Impact of methicillin-resistant Staphylococcus aureus prevalence among S. aureus isolates on surgical site infection risk after coronary artery bypass surgery

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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 determine the threshold of methicillin-resistant Staphylococcus aureus (MRSA) prevalence at which perioperative glycopeptide prophylaxis minimised the incidence and cost of surgical site infections, compared with beta-lactam prophylaxis. The authors concluded that glycopeptide prophylaxis minimised the risk of infections and costs when the prevalence of MRSA exceeded 3%. In general, the study methods were adequate, but the reporting of the costs was limited, making the results potentially unreliable.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to determine the threshold of methicillin-resistant Staphylococcus aureus (MRSA) prevalence at which perioperative glycopeptide prophylaxis minimised the incidence and cost of surgical site infections, compared with beta-lactam prophylaxis.

Interventions
Two perioperative antibiotics for the prevention of infections in cardiothoracic surgery were compared: a glycopeptide and beta-lactam.

Location/setting
USA/in-patient secondary care.

Methods
Analytical approach:
A decision tree was developed to assess the outcomes and costs for the two prophylaxis interventions, over a short time horizon. The authors reported that the perspective was that of the health care system.

Effectiveness data:
The clinical and effectiveness data were from published studies, which were identified by a literature review. The authors reported that PubMed, EMBASE and The Cochrane Library were searched for randomised studies published in English between 1966 and 2010. The data from studies with similar designs were pooled, weighted by the study size.

Monetary benefit and utility valuations:
None.

Measure of benefit:
No summary measure was derived. The primary outcome was the probability of developing a surgical site infection.

Cost data:
The direct costs were those of performing cardiothoracic surgery and of treating post-operative infections. These costs were from the Centre for Medicare and Medicaid Services reimbursement rates. The price year was 2010. All costs were reported in US $.

Analysis of uncertainty:
One- and two-way sensitivity analyses were undertaken by varying all the probabilities and parameters in the model.

**Results**

The rate of development of a surgical site infection when no *Staphylococcus aureus* isolates were MRSA was 3.64% with glycopeptide prophylaxis, and 3.49% with beta-lactam prophylaxis.

At a MRSA prevalence of zero, the mean estimated costs were $31,632 with beta-lactam and $31,813 with glycopeptide prophylaxis.

The sensitivity analyses showed that when the prevalence of MRSA exceeded 3%, glycopeptide prophylaxis minimised the rate of infection and the costs over beta-lactam prophylaxis.

**Authors' conclusions**

The authors concluded that glycopeptide prophylaxis minimised the risk of a surgical site infection and the cost when the prevalence of MRSA exceeded 3%.

**CRD commentary**

**Interventions:**
Sufficient details of the interventions were reported.

**Effectiveness/benefits:**
The clinical and effectiveness data for the model were derived from studies identified by a systematic review of the literature. The authors reported the databases searched, the key terms used, the inclusion and exclusion criteria, and some of the methods used to synthesise the results from the studies. It is likely that the best available evidence was used.

**Costs:**
The authors reported that a health care system perspective was adopted. A very short time horizon was used, so the long-term care implications of contracting an infection were not considered. The costs of the two prophylaxis interventions were not explicitly analysed, and it was unclear if there was a price difference between them and what if any impact this could have on the results. The price year was reported.

**Analysis and results:**
A decision-tree model was used to synthesise the data. The details of the structure were reported, with a diagram. The impact of uncertainty in the results was tested in one- and two-way sensitivity analyses. These analyses evaluated the uncertainty to some extent, but probabilistic sensitivity analysis could have better assessed the overall model uncertainty. The authors reported that the main limitation to their study was that the model was limited because the studies did not differentiate between superficial, deep, and organ-space infections.

**Concluding remarks:**
In general, the study methods were adequate, but the reporting of the costs was limited, making the results potentially unreliable.

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**Bibliographic details**

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