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Short communication

Cost-effectiveness of avelumab maintenance therapy for advanced urothelial carcinoma in North Macedonia

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Introduction

Advanced urothelial carcinoma remains associated with poor long-term prognosis and substantial healthcare burden despite recent therapeutic advances. Historically, patients with locally advanced or metastatic urothelial carcinoma who achieved disease control following platinum-based chemotherapy were managed with best supportive care alone, with limited survival benefit and high rates of disease progression. The JAVELIN Bladder 100 trial demonstrated that maintenance therapy with avelumab significantly improved overall survival compared with best supportive care (BSC), establishing avelumab maintenance as a new standard of care in this setting (Powles et al., 2020, 2021). However, the introduction of immune checkpoint inhibitors is associated with considerable treatment costs, creating challenges for healthcare systems with limited resources. Pharmacoeconomic evaluation is therefore essential to assess the balance between additional costs and clinical benefits. This study aimed to evaluate the cost-effectiveness of avelumab maintenance therapy plus BSC compared with BSC alone from the perspective of the healthcare payer in the Republic of North Macedonia.

Materials and methods

A cost-effectiveness analysis was conducted to evaluate avelumab maintenance therapy plus best supportive care (BSC) compared with BSC alone in patients with locally advanced or metastatic urothelial carcinoma without disease progression following platinum-based chemotherapy. A three-state partitioned survival model (progression-free survival, progressed disease and death) was developed in TreeAge Pro from the perspective of the healthcare payer in the Republic of North Macedonia. Clinical efficacy inputs were derived from the JAVELIN Bladder 100 trial. Overall survival and progression-free survival were extrapolated using Weibull parametric functions. Direct medical costs included drug acquisition, monitoring, adverse event management, subsequent treatment and terminal care costs. Health outcomes were expressed as life-years (LYs) and quality-adjusted life-years (QALYs). Costs and outcomes were discounted annually at 3%. Deterministic and probabilistic sensitivity analyses were performed to evaluate model uncertainty (Briggs et al., 2006).

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Results and discussion

In the base-case cost-effectiveness analysis, maintenance treatment with avelumab + best supportive care (BSC) demonstrated improved health outcomes compared with BSC alone in patients with locally advanced or metastatic urothelial carcinoma without progression after platinum-based chemotherapy.

The model predicted that patients treated with avelumab + BSC accrued 1.54 QALYs and 1.88 life-years (LYs), compared with 1.29 QALYs and 1.58 LYs in the BSC arm. This resulted in an incremental gain of 0.25 QALYs and 0.30 LYs in favor of avelumab + BSC.

Total lifetime costs were estimated at 33,248,304.73 MKD for avelumab + BSC and 33,226,369.54 MKD for BSC alone, corresponding to an incremental cost of 21,935.19 MKD. The resulting incremental cost-effectiveness ratio (ICER) was 88,056.96 MKD/QALY gained, which remained substantially below the willingness-to-pay (WTP) threshold of 652,200 MKD/QALY (1× GDP per capita of the Republic of North Macedonia). Therefore, avelumab + BSC was considered highly cost-effective in the base-case analysis.

One-way sensitivity analysis demonstrated that the model was most sensitive to the Weibull overall survival parameter (λ) in the avelumab arm, followed by the proportion of patients receiving subsequent avelumab treatment after progression in the BSC arm and the progression-free survival parameters. Nevertheless, even across the tested parameter ranges, the ICER remained below the national WTP threshold in the majority of scenarios, supporting the robustness of the base-case findings. In contrast, utility values, adverse event disutilities, monitoring costs and adverse event management costs demonstrated comparatively limited influence on the overall model outcomes. These findings suggest that the economic value of avelumab maintenance therapy is primarily driven by survival benefit rather than by variations in toxicity-related or follow-up costs.

Probabilistic sensitivity analysis confirmed model robustness, with most Monte Carlo iterations located in the northeast quadrant of the cost-effectiveness plane, indicating higher effectiveness with slightly increased costs for avelumab + BSC versus BSC alone. At the WTP threshold corresponding to 1× GDP per capita (652,200 MKD/QALY), the cost-effectiveness acceptability curve (CEAC) showed that the probability of avelumab + BSC being cost-effective was approximately 59.1%, compared with 40.9% for BSC. The probability of cost-effectiveness for avelumab + BSC progressively increased with higher WTP thresholds, reaching approximately 73.7% at the upper tested threshold.

Conclusion

Avelumab maintenance therapy plus best supportive care demonstrated improved survival outcomes and favorable cost-effectiveness compared with BSC alone in patients with advanced urothelial carcinoma in North Macedonia. Despite slightly higher overall costs, the resulting ICER remained well below the national willingness-to-pay threshold, supporting the economic value of avelumab maintenance in this clinical setting.

References

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