Cost-Effectiveness Analysis of Abrocitinib versus Dupilumab in Adolescents with Severe Atopic Dermatitis in Spain

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INTRODUCTION

- Atopic dermatitis (AD) is a chronic, inflammatory skin disease characterized by itchy, painful, and dry skin. In Spain, it affects approximately 6.43% of adolescents[1], with 3.1% of them suffering from severe AD[2].
- Abrocitinib, a JAK inhibitor, has recently been approved and reimbursed for adolescents with AD. Given the availability of various treatment alternatives for these patients, conducting economic evaluations will aid in evidence-based decision making.

OBJECTIVE

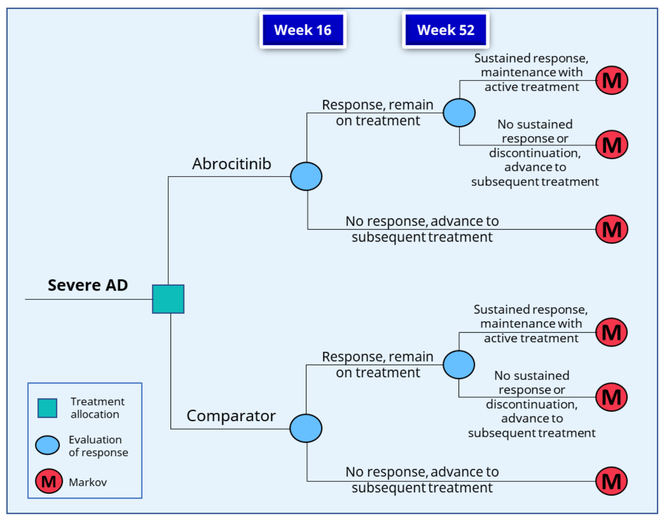
To evaluate the cost-effectiveness of abrocitinib (100 and 200mg) versus dupilumab 200/300 mg in the treatment of adolescent patients (12-17 years) with severe AD who are candidates for systemic treatments, from the Spanish National Health System (NHS) perspective.

METHODS

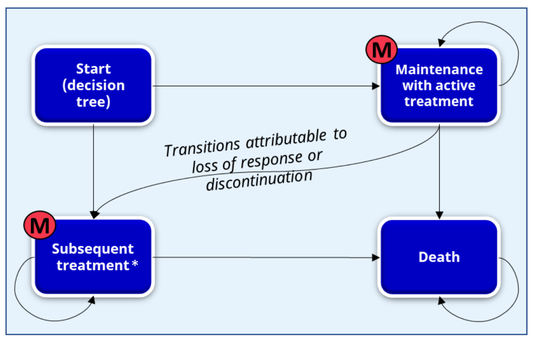
Design

- The cost-effectiveness analysis was performed using a hybrid model, consisting of a decision tree (52 weeks) followed by a Markov model for the remainder of a 5-year time horizon, programmed in Excel, with 6-month cycles (Figure 1).
- In the decision tree, patients were assigned to each treatment, and response and discontinuation rates were evaluated at 16 and 52 weeks. After 52 weeks, patients transitioned to the Markov model, which included three health states: maintenance on active therapy, subsequent treatment (for those who discontinued or lost response) and death (absorbing state).
- Response was assessed using a 75% reduction in baseline Eczema Area and Severity Index score (EASI-75) as a measure of efficacy[3].

Figure 1. Model structure (decision tree and Markov)



AD: atopic dermatitis



*Patients discontinuing active treatment are assumed to receive a 'basket' of subsequent treatments, which includes all systemic options available for adolescents.

Clinical parameters

- Key efficacy inputs used in the model included: time to onset of response, response at 16 and 52 weeks (decision tree), and treatment waning and discontinuation rates (Markov model).
- The model considered age-dependent mortality data for the Spanish population[4].
- Comparative efficacy data were obtained from a network meta-analysis included in a NICE evaluation[3] (Table 1).

Table 1. Response and discontinuation rates

Parameter	Abrocitinib 100mg	Abrocitinib 200mg	Dupilumab 200/300mg
Decision tree			
Response at week 16	67.4%	78.6%	58.5%
Response at week 52*	86.7%	88.9%	94.9%
Markov model			
Discontinuation rate†	13.3%	11.1%	5.1%

*Response rate at week 52 for week-16 responders; †Treatment discontinuation rates were assumed to be the same as the conditional discontinuation data observed between 16-52 weeks.

