Evaluating the pharmacoeconomic effect of adding tiotropium bromide to the management of chronic obstructive pulmonary disease patients in Singapore

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The objective of the study was to perform a pharmacoeconomic analysis on the treatment of chronic obstructive pulmonary disease (COPD) with the addition of tiotropium bromide. The authors concluded that adding tiotropium bromide for severe COPD patients would lead to significant cost-savings for the economy. The methodology of the study had limitations and, although the results were reported in detail, the methods were poorly reported. Given the poor reporting and the study's limitations, the conclusions should be considered with caution.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective of the study was to perform a pharmacoeconomic analysis on the treatment of chronic obstructive pulmonary disease (COPD) with the addition of tiotropium bromide.

Interventions
The study compared the use of tiotropium bromide with placebo in the treatment of COPD patients in Singapore.

Location/setting
Singapore/secondary care.

Methods
Analytical approach:
The authors reported that pharmacoeconomic modelling was performed using data derived from the literature on the effectiveness of tiotropium bromide. The time horizon was 1 year. The authors did not report the perspective adopted in the economic study.

Effectiveness data:
The authors reported that the effectiveness data were derived from three published studies comparing tiotropium bromide with placebo in differing severities of COPD. However, with the exception of their results, the authors provided no details of these studies or how the studies were identified. The main clinical effectiveness estimates derived from the three studies were the number of hospitalisation events and the exacerbation events without hospitalisation.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The measures of benefits were the number of hospitalisation events and the exacerbation events without hospitalisation.

Cost data:
The costs included in the analysis were those relating to treatment with tiotropium bromide and ipratropium bromide, exacerbation costs (including A&E visits and drugs), hospitalisation costs, and loss of income due to hospitalisation for exacerbation events. The hospitalisation costs were derived from the median charged by four hospitals where COPD
patients were subsidised by Singapore’s Ministry of Health, and from a cohort of 2,104 hospitalised patients across three hospitals in Singapore. The drug costs were based on the current acquisition costs in a university hospital. The source used to value the productivity losses due to hospitalisation was not reported. The price year was not reported. The costs were reported in Singapore dollars (SGD).

Analysis of uncertainty:
Uncertainty in the model was evaluated using a series of one-way sensitivity analyses which examined the influence of differing drug impact, different dosing of ipratropium bromide (a substitution drug) and the varying cost of hospitalisation.

Results
Across the three studies, tiotropium bromide was found to be more effective than placebo in reducing the number of hospitalisation events and the number of exacerbation events without hospitalisation.

Compared with placebo, treatment with tiotropium bromide generated savings ranging from SGD 445.88 to SGD 176.75 per patient, depending on the study used.

The authors found that, regardless of hospitalisation and ipratropium drug costs, treatment with tiotropium bromide would generate cost-savings. However, if the cost of tiotropium bromide exceeded SGD 180 for 30 doses, then it would generate additional costs.

Authors’ conclusions
The authors concluded that adding tiotropium bromide for severe COPD patients would lead to significant cost-savings for the economy.

CRD commentary
Interventions:
The authors reported very few details of the interventions studied and did not explain why placebo was used as the comparator.

Effectiveness/benefits:
The effectiveness data were derived from three published studies. The authors did not report any details of these studies or the methods used to identify them. Consequently, it is not clear if the best available evidence was used.

Costs:
The authors did not report the perspective used in the analysis, thus it is not possible to determine whether all the relevant categories of cost were included in the analysis. The authors reported the sources of both the unit cost data and resource use data, which were derived from data sources from Singapore. However, the price year was not reported, which will hamper any future inflation exercises.

Analysis and results:
The analytical approach was not well reported, with the authors giving no details of the model structure used and only very brief details of the methods used. The results, however, were presented in full. The authors performed a series of one-way sensitivity analyses. Although this type of analysis goes some way towards addressing parameter uncertainty, a probabilistic sensitivity analysis would be a more thorough way of fully capturing parameter uncertainty. Overall, the level of reporting was limited, with the authors providing very brief outcome information. The authors acknowledged the main limitations of their analysis.

Concluding remarks:
The methodology of the study had limitations and, although the results were reported in detail, the methods were poorly reported. Given the lack of reporting and the study’s limitations, the conclusions should be considered with caution.

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**Other publications of related interest**


**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Bronchodilator Agents /economics /therapeutic use; Cost of Illness; Economics, Pharmaceutical; Health Care Costs; Hospitalization /economics; Humans; Ipratropium /economics /therapeutic use; Pulmonary Disease, Chronic Obstructive /drug therapy /economics /epidemiology; Scopolamine Derivatives /economics /therapeutic use; Severity of Illness Index; Singapore /epidemiology; Treatment Outcome

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