Evaluating the effectiveness of hepatitis B immunoglobulin and vaccination in preventing mother-to-child transmission of hepatitis B virus, in the context of C4 genotype: a retrospective cohort study in Australia's Northern Territory.

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Background: Hepatitis B virus (HBV) infection is transmitted through blood and body fluid, and can be acquired through mother-to-child transmission. Public health interventions such as antenatal antiviral therapy, and timely administration of vaccine and hepatitis B immunoglobulin (HBIG) significantly reduce the chances of transmission. However, there are concerns that the existing hepatitis B vaccine does not optimally induce immunogenicity against sub-genotype C4, which is prevalent in Aboriginal communities in Northern Australia. This study aims to evaluate the effectiveness of HBIG administration and vaccination in neonates born to Aboriginal and Torres Strait Islander mothers living with chronic hepatitis B (CHB) in the Northern Territory.

Methods: A retrospective cohort study conducted of all neonates born to mothers living with CHB in the Northern Territory from 2010-2023 utilising data from electronic health records.

Results: HBIG was provided to 93.3% of the 179 eligible neonates. A four dose vaccination schedule was given to 94.4% of neonates; this was according to recommended dose intervals for 68.2% of neonates. Serological results were available for 121 infants; 3 infants acquired CHB infection and 10 infants acquired hepatitis B core antibody (HBcAb), consistent with prior exposure. Infants with evidence of seroconversion were more likely to be more born to mothers with Hepatitis B e antigen positive infection (OR 17.2 (1.81, 163.1), p=0.01). The mothers of neonates who acquired CHB infection received limited antenatal care. However, among neonates who acquired HBcAb, all mothers received antiviral therapy according to guidelines and all neonates received a birth dose of HBIG and four does of hepatitis B vaccine.

Conclusion: While ensuring access to appropriate antenatal care is crucial to prevent mother-to-child transmission, the current hepatitis B vaccine may provide inadequate protection against acquisition of HBcAb in the context of C4 genotype.

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