- Long-term data on the maintenance of treatment benefits with abrocitinib and dupilumab are limited. In line with the NICE report, treatment response was assumed to wane by 2% in year 2, 5% in year 3, 7% in year 4, and 8% in year 5 and beyond[3].
- Adverse events (AE) experienced by at least 5% of participants in clinical trials for any treatment were included[5,6].
- Health-state utilities were obtained from the NICE report, and were assigned as follows: 0.55 for baseline utility, 0.88 for treatment responders, and 0.71 for non-responders[3].

Costs

- Unit costs (€, 2023) for drug acquisition and administration, AE management, monitoring laboratory tests, medical visits, hospitalisations, and subsequent treatment were obtained from local sources[7,8]. Both, costs and outcomes were discounted at a 3% per year[9,10].
- The cost of subsequent treatment was estimated as the average monthly cost between JAK inhibitors (i.e., abrocitinib) and biologics (i.e., dupilumab), resulting in €1,092.0 per month.

Table 2. Cost inputs

Cost type	Abrocitinib 100mg	Abrocitinib 200mg	Dupilumab 200/300mg
Unit cost	€31.7/tablet	€31.7/tablet	€560.3/syringe
Monthly cost	€965.8	€965.8	€1,218.2
Loading dose	-	-	€1,120.7
Administration	-	-	€76.2
Monitoring tests	€433.7 (annual cost)		
AE management	€88.6 (ophthalmologist) for allergic conjunctivitis / €78.9 (dermatologist) for all other AE		

Visits and hospitalisations by type of response	Hospitalisations	Emergency room	Primary care visits	Dermatology visits
Responders (annual cost)	€60.4	€2.9	€369.3	€341.0
Non-responders (annual cost)	€462.0	€11.3	€768.6	€473.6

AE: adverse events

Analysis

- The analysis was expressed as incremental cost-effectiveness ratio (ICER): incremental cost per quality-adjusted life year (QALY) gained (willingness-to-pay threshold: €25,000/QALY[11]). Sensitivity analyses were performed.
- Additionally, considering the comparative efficacy data, number of patients that would need to be treated (NNT) with abrocitinib to achieve an additional EASI-75 responder compared to dupilumab (active control) was calculated: $NNT = \frac{1}{(abrocitinib\ \%EASI{-}75) - (dupilumab\ \%EASI{-}75)}$

RESULTS

Cost-effectiveness

- Abrocitinib (100 and 200mg) was dominant versus dupilumab, generating a QALYs gain with direct healthcare cost-savings (Table 3).

Table 3. Deterministic results

Results	Abrocitinib 100mg	Abrocitinib 200mg	Dupilumab 200/300mg
Total QALYs	3.71	3.80	3.70
Total costs	€64,787.0	€63,855.7	€73,376.1
Abrocitinib 100mg			
ΔCost	-	-	**-€8,589.1**
ΔQALYs	-	-	**0.02**
ICER	-	-	**Dominant**
Abrocitinib 200mg			
ΔCost	-	-	**-€9,520.4**
ΔQALYs	-	-	**0.10**
ICER	-	-	**Dominant**

ICER: incremental cost-effectiveness ratio; QALYs: quality-adjusted life-years

- Sensitivity analyses confirmed the robustness of the model. In the probabilistic sensitivity analysis (PSA), abrocitinib was dominant in 70.7% and 80.7% of simulations for the 100mg and 200mg doses, respectively, compared to dupilumab.
- Additionally, sensitivity analysis demonstrated consistent results, regardless of possible ranges of confidential price agreements (Table 4).

Table 4. Price sensitivity analysis for all presentations

Abrocitinib Discount	Dupilumab Discount / Monthly Cost per Patient	0% / €1,218.2	10% / €1,096.4	20% / €974.6	30% / €852.8	40% / €730.9	50% / €609.1	60% / €487.3	70% / €365.5
0%	€965.8								
10%	€869.0								
20%	€773.0								
30%	€676.0								
40%	€579.5								
50%	€482.7								
60%	€386.2								
70%	€289.8								

Abrocitinib (100 and 200 mg) is dominant

Abrocitinib (100 and 200 mg) is cost-effective (RCEI < €25,000/QALY)

Abrocitinib 200 mg is cost-effective (RCEI < €25,000/QALY)

Abrocitinib (100 and 200 mg) is not cost-effective (RCEI > €25,000/QALY)

NNT analysis

- NNT to obtain an additional EASI-75 responder at week 16:
  - Abrocitinib 100 mg vs dupilumab: NNT = 11.24
  - Abrocitinib 200 mg vs dupilumab: NNT = 4.98
- Given that abrocitinib was cost-saving, it was considered a dominant alternative vs dupilumab.

CONCLUSIONS

From the Spanish NHS perspective, abrocitinib is a dominant alternative versus dupilumab for adolescents with severe atopic dermatitis, offering dose flexibility.

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DISCLOSURE

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