Cost-utility analysis of dupilumab versus upadacitinib in adult moderate-to-severe atopic dermatitis in Australia

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Introduction

Atopic dermatitis (AD) is a chronic inflammatory skin disease with substantial economic and clinical burden. Treatment of AD has been revolutionised by therapies such as dupilumab and upadacitinib, though these drugs are markedly more costly than standard systemic immunosuppressants.[1,2] Given finite healthcare resources, understanding the cost-effectiveness of available therapies is critical in guiding resource distribution and clinical practice.[3]

Aim

To evaluate the cost-effectiveness of dupilumab versus upadacitinib as first-line therapy for adults with moderate-to-severe AD.

Methods

A cost-utility analysis was conducted from an Australian healthcare system perspective. Following collaboration between a diverse team of medical practitioners and health economists, a decision tree and Markov model was constructed, with 16-week treatment cycles over a five-year period.

Patients were initiated on either first-line dupilumab (600mg stat then 300mg every 2 weeks) or upadacitinib 30mg daily. The cohort transitioned between controlled disease, uncontrolled disease, and background mortality.

Efficacy and utility values were derived from literature and real-life clinical experience at an Australian tertiary dermatology centre. Costs were obtained from public information. One-way and probabilistic sensitivity analyses were conducted to assess the effects of uncertainty on parameter inputs. Scenario analysis with a dosing regimen of upadacitinib 15mg daily was performed.

The primary outcomes were the changes in cost and quality-adjusted life-years (QALYs), and the incremental cost-effectiveness ratio (ICER). All modelling and analyses were performed using TreeAge Pro Healthcare, version 2024 R1.0.

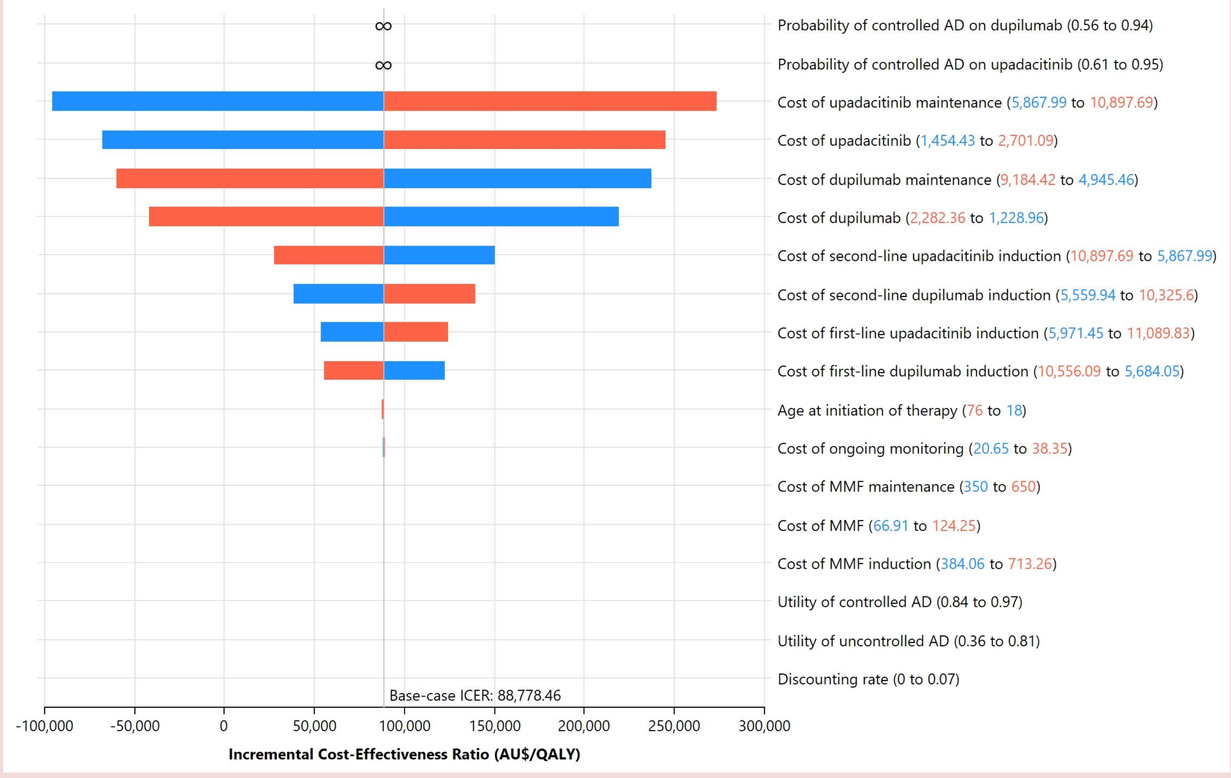

Figure 1. Tornado diagram of the one-way sensitivity analysis. The diagram is arranged by the parameters with the greatest to least impact on the ICER.

