**BELIMUM FOR THE TREATMENT OF SYSTEMIC LUPUS ERYTHEMATOSUS (SLE) IN GREECE: A COST-EFFECTIVENESS AND COST-UTILITY ANALYSIS**

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Introduction

* Systemic Lupus Erythematosus (SLE) is a chronic autoimmune inflammatory disease that can affect most of the organ systems of the human body such as the central nervous system, skin, joints, cardiovascular system, kidneys and lungs (1).

* SLE is associated with increased morbidity for infections, high blood pressure, atherosclerosis, cardiovascular diseases, diabetes, osteoporosis, and certain types of cancer (2). SLE also entails economic consequences related to the increased use of health care resources, productivity losses due to its overall impact on the patients' lives (3), and the burden of adverse events associated with the pharmacological treatment (4).

* SLE prevalence is estimated at 25-91/100,000 in European countries (5). The overwhelming majority of SLE patients are women (6), whereas 80% of them fall into the age group of 30 years and below (7). In Greece, the prevalence of SLE is estimated at 38/100,000 (8).

* SLE standard of care (SoC) treatment is highly individualized and includes the use of corticosteroids, antimalarials, non-steroidal anti-inflammatory drugs (NSAIDs) and immunosuppressive agents.

* Belimumab is a recombinant, fully human immunoglobulin G mononuclear antibody that inhibits the biologic activity of the soluble form of the essential B cell survival factor B-lymphocyte stimulator (BLyS), thus preventing its binding to its receptors (5). It is a novel therapy intended for the treatment of adults with active, autoantibody-positive SLE who are receiving SoC therapy.

Purpose

* To estimate the incremental cost-effectiveness ratio (ICER) and incremental cost-utility ratio (ICUR) in patients with severe or active SLE and high disease activity in the Greek healthcare setting.

Model Inputs

* The base case considers patients with anti-double stranded DNA positive, low complement.

* Baseline patient demographics (Age/Gender/Black/ethnicity/SLE duration), baseline disease activity parameters and steroid use, as well as individual SLICC item scores are based on data from BLISS trials (Table 1).

**Table 1. SLE patients’ baseline characteristics and short-term costs**

<table>
<thead>
<tr>
<th>Patient Characteristic</th>
<th>Individual SLICC Item occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>28.1</td>
</tr>
<tr>
<td>Gender (%) Female</td>
<td>93.9</td>
</tr>
<tr>
<td>Disease Duration (years)</td>
<td>8.9</td>
</tr>
<tr>
<td>Age at Diagnosis</td>
<td>19.8</td>
</tr>
<tr>
<td>Body Mass index (BMI)</td>
<td>24.1</td>
</tr>
<tr>
<td>Disability (analog)</td>
<td>3.6</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Model description

* The analysis is based on the local adaptation of a micro-simulation model. The model simulates individual patients over a lifelong period and allows interactions between patient characteristics, disease activity, medication (steroid use), risk of organ damage development and mortality (Figure 1).

* The course of disease is simulated for distinct patients that are either treated with standard of care (SoC) or with belimumab on top of SoC. The model has a lifetime horizon (Figure 2).

* The patient population entering the model reflects the population in the BLISS trials that have been conducted to assess the efficacy of belimumab added to standard of care (SoC), compared to SoC alone.

* To estimate short-term outcomes, data from the BLISS trials was inserted in the model. In order for the model to capture long term outcomes, natural history models were developed based on data from the Johns Hopkins SLE Lupus registry.

Results

* For both groups of patients, the organ damage costs are the highest expense. Organ damage costs are lower for belimumab-treated patients ($76,290 compared to $75,220) because fewer patients on belimumab develop cardiovascular, peripheral vascular, pulmonary and renal organ damage compared to SoC (Table 2). The incremental costs are $18,262 due to the drug acquisition and administration costs.

* According to the simulation, the belimumab-treated patients have an incremental gain of 0.56 life years (discounted) and 0.37 QALYs (discounted), compared to patients on SoC treatment (Table 3). This results in an incremental cost of $18,350 per life year gained and incremental cost of $27,254/QALY.

Sensitivity Analyses

* Probabilistic sensitivity analysis (1000 iterations of the model) showed that belimumab had a 63.5% probability of being cost-effective at an implicit $30,000/QALY gained threshold.

Conclusions

* Adding belimumab to the SoC for patients with high disease activity, positive anti-dsDNA, and low complement treated, shows a favorable cost-effectiveness ratio of $18,350 compared to the current disease management strategy.

* The incremental cost-utility ratio (ICUR) is $27,254, a value below commonly accepted thresholds. Belimumab can be considered as a cost-effective add-on therapy to SoC for the treatment of SLE patients with active SLE, positive anti-dsDNA and low complement.

References