The Clinical and Economic Impact of Dolutegravir-based First-line ART in India

Amy Zheng, BA,1 Nagalingeswaran Kumarasamy, MD, PhD,2 Mingshu Huang, MA, PhD,3 A. David Patiell, PhD,3 Kenneth H. Mayer, MD,6,7,8 Bharat B. Rewari, MD,3 Rochelle P. Walensky, MD, MPH,1,4,5,9 Kenneth A. Freedberg, MD, MSc1,4,5,10

1Medical Practice Evaluation Center, Massachusetts General Hospital, Boston, MA, USA; 2Y. R. Gaitonde Centre for AIDS Research and Education, Voluntary Health Services (VHLS), Chennai, India; 3Yale School of Public Health, New Haven, CT, USA; 4Divisions of Internal Medicine and Infectious Diseases, Massachusetts General Hospital, Boston, MA, USA; 5Boston Medical School, Boston, MA, USA; 6The Fenway Institute, Fenway Health, Boston, MA, USA; 7Beth Israel Deaconess Medical Center, Boston, MA, USA; 8World Health Organization, Country Office, New Delhi, India; 9Department of Health Policy and Management, Harvard T.H. Chan School of Public Health, Boston, MA, USA

INTRODUCTION - The Clinical and Economic Impact of Dolutegravir

Dolutegravir (DTG)-based antiretroviral therapy (ART) has proven superior or non-inferior to other regimens and is recommended 1st-line treatment for HIV infection in the United States and Europe. Efavirenz (EFV)-based regimens remain the standard of care (SOC) in India and other resource-limited settings, where DTG is not yet available. Anticipating generic DTG availability, we examined the clinical outcomes, cost-effectiveness, and 2- and 5-year budgetary impact of a DTG-based 1st-line ART regimen in India.

METHODS - We used the Cost-Effectiveness of Preventing AIDS Complications-International (CERAP-I) microsimulation model of HIV disease and treatment, populated with cohort, clinical, and cost data from India. Cohort characteristics were representative of patients initiating ART in India (males aged 37 years, 43% females, and median CD4 count of 154 cells/µL).

We assessed the clinical and economic impact of two 1st-line ART strategies: 1. EFV/TDF3TC (SOC); 2. DTG+TDF3TC (DTG regimen).

RESULTS - Table 1. Select model input parameters

Table 2. Base case clinical, cost, and cost-effectiveness results

Table 3. Base case clinical, cost, and cost-effectiveness results

RESULTS (Cont.)

RESULTS - The Clinical and Economic Impact of Dolutegravir

Figure 1. Multi-way sensitivity analysis on the cost-effectiveness of a DTG regimen compared to SOC in India

Figure 2. Cumulative undiscounted ART and HIV care costs at 2- and 5-years for SOC and a DTG regimen in India

CONCLUSIONS

- A generic DTG regimen for 1st-line ART in India will increase survival and decrease the proportion of patients switching to more costly 2nd-line ART.
- At $102 per patient per year, a DTG regimen is very cost-effective and its implementation would be at no additional cost for the national HIV program in 5 years in India.
- DTG-based first-line ART, once generally available in India, should become the standard of care for ART initiation in India.

Key clinical and cost-effectiveness findings:

- A DTG regimen increases survival at 2 and 5 years by 3.8% and 5.4%, respectively, if implemented as 1st-line therapy for HIV (Table 2).
- At an annual cost of $102 per patient, a DTG regimen confers 1.4 additional life-years compared to EDOC (at an increase of $110 per patient cost of care, the DTG regimen is a very cost-effective alternative to SOC; ICER $100/YLS).
- When the annual cost of a DTG regimen, late virologic failure rate, and annual cost of 2nd-line ART input parameters were varied simultaneously in multi-way sensitivity analysis, a DTG regimen remained cost-effective at an annual cost of $180 when late virologic failure ≤0.6/month, regardless of 2nd-line ART costs (Figure 1), above).

Key budget impact findings:

- A greater proportion of costs under SOC compared to a DTG regimen are attributable to more costly 2nd-line ART at 2 years (0.8% vs. 0.5%) and 5 years (3.0% vs. 1.5%) in India (Figure 2, above).
- Over the short-term, a DTG regimen as initial treatment would improve clinical outcomes at no additional cost compared to SOC.

Projected clinical outcomes included: 2 and 5-year survival, proportion of patients on 1st-line ART at 5 years; life expectancy (age 37); cost; and cost-effectiveness.

We defined a strategy as “cost-effective” if incremental cost-effectiveness ratio (ICER) ≤5-year of life saved (YLS) per $100,000 USD (1%).

We examined model parameter uncertainty in one-way and multi-way sensitivity analysis by varying annual ART cost of a DTG regimen ($80-180), annual cost of PI-based 2nd-line ART ($98-318), as well as initial suppression (92%), late virologic failure (0.1-0.5/month), and nephrotoxicity rates (1.6-13.0%) of a DTG regimen.