Hepatitis B vaccine response in Pediatric patients attending Rwanda Military Hospital

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Key words: Anti-HBs titers, HBV infection, Pediatrics, Rwanda Military Hospital

Background:

Hepatitis B virus (HBV) vaccine is protective in over 85% and thus governments have endeavored to prioritize HB vaccination under the routine immunization programs in most low resource settings (LRSs). Rwanda introduced the HBV vaccine in 2002, however there is paucity of information in LRSs in the pediatric population concerning HBV infection and the impact of HBV vaccination since introduction. Our general objective was to assess the humoral response to Hepatitis B vaccine in pediatric patients attending Rwanda Military Hospital after widespread hepatitis B vaccination. The study hypothesis was:HBV vaccination wanes significantly with time.

Methods:

This was a prospective cross sectional study design carried out at Rwanda Military Hospital from October 2013 –December 2013. Children aged 3.5 months -18 years were enrolled consecutively in the study after fulfilling the study criteria. A standardized questionnaire was used to capture the demographic parameters of participants. Blood samples were removed to carry out HBsAg, antibodies to the HBsAg, and HIV. Data was entered and analyzed using STATA version 1 2. Ethical and Scientific approval was sought from the Institutional Review Board (IRB) at RMH and College of Medicine and Health Sciences School of Medicine University of Rwanda IRB.

Results:

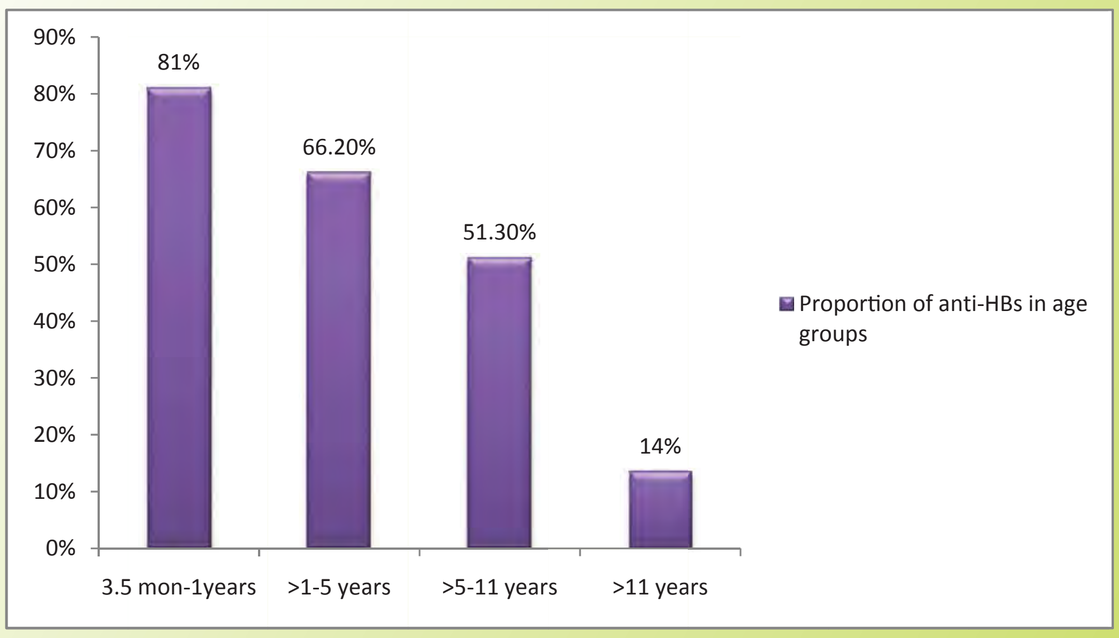
Three hundred and four children were analysed, with a male: female ratio of 1.4:1 and an age range of 3.5 months to 18 years with a mean age of 7.88 years (SD= ±5.5 years). The prevalence of HBV infection was 12/248(4.8%) and the mean age of HBV infected children was 12.7 years with an age range: 2.75-18 years and the prevalence was highest 9/12(75%) in >11-18 years age group with a male: female ratio of 10:2. HIV prevalence was found to be 1.6% with no HBV-HIV co-infection.Factors associated with HBV infection were male sex p-value <0.001; OR=9.1(CI: 8.5-9.9) and invasive traditional practices p-value <0.017; OR= 9.7(CI: 1-9.9).

The overall reported vaccination rate by the primary care taker was found to be 214/304(70.4%) *(table 1 below)* however 108/247(35.5%) were found to have Abs HBsAgtiter>10IU that conferred protection. It was noted that the protective vaccination titers were found to be 61.9% and 10.3% for ages between 3.5 months-11 year, >11year-18 years respectively in the vaccinated children. Of those reported to be vaccinated 59.9% had adequate Abs HBsAg titers and the proportion of Abs HBsAg levels decreased with increasing age with a p value<0.001 figure 1 below.

Table 1: illustrating Relationship between the demographic characteristics with Abs HBsAg titers of the study participants at RMH

Characteristics	Total N = 304 *57 missing	Ab HBsAg Yes n =108	No n =139	p-value; Odds ratios(CI)
Gender				
Female	101(40.9)	42(41.6)	59(58.4)	0.57
Male	146(59.1)	66(45.2)	80(54.8)	1.16(0.70-1.93)
Age				
3.5Mo – 11 years	159(64.4)	96(60.3)	63(39.7)	**< 0.001***
>11 - 18 years	88(35.6)	12(13.6)	76(86.4)	**9.651(4.86-19.2)**
Departments				
Pediatric OPD	209(84.6)	91(43.5)	118(56.5)	0.891
Pediatric IPD	38(15.4)	17(44.7)	21(55.3)	0.95(0.475-1.91)
Vaccination				
Yes	167(67.6)	100(59.9)	67(40.1)	**<0.001***
No	80(32.4)	8 (1)	72(90)	**13.43(6.08-29.7)**

Figure 1.Graph showing the proportion of children with antibody titers against HBsAg by age categories at RMH in 2013



Conclusions:

Abs to HBsAg wane with age amongst the vaccinated group and the commonest age group with high HB infection was in the older age thus there is need for providing HB vaccination boosters for the older age group to maximise HB prevention strategies. There is need to provide HB treatment beyond those who are HIV positive as our study clearly demonstrates that those infected by HBV were all HIV negative.

A larger study is recommended to determine the predictors of possible low HB antibody titers in our children and to come up with the appropriate timing for booster doses so that more relevant vaccine programs can be rolled out.

Acknowledgement:

- The Primary carers
- The children who participated in the study
- The Department of Pediatrics at RMH