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## Effectiveness of birth dose of hepatitis B vaccine to the conventional 3-dose of pentavalent (DTP+HEP-B+HIB) vaccine among infants in rural Bangladesh

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**Background:** Many countries have introduced the birth dose of hepatitis-B vaccine in their national immunization program aiming to reduce hepatitis B disease burden by preventing the perinatal transmission of hepatitis-B viral infection. Bangladesh has not yet introduced birth dose of hepatitis B vaccine in national immunization program and it needs evidence based information on the superiority in effectiveness of birth dose of hepatitis B vaccine among the infants in Bangladeshi context before taking decision on introduction of birth dose of hepatitis vaccine in national immunization program. No such study has been conducted in Bangladesh so far before this study.

**Objective:** To compare the effectiveness of hepatitis B vaccine with and without a birth dose among the Bangladeshi infants.

**Materials and Methods:** A multicenter open label randomized controlled trial where 486 newborn delivered by 480 mothers were randomly assigned to either receive conventional 3 doses of hepatitis B containing pentavalent (DTP+Hep-B+Hib) vaccine (control group) at 6,10 and 14 weeks or receive monovalent hepatitis B vaccine at birth in addition to the 3 doses of pentavalent vaccine(intervention group). Blood samples were drawn one month after the 3<sup>rd</sup> dose of pentavalent vaccine to assess seroprotection against hepatitis B and the seroprevalance of HBsAg among the vaccinated infants.

**Results:** Out of 486 infants, 463 completed the study, where 234 and 229 infants were randomly assigned to the intervention group and the control group respectively. Overall, 99.4 % of infants achieved protective (anti-HBs:  $\geq 10$  mIU/ml) level of antibody. The seroprotection rate was 99.2 % and 99.6 % among infants in the intervention group and the control group respectively. In general, the geometric mean titer (GMT) was 39.4 mIU/ml. This GMT was 38.7 mIU/ml in the intervention group and 40.9 mIU/ml in the control group. Gestational age and mother's education level were associated with antibody level among the infants ( $p=0.03$ ). No infant was found to be positive with HBsAg.

**Conclusions:** Both schedules (with and without birth dose) of hepatitis B vaccine were well effective in terms of immune response, which indicates that the existing hepatitis B vaccination schedule in national immunization program in Bangladesh is well effective and need not to give birth dose of monovalent hepatitis B vaccine in addition to the conventional 3 doses of hepatitis B containing pentavalent vaccine.

## Cationic $\beta$ -cyclodextrin-chitosan conjugated as potential carrier for pmcherry-C1 plasmid delivery into U87 human glioblastoma cell line

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In this work, cationic  $\beta$ -cyclodextrin-chitosan conjugates were prepared for carrying pmCherry-C1 plasmid in the form of CS/CD/TPP/pmCherry-C1 complexes to achieve high transfection efficiency and high levels of transgene expression in *in vitro* transfection using U87. Transfection efficiencies of CS/CD/TPP complex (polyplex) as well as the lipofectamine complex (lipoplex) and Electroporation method were compared using Cherry expression plasmid. Optimum transfection efficiency and subsequent cell viability according to a number of experimental variables e.g. cell density, reagent and DNA concentrations, reagent-DNA complexing time and the presence or absence of media components such as antibiotics and serum. Positively charged CD/CS/TPP complexes interact with DNA by complementary electrostatic binding serve as efficient DNA delivery systems. The stability of CD/CS/TPP nanoparticle-bound DNA toward biological agents were investigated and the CD/CS/TPP/pmCherry-C1 was efficiently protected from DNase I digestion.

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