Single-dose versus multiple-dose antibiotic prophylaxis for the surgical treatment of closed fractures: a cost-effectiveness analysis
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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 was to assess the cost-effectiveness of single-dose versus multiple-dose antibiotic prophylaxis, in the surgical treatment of closed fractures. The authors concluded that single-dose prophylaxis was slightly more cost-effective than multiple doses. On the whole, the methods seem to have been appropriate and were reasonably well reported. The conclusion reached by the authors reflects the scope of their analysis.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of single-dose versus multiple-dose antibiotic prophylaxis, during surgical treatment of closed fractures.

Interventions
The antibiotic prophylaxis was an intravenous administration of 1g of cefazolin, which was administered as a single dose or four times perioperatively.

Location/setting
Canada/hospital.

Methods
Analytical approach:
The economic evaluation was based on a decision tree, with a 60-day and a one-year time horizons. The authors reported that the analysis was performed from a health care payer perspective.

Effectiveness data:
The effectiveness data were derived from published studies. The key clinical parameters were the probabilities of developing a wound infection, which were from a meta-analysis, or diarrhoea associated with Clostridium difficile.

Monetary benefit and utility valuations:
Health-related quality of life estimates were derived from published studies.

Measure of benefit:
Quality-adjusted life-days (QALDs) were the measure of benefit.

Cost data:
The analysis of costs included the treatment and the perioperative complications. The costs of treatment were generally from published reports, with some of the antibiotic prophylaxis costs from the hospital where the study was carried out. The price year was 2007 and all costs were reported in US dollars ($).

Analysis of uncertainty:
Both one-way and probabilistic sensitivity analyses were completed and the results of the probabilistic sensitivity analysis were displayed in a cost-effectiveness acceptability curve.
Results
Both single-dose and multiple-dose antibiotic prophylaxis were associated with 272 QALDs. Single dose antibiotic prophylaxis had an average cost of $2,576.49, while multiple-dose had an average cost of $2,595.84.

The one-way sensitivity analysis showed that these results were sensitive to the probability of a surgical-site and deep-wound infection. The probabilistic sensitivity analysis showed that the single dose was more cost-effective in 70% of simulations.

Authors' conclusions
The authors concluded that single-dose prophylaxis was slightly more cost-effective than multiple doses, during treatment of closed fractures. Further research was needed into the utility data in the postoperative period, from the patients' perspective.

CRD commentary
Interventions:
The choice of comparators appears to have been appropriate for the authors' setting. The dosages were provided.

Effectiveness/benefits:
The methods used to identify the studies for the effectiveness estimates were not reported, which makes it difficult to determine if the best available evidence was used. A meta-analysis was used to estimate the probability of developing a wound infection and this should ensure the validity of that estimate. The primary outcome measure was QALDs, which was appropriate.

Costs:
The perspective was clearly stated and the relevant costs appear to have been included. The resource quantities and unit costs were not reported separately. Most of the cost estimates were from the literature, but some of the drug costs were from the authors' institution and might not be generalisable to other settings. The price year was reported and the costs were appropriately standardised, using the consumer price index. Discounting was not performed and was not necessary given the time horizon.

Analysis and results:
The authors conducted an appropriate incremental analysis and the full results were presented. The uncertainty was satisfactorily addressed through a series of one-way and probabilistic sensitivity analyses. The authors discussed one limitation of their analysis, which was the lack of utility data for the postoperative period.

Concluding remarks:
On the whole, the methods seem to have been appropriate and were reasonably well reported. The conclusion reached by the authors reflects the scope of their analysis.

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