Introduction

HBV infection is endemic in South Africa: the estimated prevalence among adults is 6.1% (1). In a recent study in Kimberly (Fig. 1), we demonstrated cases of HBV infection among children with HIV, despite the inclusion of the HBV vaccination in routine childhood immunisation programmes in South Africa since 1995 (2).

The vaccine, a safe and affordable recombinant surface antigen protein, has been available for over two decades (3), and is highly efficacious, generating immunity to HBV in >95% of immunocompetent infants after three doses (3). Since the mid-1990s, the WHO has encouraged universal coverage of the HBV vaccine through its Expanded Programme on Immunisation (EPI). EPI guidelines recommend the primary HBV vaccine dose in the first day of life (4). However, in South Africa, the first dose is conventionally delayed until age 6 weeks, leaving a window during which vertical transmission can occur perinatally or in the early weeks of life. Estimates for coverage of the third vaccine dose range from 56-97% (2).

South Africa’s high HIV prevalence poses a further challenge to the success of national HBV initiatives, as being HIV positive can increase the risk of perinatal transmission of HBV, and the HBV vaccine has been demonstrated to have reduced efficacy in HIV positive individuals (5).

Aims

• In order to investigate HBV vaccine coverage and vaccine-mediated immunity in South Africa, we set out to investigate HBV infection and sero-epidemiology in HIV-positive and HIV-negative children.

• The aim is to provide a detailed picture of the impact of existing prevention measures on HBV prevalence, and to highlight some of the remaining challenges for HBV elimination.

Materials and Methods

Study cohort

Children were recruited as part of the Co-infection in South African Children (COSAC) study, in Kimberly, South Africa (8). Subjects were recruited between the ages of 6 - 60 months. These children were recruited from two sources:

• HBV-negative participants (n=174): recruited after admission to hospital with a clinical diagnosis of respiratory tract infection between July 2014 and August 2016.

• HBV-positive children (n=136): recruited from HIV outpatient clinics between September 2009 and July 2016. Additional data were recorded on consenting children of South Africa (HBV Study Ref: ETVOS Nbr 08/09 and COSAC Study Ref: ECDFS NR 80/2014). Written consent for enrolment into the study was obtained from the child’s parent or guardian.

Vaccine mediated immunity

Due to the varying use of different thresholds for Anti-HBs, we have presented our results pertaining to both thresholds of ≥10 mIU/ml and ≥100 mIU/ml.

Vaccine response and ART

Study subjects had been treated with ART for varying lengths of time (median 26 months; IQR ± 33 months). We compared anti-HBs titres of subjects being treated with ART compared to those not currently receiving ART (Fig. 4) and found no significant difference.

Discussion

HBV vaccination schemes in South Africa leave a potential window for perinatal HBV transmission (2). This is illustrated by ongoing cases of paediatric infection. Systematic efforts to deliver the first vaccine dose soon after birth and introduce antenatal screening could reduce such transmission events.

Vaccine-mediated immunity to HBV

Anti-HBs titres were significantly lower in HIV-positive participants when compared to HIV-negative subjects, with previous reports (5). We also found that vaccine responses in HIV positive subjects wane rapidly after immunisation (7).

There was no difference in anti-HBs titres according to ART, although there are previous reports correlating ART with improved vaccine responses (5). Our findings indicate that ART was not completely reconstitute immune responses to vaccination, and that alternative strategies, such as booster vaccinations after immune reconstitution, which has been documented to take up to 5 years, may be of benefit.

References


3. Chaouch H, Hachfi W, Fodha I, Kallala O, Saadi S, Bousaadia A, et al. Impact and long-term follow up after Active infection with HBV in children, recruited from HIV outpatient clinics between September 2009 and July 2016. Additional data were recorded on consenting children of South Africa (HBV Study Ref: ETVOS Nbr 08/09 and COSAC Study Ref: ECDFS NR 80/2014). Written consent for enrolment into the study was obtained from the child’s parent or guardian.

5. ART – antiretroviral therapy.