

## Higher number of nonresponders to Hepatitis B vaccine in HIV exposed uninfected infants

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### Abstract

This study evaluated the efficacy of seroconversion on HIV exposed uninfected children and unexposed children after receiving three doses of Hepatitis B vaccine. Significant differences were found ( $p < 0,0001$ ). Changes on the Hepatitis B vaccination scheme in Brazil were also assessed, and significant higher seroconversion rates were found among patients under the new vaccination scheme ( $p = 0,0015$ ).

### Key words:

HIV-exposed, Hepatitis B, Vaccination.

### Introduction

Hepatitis B vaccine has a remarkable efficacy on protecting immunocompetent children (90-95%)<sup>(1)</sup>. Nevertheless, nearly 2 million HIV-exposed uninfected children (HEU) are born annually<sup>(2)</sup>, thanks to vertical transmission prevention programs<sup>(3)</sup>. This highlights the importance of supervising if a similar protection rate is observed in the HEU population.

Abramczuk et al.<sup>(4)</sup> analyzed the immune response of HEU and non-exposed (NE) infants after the third dose of Hepatitis B vaccine and a significantly higher number of nonresponding individuals was found on the HEU population. On the other hand, the percentage of individuals considered very good responders on the HEU group was of 64,4%, in contrast with 38,4% on the NE group. Before vaccination, Reikie et al.<sup>(2)</sup> observed significantly higher anti-HBs titers on HEU, but after three months of age similar protection levels were observed between the two groups. This way, this study aims to evaluate the protection rates of Hepatitis B vaccine on these two groups after receiving three doses.

From the 2<sup>nd</sup> semester of 2012, the Brazilian Hepatitis B immunization schedule was altered. Instead of three doses of Hepatitis B vaccine, currently one dose of HBV vaccine is given at birth followed by 3 doses of pentavalent vaccine. This study will also compare the seroconversion rates of HEU individuals that received 3 doses of HBV vaccine with the ones presented by HEU individuals who were immunized according to the new vaccination scheme.

### Results and Discussion

Three groups were defined according to vaccination scheme and exposure to HIV. 3 doses NE group was composed of 112 children (59 male and 53 female), and 3 doses HEU group was composed of 51 patients (25 male and 26 female). 4 doses HEU group was composed of 36 individuals (22 male and 14 female) that were immunized according to the new vaccination scheme. Seroconversion was evaluated by anti-HBs titers: titers below 10 mIU/ml were characterized as nonresponsive, titers above 10 mIU/ml were considered protective and patients with titers above or equal to 1000 mIU/ml were

considered very good responders. Results are presented at chart 1.

**Chart 1.** Evaluation of seroconversion according to HIV exposure and number of doses of HBV vaccine

	<10 mIU/ml n (%)	10 – 1000 mIU/ml n (%)	>1000 mIU/ml n (%)
3 doses NE	4 (3,6%)	65 (58%)	43 (38,4%)
4 doses HEU	2 (5,56%)	27 (75%)	7 (19,44%)
3 doses HEU	18 (35,29%)	31 (60,78%)	2 (3,92%)

Chi square test indicated that HEU children that received three doses of the HBV vaccine presented a failure on seroconversion statistically significant ( $p < 0,0001$ ) in comparison to NE children under the same vaccination scheme. These results are in line with the ones obtained by Abramczuk et al.<sup>(4)</sup> There was a discrepancy on the number of very good responders between the two studies though: 3,92% in our study in contrast to 64,4%<sup>(4)</sup>. A significant difference in the efficacy of seroconversion according to the vaccination scheme was also observed. Individuals from the group 4 doses HEU were more efficiently immunized than those from the group 3 doses HEU (chi square test,  $p = 0,0015$ )

### Conclusions

A significant higher number of nonresponders was observed in HIV exposed uninfected children in comparison to non-exposed children under the same HBV vaccination scheme ( $p < 0,0001$ ). HEU patients that were given four doses of the Hepatitis B vaccine were more efficiently immunized than those who received three doses ( $p = 0,0015$ ).

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<sup>1</sup> WHO. Hepatitis B vaccines. Weekly Epidemiol Rec. **2009**, 84, pp. 405-20.

<sup>2</sup> Reikie, B. et al. Antibody Responses to Vaccination among South African HIV-Exposed and Unexposed Uninfected Infants during the First 2 Years of Life. Clin and Vaccine Immunol, **2012**, v. 20, n. 1, p. 33-38.

<sup>3</sup> How to get to zero. Geneva: Joint United Nations programme on HIV/AIDS (UNAIDS), **2011**.

<sup>4</sup> Abramczuk, B.M. et al. Impaired Humoral Response to Vaccines among HIV-Exposed Uninfected Infants. Clin and Vaccine Immunol, **2011** v. 18, n. 9, p. 1406-9.