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Estimation of Antibodies To HBsAg in Vaccinated Health Care Workers

Dear editor,

Hepatitis B infection is a universal health problem. Around 300-400 million carriers are estimated worldwide. Fortunately, there are effective vaccines against the virus, which are about 95% effective.^[1] Although the protective efficacy of the primary course of vaccine is well established, there has been no unified opinion for booster doses to sustain protection. The seroconversion rate is influenced by a number of factors, the most important of which are the age and sex of the vaccinee. Because the virus challenge, the dosage and the infectivity of sources can vary considerably, it is difficult to define a minimum protective level of anti-HBs, but the level should be greater than 100 IU/L.^[2] Although 10 mIU/mL is generally taken to be protective, some countries, like the UK, adopt a higher reference level of ≥ 100 mIU/mL.^[3]

The present study was undertaken at Jubilee Mission Medical College and Research Institute, Thrissur, Kerala. The purpose of the study was to estimate antibody titers to HBsAg in health care workers who were vaccinated (with the protocol of three doses, (0-1-6) schedule and defaulted after one or two doses). The duration of the response to vaccine is variable, and dependant on the titer of anti-HBs after completion of the course. If vaccine is given for occupational protection and anti-HBs level is low (<100 IU/L), a booster dose should be recommended. Low or non-responders need to be identified and informed that

they are not protected and advised to seek prophylaxis on accidental exposure.^[2]

A total of 65 health care workers of both sexes (23 males and 42 females) in age group from 20-60 years were tested. Among them, 57 (88%) have completed three dose schedules of primary vaccination. Two (3%) had only one dose, and six (9%) had two doses. All the serum samples were tested for estimation of anti-HBs titers by Roche Elecsys with protocols of electrochemiluminescence. Antibodies to HBs (IgG) were estimated in ranges of 2-1000 mIU/mL of the master curve. Estimated Levels of Anti-HBs in health care workers is given in the Table.

The test results indicate that six (10.5%) of all successfully vaccinated persons have not attained minimal protective levels of antibody, 10 mIU/mL, and six (10.5%) have antibody levels in the range of >11 -100 mIU/mL and the rest 45 (79%) have antibody levels >101 mIU/mL. Among the six defaulters who received only two doses, five persons (85%) have attained >101 mIU/mL. This limited study proves that the first two doses usually suffice to initiate anti-HBs production and prepare the immune system for a secondary response to antigen. The third dose stimulates the secondary response and biologically acts as a booster.^[3] The other participants who received two doses have attained

Table: Estimated levels of anti-HBs in health care workers

No. of vaccine recipients (<i>n</i> = 65)	Quantization of anti-HBs titers		
	<10 mIU/mL	>11-100 mIU/mL	>101 mIU/mL
Three doses (<i>n</i> = 57)	6 (10.5%)	6 (10.5%)	45 (79%)
Two doses (<i>n</i> = 6)	0	1 (15%)	5 (85%)
One dose (<i>n</i> = 2)	0	1 (50%)	1 (50%)

>10 to up to <100 mIU/mL. In spite of only one dose, one participant attained >100 mIU/mL.

As there are no data to support the need for booster doses of HB vaccine in immunocompetent individuals who responded well to primary doses, some authorities recommend regular booster doses to maintain seropositive anti-HBs titers. Health care workers are at a special risk of infection due to their nature of work and should be immunized and responses checked.^[2] If post-vaccination antibody testing suggests that adequate immunological priming has not been achieved, the option remains with administering an additional dose of vaccine. However, no clinically overt hepatitis has been reported so far in successfully vaccinated individuals.^[4] In the present study, 12% of health care workers have not complied with completion of three doses of vaccine. Six (10.5 %) of the successfully vaccinated health care workers who were low or non-responders (<10 mIU/mL) were advised to receive additional dose of vaccine since some may mount an anti-HBs response when given a dose of vaccine years later.^[3] All the defaulters were advised to have their anti-HBs levels checked at least once in two years for the sustainability of minimal protective levels of antibody.

It is essential that long-term follow-up studies should continue to monitor groups of immunized individuals to determine if clinically significant breakthrough episodes of

hepatitis B occur or whether the carrier state develops. The outcome will help in future decisions on booster policies.

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