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Cost-effectiveness of maternal antiviral treatment for further preventing mother-to-infant hepatitis B virus transmission in China

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Abstract

Objective: About 10–20% of infants born to HBsAg and HBeAg positive mothers with high viral loads still incur perinatal transmission of HBV though received active-passive immunoprophylaxis. Three nucleoside drugs (lamivudine, telbivudine and tenofovir) have demonstrated effect in decreasing maternal serum HBV-DNA level and diminishing the risk of perinatal transmission by many clinical trials. This study aimed at evaluating the cost-effectiveness of prophylactic use of antiviral therapies in HBsAg and HBeAg positive mothers for further preventing mother-to-child HBV transmission and identifying which one of the three antiviral agents was the most cost-effective.

Method: A decision-Markov model from a societal perspective was constructed to investigate the cost-effectiveness of four different strategies: lamivudine, telbivudine , tenofovir treatment strategy, and the current active-passive immunoprophylaxis. Clinical outcomes and cost were calculated for each strategy. The incremental cost-effectiveness ratio was calculated. One-way and probabilistic sensitivity analyses were used to explore the parameters' impact on the uncertainty of the results.

Results:

For the simulated 100000 newborns, lamivudine, telbivudine and tenofovir strategies could diminish HBV-related liver diseases and save 3747, 6988 and 9114 QALYs, respectively, compared with the active-passive immunoprophylaxis strategy. Under the baseline assumptions, the ICER of lamivudine, telbivudine and tenofovir strategies compared with the active-passive immunoprophylaxis strategy were 31733, 24516 and 40070, respectively. Strategy telbivudine had an ICER of 16170 CN$ per QALY gained compared with strategy lamivudine, whilst strategy tenofovir had an ICER of 91178 CN$ per QALY gained compared with strategy telbivudine.

Conclusion:

According to WHO's criteria, antiviral treatments with lamivudine, telbivudine and tenofovir for mothers who were positive for HBsAg and HBeAg in late trimester were all highly cost-effective when compared with the current active-passive immunoprophylaxis. Telbivudine was the most cost-effective strategy when the willingness-to-pay was between one and three times per-capita GDP per QALY gained (CN$ 41908-125724).

Image

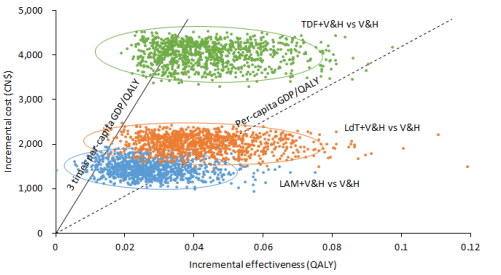


Figure 1 Incremental cost-effectiveness scatterplots of 1,000 iterations for each adding treatment strategy compared with V&H. The ellipse shows the 95% confidence interval.

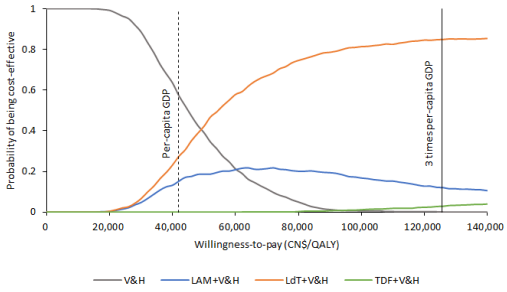


Figure 2 Cost-effectiveness acceptability curves for four strategies.

Recent Publications

1. Sun SL, Gao YQ, Yin J, Zhuang GH (2016). A

cost-effectiveness analysis on universal infant rotavirus vaccination strategy in China. Chinese Journal of Epidemiology, 37(2): 238-242.

2. Yin J, Ji Z, Liang P, et al (2015). The doses of 10μg should replace the doses of 5μg in newborn hepatitis B vaccination in China: A cost-effectiveness analysis. Vaccine, 33 (31): 3731-3738.
3. Liang P, Zu J, Yin J, et al (2015). The independent impact of newborn hepatitis B vaccination on reducing HBV prevalence in China, 1992–2006: a mathematical model analysis. Journal of Theoretical Biology, 386:115-121.
4. Zhou KN, Zhuang GH, Zhang HM, Liang PF, Yin J, et al (2013). Psychometrics of the Short Form 36 Health Survey version 2 (SF-36v2) and the Quality of Life Scale for Drug Addicts (QOL-DAv2.0) in Chinese mainland patients with methadone maintenance treatment. PLoS One, 8(11): e79828.
5. Yin J, Zhou KN, Li XM (2012). Survey of social functional status of schizophrenia patients and its influencing factors in Xi'an city. Chinese Nursing Research, 26(7):1941-1942.



Biography (150 words limited)

Juan Yin received her PhD degree in epidemiology and biostatistics from Xi'an Jiaotong University of China in July 2016. After that, she is doing postdoctoral research in faculty of nursing in Xi'an Jiaotong University. Her research direction is health economic evaluation. During her doctoral study, she focused on the cost-effective analysis of hepatitis B vaccine in different people.

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