Economic Evaluation of HLA-B*15:02 Genotyping for Asian Australian Patients With Epilepsy

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Abstract

Background: The HLA-B*15:02 allele has been associated with an increased risk of carbamazepine-induced Stevens-Johnson syndrome and toxic epidermal necrolysis in specific Asian populations.[1] While HLA-B*15:02 genotype testing in Asian populations is recommended by several international prescribing guidelines,[2] it is currently not subsidised by the Medicare Benefits Schedule in Australia. Despite more than 17% of Australia's population self-reporting Asian ancestry,[3] the cost-effectiveness of HLA genotyping in the Australian context is lacking and practitioners have proposed its necessity to improve Australia's pharmacogenetic screening policy.[4,5]

Aim: To evaluate the cost-effectiveness of HLA-B*15:02 genotyping in Asian Australian epilepsy patients.

Methods: A model with components of decision analysis and Markov simulation was developed to simulate clinical trajectories of adult Asian Australian patients with newly diagnosed epilepsy being considered for carbamazepine treatment. Cost-effectiveness and cost-utility analyses over a lifetime time horizon were conducted from the perspective of the Australian health care sector. Two alternative strategies were assessed: (1) No HLA-B*15:02 genotyping and the empirical commencement of carbamazepine vs (2) HLA-B*15:02 genotyping and the commencement of valproate in allele carriers. Main outcomes and measures included life-years (LYs), quality-adjusted life-years (QALYs), costs in 2023 Australian dollars (A$), and incremental cost-effectiveness ratios.

Results: HLA-B*15:02 screening was associated with additional mean cost of A$114 (95%CI, −A$83 to A$374), and a reduction in 0.0152 LYs (95%CI, 0.0045 to 0.0287 LYs) but improvement by 0.00722 QALYs compared with no screening, resulting in an incremental cost-effectiveness ratio of A$15,839 per QALY gained. Therefore, universal genotyping for Asian Australians was cost-effective compared with current standards of practice at the A$50,000 per QALY willingness-to-pay threshold. Sensitivity analyses demonstrated that the intervention remained cost-effective across a range of costs, utilities, transition probabilities and willingness-to-pay thresholds. At the A$50,000 per QALY willingness-to-pay threshold, universal screening was the preferred strategy in 88.60% of simulations.

Conclusion: In this analysis, HLA-B*15:02 screening represents a cost-effective choice for Asian Australian epilepsy patients being considered for carbamazepine.

References

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