ACTIVE IMMUNIZATION AGAINST HEPATITIS B VIRUS (HBV) WITH LOW-DOSES OF PLASMA-DERIVED VACCINE BY INTRADERMAL ROUTE

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SUMMARY

Schedule for vaccination against HBV infection has usually been based on three separate injections of 20 mcg of the vaccine by intramuscular route. One of the main shortcomings to its use in large scale programs has been its high cost. Ninety out of 300 health workers were submitted to three injections of 2 mcg of plasma-derived vaccine (PDV) by intradermal (ID) route on days 0, 30, and 180. Anti-HBs was detected in 74 (82.2%) after the second dose and in 80 (88.9%) after the third dose, a non-significant difference. However, levels above 10 times the cut off were observed in 29 (32.2%) and 77 (85.5%), respectively (p < 0.001). The results showed that a low-dose schedule is effective when used in health workers and should be tried with other risk groups.

KEY WORDS: Hepatitis B; Hepatitis B virus; Hepatitis B vaccine; Immunization.

INTRODUCTION

Plasma-derived vaccine is very effective against HBV1, 2, 4, 8, 15. The protective antibody against surface antigen (anti-HBs) develops after three doses of the vaccine in more than 90% of the general population3. The recommended schedule in most programs of active immunization has been three separate injections of 20 mcg per dose by intramuscular (IM) route in deltoid region3, 4, 7, 15. One of the main difficulties to apply this program in underdeveloped countries is its high cost. For this reason different schedules with lower doses have been tried, such as 10, 5 and 2.5 mcg by intramuscular routes2, 7, 12, 13. More recently, 2 mcg by intradermal (ID) route was employed, with promising results5, 8, 9, 17, 13. However, the samples in most studies were rather small.

The aim of this study was to investigate the efficacy of the plasma-derived vaccine by using 2 mcg by ID route.

MATERIAL AND METHODS

A total of 300 hospital health workers were submitted to a serological study of HBV mar.
kers. Hepatitis B surface antigen (HBsAg) and its antibody (anti-HBs) and total core antibody (anti-HBc) were studied by using an enzyme-linked immunoassay (AUSZYME II, AUSAB EIA and CORZYME, respectively, produced by ABOTT LABORATORIES, U. S. A.). The schedule of active immunization was similar to that used by MILLER et al\textsuperscript{11}: one dose at day zero, and subsequent doses at one and six-month intervals using 2 mcg by ID route. Only workers without HBV markers were submitted to vaccination on a voluntary basis.

Seroconversion to anti-HBs was studied immediately before and one month after the third dose. A rough semiquantitative determination was based on the value of the cut-off. It was considered a good antibody response when the value obtained was above then times the cut-off level\textsuperscript{8}.

In the screening of the 300 workers, anti-HBc was detected in 43 (14.3%), including 9 (3.0%) with HBsAg and 34 (11.3%) of anti-HBs (Figure 1). Only 90 (35.0%) out of 257 workers without HBV markers accepted the vaccination schedule. This group consisted of 68 females and 22 males; with a mean age of 37.4 ± 8.4 years (22 - 56 years).

**RESULTS**

The results showed that, anti-HBs was detected in 74 (82.2%) and 80 (88.9%) workers, respectively before and after the third dose, a non-significant difference (chi-square = 1.1238, 0.30 > p > 0.20, Figure 2). However, a good antibody response was obtained in only 29 out of 90 (32.2%) after the second dose and in 77 out of 90 (85.5%) workers after the third dose (chi-square = 50.6909, p < 0.001), as shown in Figure 3.

**DISCUSSION**

Our results clearly show that vaccination with three doses of 2 mcg of HBV plasma-derived by ID route produces a high number of seroconversion to anti-HBs (88.9%). These results agree with those published by MILLER et al\textsuperscript{11} and REDFIELD et al\textsuperscript{14}. To our knowledge only few papers based on such a schedule of immunization have been published to date\textsuperscript{9, 10, 11, 14}. It is worth mentioning that the seroconversion
rate observed in those studies varied from 74.0 to 100.0%. Besides, a comparison between 20 mcg by IM route and 2 mcg by ID route showed no significant difference in the seroconversion rate\(^5\)\(^{14}\), though the levels of anti-HBs tend to be lower after reduced doses\(^2\)\(^5\)\(^{16}\).

In our material, a low percentage of subjects (35.0%) accepted to be vaccinated against HBV. The main reason for this high refuse was the unjustifiable fear that plasma-derived vaccine would be contaminated by human immunodeficiency virus\(^5\).

REDFIELD et al\(^{14}\) and MULLEY et al\(^{12}\) emphasized that vaccine cost remains a major obstacle for the expansion of HBV vaccination programs.

The low doses schedule used in this study proved to be effective, and, if confirmed in field studies\(^{17}\), it should be considered in large scale programs of immunization against HBV.

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REFERENCES


