Cost Effectiveness Simulation Analysis of Tenofovir Disoproxil Fumarate (TDF), Lamivudine (LAM), Adefovir Dipivoxil (ADV) and Entecavir (ETV) in HBeAg Negative Patients with Chronic Hepatitis B (CHB) in the USA

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Methods

A Markov Model was developed to estimate incidence and costs of CHB-related complications according to HBV-DNA viral levels achieved with different hepatitis B (HBV) treatments over 20 years. Four cohorts of 1,000 patients with chronic hepatitis B infection are defined based on the initial HBV treatment:

1) tenofovir disoproxil fumarate (TDF) cohort
2) adefovir disoproxil (ADV) cohort
3) entecavir (ETV) cohort
4) lamivudine (LAM) cohort

Patients in each cohort are associated with a level of HBV-DNA and risk of developing resistance specific to their initial treatment. Patients who develop resistance are assumed to switch to specific mono- and combination 2nd-line HBV therapies reflecting recommendations from the 2008 Treatment Algorithm for the Management of Chronic Hepatitis B Virus Infection in the United States. During the analysis, incidence of compensated cirrhosis (CC), decompensated cirrhosis (DC) and hepatocellular carcinoma (HCC) is estimated for each cohort based on proportion of patients exposed to different HBV-DNA viral levels every year.

Results

All HBV treatment costs are based on wholesaler acquisition costs. Utility scores and costs associated with CHB-related complications are obtained from published literature and are reflective of 3rd party payers. Both health outcomes and costs are discounted at 3% per year.

A cost-effectiveness analysis was performed by comparing the 4 cohorts of patients based on total cumulative complications, HBV treatment costs and cumulative quality adjusted life years (QALYs). A probabilistic sensitivity analysis was conducted to identify which initial HBV treatment option which is cost-saving and cost-effective compared to LAM.

Figure 4. Probabilistic Sensitivity Analyses

Figure 5. Cost Effectiveness Results by Patient Cohort Over 20 years