Cost analysis and safety comparison of cisatracurium and atracurium in patients undergoing general anesthesia

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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 aim was to evaluate the cost and adverse events of two neuromuscular blockers, atracurium and cisatracurium, for patients having surgery under anaesthesia. The authors concluded that the two drugs appeared to have similar safety profiles, but atracurium was cheaper. The study was limited by the small trial, its outcome measures, and inadequate cost reporting and measurement. Larger samples, with more thorough clinical and economic outcome measures and analyses, are necessary to reach any cost-effectiveness conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The aim was to evaluate the cost and adverse events of two neuromuscular blockers, atracurium and cisatracurium, for patients having surgery under anaesthesia.

Interventions
Patients received either cisatracurium besilate 0.15mg per kg or atracurium besilate 0.6mg per kg. For all patients, anaesthesia was initiated with intravenous propofol 2mg per kg and sufentanil 3micrograms (mcg) per kg. Anaesthesia was maintained with an infusion of 5mcg sufentanil every 30 minutes and isoflurane 1.5% to 2%. After surgery, the block was reversed with neostigmine 50mcg per kg and atropine 15mcg per kg.

Location/setting
Iran/secondary care.

Methods
Analytical approach:
The economic evaluation was conducted alongside a randomised controlled trial of 100 patients (50 in each group). The perspective was not explicitly stated.

Effectiveness data:
The effectiveness outcomes were recorded adverse events for each treatment. The adverse event categories were cardiovascular (bradycardia, tachycardia, hypertension, hypotension, flushing, or collapse), respiratory (hyperthermia, wheezing, bronchial secretion, bronchospasm, laryngospasm, dyspnoea, or apnoea), skin (erythema, itching, or urticaria), muscle (acute quadriplegic myopathy syndrome, or myositis ossificans), injection reactions, and other (seizure, or prolonged recovery time). Patients were compared at the start for differences in age, gender and weight.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The effectiveness outcomes were used as the measures of benefit.

Cost data:
The drug costs were calculated for each group, using mean dosage multiplied by drug price. The cost data were reported...
in dollars ($).

Analysis of uncertainty:
Probabilities were used find any statistically significant differences for each adverse event.

Results
No statistically significant differences in adverse events were found between cisatracurium and atracurium, but there were consistently more events with atracurium.

The mean cost was $8.64 (SD 1.10) for atracurium, and $16.63 (SD 2.70) for cisatracurium; this difference was statistically significant (p<0.01).

Authors' conclusions
The authors concluded that the two drugs appeared to have similar safety profiles, but atracurium was cheaper.

CRD commentary
Interventions:
The interventions were appropriately described.

Effectiveness/benefits:
The economic evaluation was based upon a very small trial, with few adverse events. Given this, it was not surprising that none of the differences were statistically significant, but there was a trend towards fewer events with cisatracurium. This trend could have tangible quality of life benefits, for patients, which were not captured by the simple adverse event counts in this study. As the method of randomisation, and allocation concealment, were not stated, there may have been bias.

Costs:
The authors indicated that they conducted a cost-minimisation analysis, as the two treatments were equally effective. The perspective was not reported, but seems to have been that of the hospital. The study was conducted in Shariati Hospital in Tehran, Iran, but it was not clear where the drug prices were from. The costs were reported in dollars, rather than Iranian rials, the country was not stated, but was likely to have been the USA. If currency conversion and inflation were necessary, the methods were not reported. The currency year was also not reported. All these factors inhibit generalisation of the costs. Only the drug costs were included; as the adverse events are likely to have incurred hospital costs, it is likely that the true costs of the drugs were not fully represented.

Analysis and results:
The analysis was clearly presented, but was limited. Given the small trial, a more thorough evaluation of uncertainty would have been useful. Probabilistic modelling would have been appropriate, to more fully assess the uncertainty.

Concluding remarks:
The study was limited by the trial size, its outcome measures, and inadequate cost reporting and measurement. Larger samples, with more thorough clinical and economic outcome measures and analyses, are necessary to reach any conclusions about the cost-effectiveness of atracurium, compared with cisatracurium.

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