Abbreviations: AU$, Australian Dollar; *ICER,* incremental cost-effectiveness ratio; *QALY*, quality-adjusted life year; *MMF,* mycophenolate mofetil

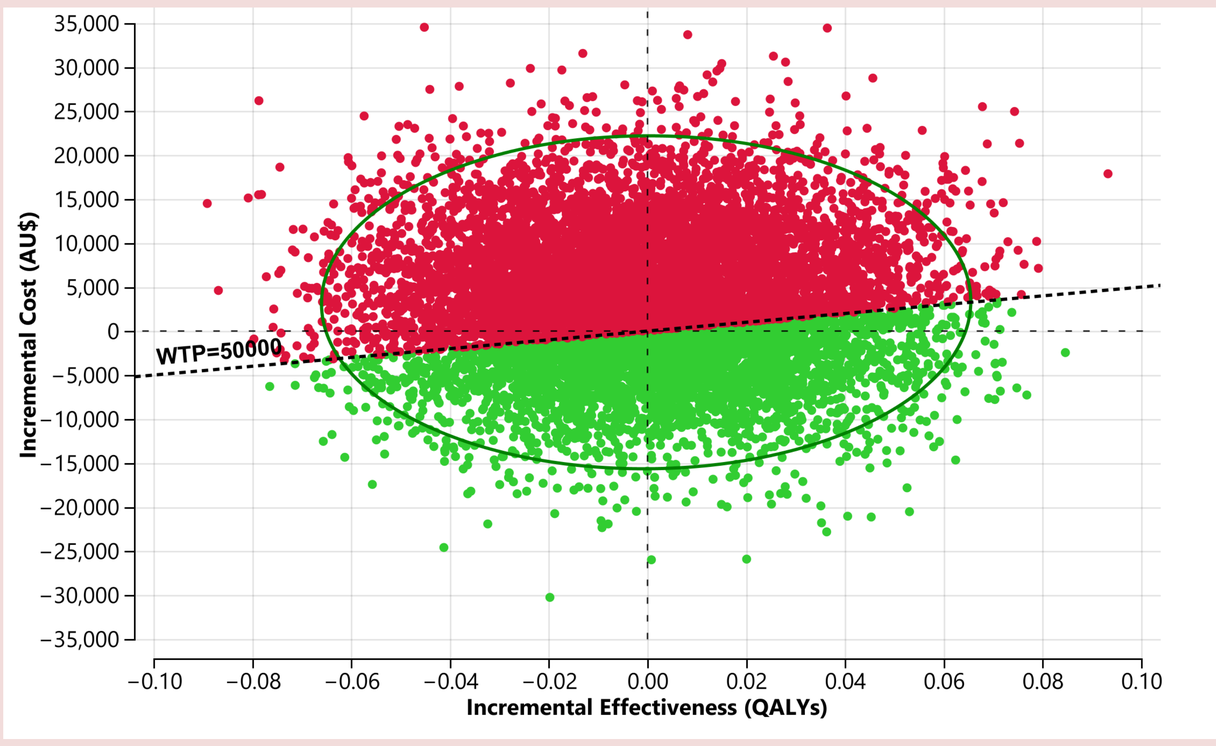

Figure 2. Incremental cost-effectiveness scatterplot. The scatterplot displays the proportion of iterations in which upadacitinib is considered more (green) or less (red) cost-effective than dupilumab with respect to the AU$50,000/QALY WTP threshold.

Abbreviations: AU$, Australian Dollar*; QALY,* quality-adjusted life year*; WTP,* willingness-to-pay

Results

Compared to dupilumab, first-line upadacitinib had an increased cost of AU$3,213 with an incremental gain of 0.04 QALYs over the five-year period, resulting in an ICER of AU$88,778/QALY. Upadacitinib was therefore not more cost-effective than dupilumab at an assumed willingness-to-pay threshold of AU$50,000/QALY, with higher associated costs and marginally increased effectiveness.

The one-way sensitivity analysis found that these results were highly sensitive to variations in transition probability and cost input parameters (Figure 1).

However, the results remained robust in the probabilistic sensitivity analysis. In the Monte Carlo simulation, upadacitinib was more cost-effective than dupilumab in 33.95% of the 10,000 model iterations (Figure 2). The cost-effectiveness of first-line dupilumab over upadacitinib was maintained across the willingness-to-pay threshold range of AU$0–AU$100,000/QALY.

In the scenario analysis, upadacitinib 15mg was not cost-effective compared to dupilumab, with a higher incremental cost (+AU$267) and decrease in effectiveness (–0.03 QALYs), resulting in an ICER of –AU$7,656/QALY.

Conclusion

While the ICER was greater than the standard AU$50,000/QALY, the minimal differences in costs and utilities suggest that both treatments may be comparable options for first-line therapy. Thus, the choice may be at the discretion of the treating clinician, based on comorbidities, patient preference and disease presentation.

Further Information

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