysis of samples.

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