Immunization Dialogue

Immunogenic Response to Hepatitis B Vaccine in Indian Infants

In the article entitled 'No seroconversion after Hepatitis B immunization'(l), Prof Jacob John in his reply has suggested that it is better to immunize early particularly in infancy In this regard, I would like to draw attention to a recent study from Chandigarh(2)

Sehgal *et al.*(2) evaluated the effectiveness of 3 doses of 10 meg of plasma derived HBV vaccine (Green Cross Corporation, South Korea) following 0,1,2 months schedule either alone (Group I, n = 21) or in conjunction with hepatitis B rmmunoglobulin (Group II, n = 24) in infants born to infected carrier mothers The anh HBsAg titers (IU/L) at 3.6, and 12 months of age were 22.27 ± 13.18, 29.18 ± 11.37, and 15.02 ± 12.8, lespechvely in Group I and 20.25 ±14.2, 15.12 ±14.2, and 21.0 ± 10.9 respectively in Group II The seroprotection rate was 58 8% in Group I and 85% in Group II At 12 months follow up, 1 infant of Group I (maternal HBe Ag +ve) and 2 infants of Group II (1 HBeAg +ve and 1 HBeAg -ve) had become chronic carriers despite vaccination.

Now the following issues arise in my mind.

1 The highest titer of protective antibodies (anti HBsAg) in the vaccinated group is only around 40 IU/L Studies abroad using a similar schedule talk of a geometric mean titer of 244 IU/L increasing to 3531 IU/L after a booster dose at 12 months(3) It is also to be noted that plasma derived vaccines reportedly achieve higher geometric mean titers than recombinant vaccines(4) What could be the reasons for a less immunogenic response in Indian infants?

2 None of the vaccinated infants had antibody levels > 100 IU/L which is supposed to produce long lasting immuity(5,6). The persistence of protective antibody levels is directly related to the peak levels achieved after initial course of vaccination(4). Even 89% of preterm infants in a Netherlands study, had achieved levels >100 IU/L(7) Probably if the Indian infants had achieved a higher peak level of antibodies, the seroprotection rate at 1 year might have been better and the chances of vaccination failures minimized.

3 Even with a 10 meg dose, our infants don't show a good antibody response. Should we use the 5 mcg neonatal dose advocated by a plasma derived Hepatitis B vaccine manufacturer in India?

I shall conclude by saying that the issue of inadequate immune response following Hepatitis B vaccination needs to be given a serious consideration and studies needed to find out if it is due to cold chain failure or an inherent deviation of immune response in Indian infants.

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Reply

Two important questions have been raised by Dr. Kartikeyan regarding Hepatitis B virus (HBV) immunization in Indian infants, after reviewing the paper from Chandigarh on neonatal immunoprophylaxis against vertical transmission. The investigators had measured antibody (Anti-HBs) levels against HBsAg during 13-12 months of follow up of infants given vaccine alone or vaccine plus Hepatitis B immune globulin (HBIg). The questions are: why were the antibody levels achieved by the infants low, and, if 10 meg doses induced only low immune response, should we accept the vaccine containing only 5 meg as recommended by one supplier? Dr. Karthikeyan recommends studies to determine if Indian infants have inherently low response to HBV vaccine, and to ensure that the vaccines on the market are of required potency. Are we sure that HBV vaccines are stored and shipped under proper cold chain? The questions and the recommendation are relevant, important and timely. The authors themselves had not discussed the immuogenicity issue in detail, except to point out the low immune response and to cite an early study in which even lower antibody levels were noted.

Some two years prior to the Chandigarh study, we had done a preliminary study just to make sure that the neonatal immunoprophylaxis as recommended on the strength of data from outside India could be replicated here. We offered counselling and HBsAg testing to pregnant women and recommended immunoprophylaxis for the infants of virus carriers. Some choose HBIg and vaccine, some chose only vaccine and a few refused both. The vaccine was identical to the one used in Chandigarh. The schedule was with 3 doses, one at birth, second at 6 weeks and the third at 5-6 months. Each dose contained 10 meg. The dose of HBIg was 10 IU per Kg body weight, given within 12 (up to 24) hours of birth. After one year of follow