The Cost-Effectiveness of Budesonide/Formoterol Maintenance and Reliever Therapy Versus Salmeterol/Fluticasone Plus As-Needed Salbutamol Among Asthma Patients ≥12 Years in China

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Objective

➢ To evaluate the cost-effectiveness of budesonide/formoterol combination therapy plus as need compared with salmeterol/fluticasone plus salbutamol as reliever therapy for asthma patients ≥12 years from the societal perspective.

Methods

Model Structure

♦ A Markov model was developed with three health states (i.e., non-exacerbation, exacerbation, and death) with a lifetime horizon (Figure 1).

♦ The exacerbation state was defined as asthma deterioration requiring for usage of oral corticosteroids for ≥ 3 days; or hospitalization/emergency room therapy; or hospitalization in combination with systemic corticosteroid use ≥ 3 days.

Figure 1 | Model structure

![Model structure](image)

Model parameters

♦ The exacerbation rates were obtained from a prospective cohort study conducted among Chinese asthma patients.

♦ Healthcare resources utilization data were collected from the authoritative diagnosis and treatment guideline and had been validated by experienced clinical experts.

♦ Asthma-related mortality, cost inputs and utility values were derived from public database and the literature.

Key Assumptions in the model

♦ Patients need to be followed up every 3 months in a non-exacerbated state of asthma.

♦ Patients with acute exacerbations who require hospitalization do not need to be admitted to an intensive care unit.

♦ The patient's condition stabilizes with age, and the frequency of acute episodes per year remains constant.

Results

Base Case result

➢ Compared with salmeterol/fluticasone plus salbutamol, budesonide/formoterol led to fewer exacerbation events (9.64 vs 11.26), with an additional ¥742.49 total cost, less ¥3027.52 cost of exacerbation management, quality-adjusted life years (QALY) gains of 0.0073 over a lifetime horizon. (Table 1 & Figure 2)

➢ The base case incremental cost-effectiveness ratio (ICER) was ¥33,616.68 per QALY gained.

Table 1 | The cost, effectiveness and incremental cost-effectiveness ratios (ICERs)

<table>
<thead>
<tr>
<th>Budesonide/Formoterol</th>
<th>Salmeterol/Fluticasone plus salbutamol</th>
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<tbody>
<tr>
<td>Total Costs</td>
<td>¥134,815.34</td>
</tr>
<tr>
<td>Exacerbation events</td>
<td>9.636</td>
</tr>
<tr>
<td>LY Gains</td>
<td>19.045</td>
</tr>
<tr>
<td>QALYs Gains</td>
<td>14.837</td>
</tr>
<tr>
<td>ICER</td>
<td>¥33,616.68</td>
</tr>
</tbody>
</table>

Sensitivity Analysis

One-way Sensitivity Analysis

♦ Key drivers were the price of budesonide/formoterol and salmeterol/fluticasone, treatment adherence, and exacerbation rates. (Figure 3)

Probabilistic Sensitivity Analysis

♦ At a willingness-to-pay of ¥85,698/QALY (1 times of GDP-per-capita in China), the probability of budesonide/formoterol maintenance and reliever therapy being cost-effective versus salmeterol/fluticasone plus as-needed salbutamol was 48.95%. (Figure 4)

Conclusion

➢ Overall, from the societal perspective, budesonide/formoterol is likely to be a cost-effectiveness option compared with salmeterol/fluticasone plus as-needed salbutamol for Chinese asthma patients ≥12 years.

References


Figure 2 | Cost Components

![Cost Components](image)

Figure 3 | The tornado graphs

![The tornado graphs](image)

Figure 4 | Cost effectiveness plane & Cost-effectiveness acceptability curve

![Cost effectiveness plane & Cost-effectiveness acceptability curve](image)