The cost-effectiveness of the management of acute sinusitis
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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
This study examined the cost-effectiveness of four treatments for adults with acute sinusitis, which were no antibiotic, empirical antibiotic, computed tomography-based antibiotic, and clinical guideline-based antibiotic. Empirical antibiotic treatment was cost-effective, from the short-term societal perspective. However, due to antibiotic resistance, the use of clinical guidelines to target therapy was cost-effective, from a long-term health care perspective. The study quality was satisfactory, but some sources of data were not well reported. The authors' conclusions should be treated with caution.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to examine the cost-effectiveness of four treatment strategies, with and without antibiotics, for adult patients with acute sinusitis.

Interventions
The four strategies were no antibiotic, empirical antibiotic, computed tomography (CT)-based antibiotic, and clinical guideline-based antibiotic. The three most commonly used antibiotics were considered and these were amoxicillin, trimethoprim-sulfamethoxazole, and erythromycin. Each antibiotic therapy was given for seven days.

Location/setting
USA/primary care.

Methods
Analytical approach:
This economic evaluation was based on a Markov model, with a time horizon of one month. The authors stated that the perspectives of society and the health care payer were adopted.

Effectiveness data:
The clinical data, for symptom resolution with antibiotic strategies and side effects, appear to have been derived from a selection of known, relevant studies such as meta-analyses and randomised controlled trials (RCTs). However, the characteristics of these studies were not reported. The diagnostic accuracy of CT was adjusted from a meta-analysis. The epidemiological data came from published studies, the designs of which were not reported, and from experts’ opinions. Some assumptions were also needed. The key clinical endpoint was the efficacy of the antibiotics.

Monetary benefit and utility valuations:
The utility valuations were derived from a published study, no details of which were reported. The utility weights were obtained from patients with chronic sinusitis, instead of those with acute sinusitis.

Measure of benefit:
Quality-adjusted life-years (QALYs) were used as the summary benefit measure.

Cost data:
The economic analysis included the costs of antibiotics, screening sinus CT, lost days from work, and time spent attending CT screening. The price and type of antibiotic, commonly prescribed, were derived from large
pharmaceutical databases. The cost of CT came from Medicare reimbursement rates and included a facility fee and a professional fee. The cost of one additional hour for the CT-sinus strategy was based on average wage earnings. The cost of days lost from work was obtained from a previous study, which investigated the burden of acute sinusitis. All costs were in US dollars ($) and the price year was 2005.

Analysis of uncertainty:
A one-way sensitivity analysis was carried out for all the model inputs. The sources for the ranges of values were not reported, but some of them may have been derived from the literature.

Results
The expected quality-adjusted life-days were 29.62 with no antibiotic, 29.84 with clinical guideline-based antibiotic, 29.91 with CT-based antibiotic, and 29.93 with empirical antibiotic.

Form the perspective of the health care payer, the cost per patient was $0 with no antibiotic, $23.41 with clinical antibiotic, $50.46 with empirical antibiotic, and $170.30 with CT antibiotic. Thus, the incremental cost per QALY gained, over the next less expensive strategy, was $38,515 with clinical antibiotic (over no antibiotic) and $104,317 with empirical antibiotic (over clinical antibiotic). The CT strategy was dominated because it was more expensive and less effective than empirical antibiotic.

From the perspective of society, the cost per patient was $747.36 with empirical antibiotic, $760.63 with clinical antibiotic, $820.33 with no antibiotic, and $898.59 with CT antibiotic. The incremental analysis revealed that empirical antibiotic was the dominant strategy (i.e. less expensive and more effective than the other strategies).

The sensitivity analysis indicated that, from the payer's perspective, the strategies of clinical guideline antibiotic or no antibiotic were the most cost-effective options under plausible assumptions. The results, from the societal perspective, were stable and confirmed the dominance of the empirical antibiotic strategy except in a few scenarios (a very high cost of antibiotic or a low prevalence of disease). However, the utility weights were a key input, for the payer perspective, and the cost of a lost day was a key input, for the societal perspective.

Authors' conclusions
The authors concluded that empirical antibiotic treatment was a cost-effective strategy from the short-term societal perspective. However, due to antibiotic resistance, the use of clinical guidelines to target therapy could be cost-effective, from a long-term health care system viewpoint.

CRD commentary
Interventions:
The selection of the four strategies appears to have been appropriate as they represented the available treatments for the patient population. The three antibiotics were widely prescribed agents.

Effectiveness/benefits:
The approach used to identify the primary sources of data was not clearly described and these studies may have been selected. The design of these sources (RCTs or meta-analyses of RCTs) should ensure the validity of the clinical inputs. However, no other details about the methods and patient populations in these studies were provided, which precludes an objective assessment of their quality. The authors did not provide any information on the source used to derive the utility values, which were required to calculate the QALYs. These issues tend to limit the transparency of the clinical estimates. QALYs are a validated benefit measure, capture the impact of disease on quality of life, and are also generalisable.

Costs:
The use of two perspectives was a strong point of the economic analysis given their relevance for different payers. A breakdown of cost items was reported and unit costs were presented for all items. Information on the patterns of resource consumption was not extensively reported. The value of productivity losses was based on a previous study, the details of which were not given. The price year and the sources of data were reported for most cost categories. Alternative cost assumptions were made in the sensitivity analysis.
Analysis and results:
The use of an incremental approach to combine the costs and benefits was appropriate. The findings were clearly presented. The issue of uncertainty was addressed by means of a deterministic approach, which focused on each input, one at a time. The use of a more comprehensive and simultaneous approach would have been more appropriate given that the cost-effectiveness of some strategies was borderline. The authors noted some limitations to their analysis such as the use of utility valuations from a sample of patients with chronic sinusitis, which might not be representative of patients with acute disease. Another critical issue was the lack of inclusion of the cost of antibiotic-resistant infections due to the limited availability of such data in the literature.

Concluding remarks:
On the whole, the study quality was satisfactory, but some sources of data were not well reported. Thus, the authors’ conclusions should be treated with some caution.

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Other publications of related interest


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