Pharmacogenetic HLA-B*58:01 testing to prevent allopurinol-induced Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis in Vietnamese population: A cost-effectiveness analysis

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Introduction

- Vietnam has a high prevalence of HLA-B*58:01 (6.5-6.9%) and a high burden of diseases requiring the use of allopurinol (1)
- HLA-B*58:01 is strongly associated with allopurinol-induced SJS/TEN in the Vietnamese population (OR: 219.7 (95%CI: 48.0, 1929,6)) (2)
- The price of HLA-B*58:01 test in Vietnam is $US 3.8
- However, there is a paucity of economic evidence of this genetic testing in the local context

Objective

- To assess the cost-effectiveness of HLA-B*58:01 testing before using allopurinol to prevent allopurinol-induced SJS/TEN in the Vietnamese population from the healthcare payer perspective

Methods

- A Markov model was developed to compare three strategies (Fig 1)
  - (1) patients initiate allopurinol without screening (current practice)
  - (2) HLA-B*58:01 screening, patients initiate allopurinol if HLA-B*58:01 positive otherwise probenecid is provided
  - (3) no HLA-B*58:01 screening, patients initiate probenecid
- A lifetime horizon and 1-year cycle length were applied.
- One-way sensitivity analysis and probability sensitivity analyses were performed to investigate the robustness of the results.
- A willingness-to-pay (WTP) threshold of 3-time GDP per capita was used (VND 257,000,000 ($US 11,100))

Results

- Compared to the current practice, HLA-B*58:01 screening led to an increase of 0.0069 in QALYs along with the incremental cost of VND 14,283,633 ($US 617), yielding an ICER of VND 2,070,459,122 ($US 89,398) per QALY gained ➔ HLA-B*58:01 screening was not cost-effective (Fig 2)
- The prevalence of allopurinol-induced SJS/TEN was the most influential factor in the result, other factors are cost of gout treatment (data are not shown)
- The ICER of the third strategy, only using probenecid, was much higher than the ICER of HLA-B*58:01 screening (VND 15,087,885,880 ($US 651,463) per QALY gained) (Table 1)

Table 1: Base case analysis results

Strategy	Cost (VND($US)[a])	Incremental cost (△Cost (VND($US)[a])	QALY	Incremental QALYs (△QALYs)	LYs	Incremental LYs	ICER (△Cost (VND($US)[a]/ △QALYs)
No HLA-B*58:01 screening, use allopurinol (1)	9,481,987 (409)		11.8089		16.6384		
HLA-B*58:01 screening (2)	23,765,620 (1,026)	14,283,633 (617)	11.8158	0.0069	16.6421	0.0037	2,070,459,122 (89,398)
No HLA-B*58:01 screening, use probenecid (3)	116,580,071 (5,034)	107,098,084 (4,624)	11.8160	0.0071	16.6422	0.0038	15,087,885,880 (651,463)

Abbreviations: HLA, human leukocyte antigen; ICER, Incremental Cost-Effectiveness Ratio; LY, Life-Year gained; QALY, Quality-Adjusted-Life-Year gained; VND, Vietnam Dong [a]: exchange rate 1 $US = 23,160 VND (year 2021, World Bank's official currency exchange rate))

Fig 1: A decision model

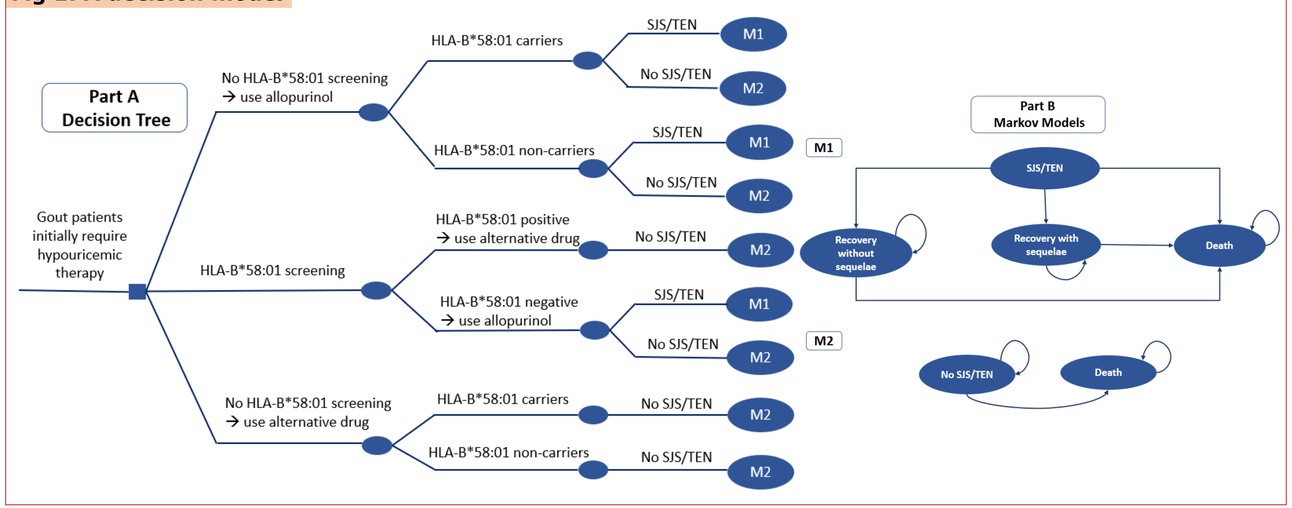
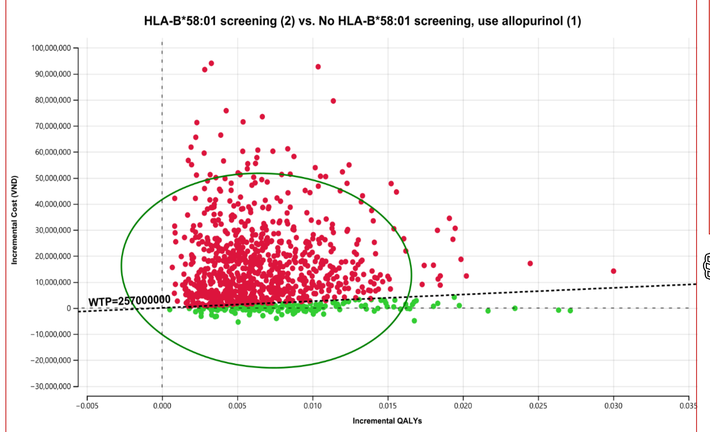


Fig 2: Cost-effectiveness plane



Conclusion

- HLAB*58:01 genetic testing prior to allopurinol is currently unlikely to be cost-effective in Vietnam at the current WTP threshold
- The prevalence of allopurinol-induced SJS/TEN was the most influential factor in the result
- The conclusion of cost-effectiveness may change if more high-risk patients are targeted, and/or febuxostat is reimbursed, and/or lower the price of probenecid

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