Cost-Effectiveness of Tezepelumab in Taiwan for Severe Asthma

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INTRODUCTION

Asthma is a heterogenous disease which is characterised by chronic airway inflammation. Symptoms of asthma include wheezing, chest tightness, cough and shortness of breath.

Severe asthma accounts for between 5% and 10% of the total asthma population[1], and is defined as either requiring a high dose of ICS plus a second agent (such as LABA) to be controlled, or remains uncontrolled in spite of this therapy[1],[2].

In uncontrolled severe asthma, biologic therapies may be offered if Type 2 inflammation is present, based on the specific biomarkers, symptoms and clinical characteristics present.

OBJECTIVE

Tezepelumab is a human monoclonal antibody specific for the epithelial-cell–derived cytokine thymic stromal lymphopoietin (TSLP). A Phase III trial demonstrate that tezepelumab treatment resulted in fewer exacerbations, improved lung function and asthma control, and increased health-related quality of life.

This study aimed to evaluate the long-term cost-effectiveness of tezepelumab for treating severe asthma in Taiwan to strengthen its value.

METHOD

A 5-state Markov model[3] was adapted to evaluate the cost-effectiveness of tezepelumab compared to benralizumab, mepolizumab, and omalizumab for treating severe asthma patients.

The model parameters were derived from the NAVIGATOR[4] and SOURCE[5] clinical trials and costs were sourced from the literature and NHIA (National Health Insurance Administration) drug costs from Taiwan. Relative risk of exacerbation for comparators was derived from indirect treatment comparison[6].

This study adopted the perspective of Taiwan NHIA. Quality-adjusted life years (QALYs), and incremental cost-effectiveness ratios (ICERs) were evaluated.

RESULTS

Compared to benralizumab, tezepelumab increases QALYs at lower treatment costs, showing dominance and cost-effectiveness (ICER: TWD $-2,212,337/QALY).

Similarly, compared to mepolizumab, tezepelumab results in increased QALYs with lower treatment costs, demonstrating dominance and cost-effectiveness (ICER: TWD $-6,742,473/QALY).

In comparison to omalizumab, tezepelumab increases QALYs with slightly higher treatment costs (ICER: TWD $619,236/QALY), below both willingness-to-pay (3 times the per capita GDP: TWD $2,925,582) and per capita GDP (TWD $975,194) thresholds in Taiwan, indicating cost-effectiveness (Table 1).

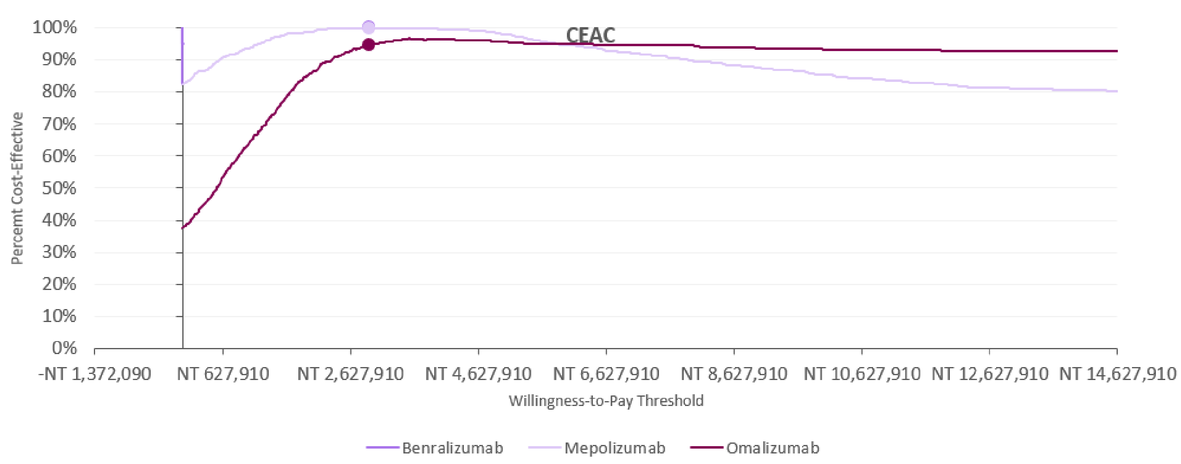
Probabilistic sensitivity analysis shows tezepelumab's high probability of cost-effectiveness compared to benralizumab, mepolizumab, and omalizumab (Figure 1).

Table 1. Health economic results (ITT populations)

Arm	Incremental			ICER	
	Costs	QALYS	Life Years		
Tezepelumab	-	-	-	-	-
Benralizumab	-TWD 307,559	0.139	0.173	-TWD 2,212,337	**Dominates**
Mepolizumab	-TWD 317,923	0.047	0.061	-TWD 6,742,473	**Dominates**
Omalizumab	TWD 94,866	0.153	0.181	TWD 619,236	**CE**

ICER: incremental cost-effectiveness ratio; QALY: quality-adjusted life year; CE: cost-effective

Figure 1. Probabilistic sensitivity analysis cost-effectiveness acceptability curve plot



A probabilistic sensitivity analysis with 1,000 iterations was conducted to assess model uncertainty through random sampling. When the willingness-to-pay (WTP) threshold is TWD $2,925,582, the probability that tezepelumab is cost-effective compared to benralizumab, mepolizumab, and omalizumab is 100%, 99.9%, and 94.5%, respectively.

CONCLUSIONS

The model reflects the rates of exacerbations and its subsequent treatment requirements. Patients who experience an exacerbations result in either a burst in OCS, an A&E visit or hospitalisation, the latter resulting in the largest cost and quality of life burden. **The results from the analysis show that tezepelumab is dominant and is a cost-effective treatment when compared to the other biologics.**

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