The Health Technology Report Series has been developed by the Institute of Family Medicine and Public Health, University of Tartu.

Cost-effectiveness of tisagenlecleucel in the treatment of relapsed or refractory acute lymphoblastic leukemia

Summary

Objective: To evaluate the effectiveness and cost-effectiveness of chimeric antigen receptor therapy (CAR-T) tisagenlecleucel compared to standard care in the treatment of relapsed or refractory B-cell acute lymphoblastic leukemia (r/r ALL) in children and young adults in Estonia.

Methods: To meet the objective, a literature review of the effectiveness and safety of tisagenlecleucel and alternative r/r ALL treatment options was composed. In addition, an overview of the cost-effectiveness of tisagenlecleucel compared to standard care was compiled from published literature. Cost-effectiveness and budget impact in the Estonian setting were calculated compared to blinatumomab, which is the best available treatment option for the target population. Cost-effectiveness analysis with a time horizon of 70 years was performed by combining a decision tree and a partitioned survival model. The decision tree was used to model processes preceding tisagenlecleucel infusion; the partitioned survival model, characterized by the distribution of patients between event-free, progressed and dead health states, was applied to model the course of disease following alternative treatments. The model transitions for tisagenlecleucel and blinatumomab were derived from the ELIANA and RIALTO trials, respectively. Based on clinical trial data an assumption was made that patients who are event-free for at least five years can be considered cured and have the mortality of general population corrected by the standardized mortality ratio of ALL patients. Drug and treatment costs were calculated using Estonian Health Insurance Fund (EHIF) data, whose perspective the analysis employed. Quality of life estimates were derived from published literature. Costs and effects were discounted using an annual discount rate of 5%. Results were evaluated in terms of costs, life years (LY), quality-adjusted life years (QALY) and incremental cost-effectiveness ratios (ICER). Additionally, a budget impact analysis from the healthcare payer perspective was carried out.

Results: In the base case scenario the analysis showed that compared to blinatumomab treatment with tisagenlecleucel would enable to gain 5.35 LYs and 4.36 QALYs per patient with r/r ALL. The additional cost compared to blinatumomab treatment was estimated at €136,340 per patient, resulting in an ICER of €31,279 per QALY gained. In sensitivity analysis, the results were most influenced by the choice of time horizon and the price of tisagenlecleucel. The budget impact analysis showed that if the annual number of patients eligible for tisagenlecleucel treatment were 1.5 the total additional cost of treatment would be €204,510 – €273,030 depending on the proportion of patients actually receiving the tisagenlecleucel infusion.

Conclusions: Based on the assumption that r/r ALL patients can be considered cured after five years without ALL related events, tisagenlecleucel is more effective at a higher cost compared to blinatumomab treatment.

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