Ambulatory intravenous antibiotic therapy for children with preseptal cellulitis

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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 assessed the cost of out-patient care, compared with in-patient care, for children on intravenous antibiotics for preseptal or periorbital cellulitis. The authors concluded that out-patient intravenous antibiotics were safe and cost-effective, compared with in-patient care, for children with preseptal cellulitis. The methods were reasonably well reported, but had some drawbacks, which should be considered when assessing the validity of the authors’ conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study assessed the cost of out-patient care, compared with in-patient care, for children on intravenous antibiotics for preseptal or periorbital cellulitis.

Interventions
The interventions were out-patient intravenous antibiotics (ceftriaxone), and in-patient intravenous antibiotics (ceftriaxone and flucloxacillin). Patients with milder symptoms were discharged home on oral antibiotics (amoxicillin and clavulanic acid, for seven days). Out-patient treatment was reviewed daily and followed by discharge, with oral antibiotics for seven days.

Location/setting
UK/out-patient and in-patient secondary care.

Methods
Analytical approach:
The analysis was based on a cohort study of young children, with the signs and symptoms of preseptal cellulitis. The time horizon was the duration of therapy. The authors did not state the perspective.

Effectiveness data:
All the data were from a retrospective cohort study, conducted in one centre (an inner London paediatric emergency department). The study included children aged 16 years or younger with the signs and symptoms of preseptal cellulitis. There were 30 patients on oral antibiotics, 42 on out-patient intravenous antibiotics, and 21 on in-patient intravenous antibiotics. The data were from a retrospective review of case notes and discharge summaries of patients from April 2009 to September 2010. Patients with milder symptoms were discharged on oral antibiotics. The primary clinical endpoint was the mean ocular symptom count, based on the presence or absence of seven symptoms.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The main endpoints were the duration of therapy, the ocular symptom count, and complications.

Cost data:
The direct medical costs of managing uncomplicated preseptal cellulitis were included. The resource use was individual patient data from the cohort study. The primary source of costs was the NHS Healthcare Resource Groups, with some data from the Trust-specific Market Forces Factor for Chelsea and Westminster Hospital. All costs were presented in
UK £, as well as US $ and Euros.

Analysis of uncertainty:
The Student's t-test was used to compare the data between groups.

Results
The duration of therapy was 2.79 days (SD 0.8) for out-patient intravenous antibiotics, and 2.76 days (SD 1.9) for in-patient antibiotics. This difference was not statistically significant (p= 0.94). The complication rate for each group was low: four patients required computed tomography (CT) scans in the in-patient group, and one required a magnetic resonance imaging scan in the out-patient group.

The ocular symptom count was 2.81 (SD 0.9) for out-patient intravenous care, and 3.52 (SD 1.0) for in-patient care. This difference was statistically significant (p=0.005).

The net cost saving with out-patient intravenous antibiotics, versus in-patient care, was £3,120 per patient.

Authors’ conclusions
The authors concluded that out-patient intravenous antibiotics were safe and cost-effective, compared with in-patient care, for children with preseptal cellulitis.

CRD commentary
Interventions:
The interventions were clearly described and appear to have been relevant to the study setting. It is possible that they were relevant to other settings.

Effectiveness/benefits:
The reporting was generally good. The clinical evidence was from a cohort study, which was retrospective and open to bias, such as selection bias, which was apparent in the differences in symptom count between groups. It was unclear whether the groups contained sufficient numbers of patients to capture significant differences between them, and there was no indication that adjustments were made for potential confounding factors. All the evidence came from one institution, which might not be representative of other health care centres. For example, the diagnostic coding for preseptal cellulitis might have differed.

Costs:
The authors did not explicitly report the perspective, but the costs appear to have been relevant to the UK NHS. The sources for the resource use and costs were well reported. The costs were presented at a category level. No discounting was reported, which was appropriate for the short time horizon. The price year was not reported, making reflation exercises difficult. All the economic data were from one hospital, and the impact of variations in the cost estimates was not assessed.

Analysis and results:
The reporting of the effectiveness outcomes was limited and there was no synthesis of costs and benefits; only the net cost saving was reported. Reasonable steps could have been taken to assess the uncertainty in the results. The authors discussed the retrospective design as a limitation of their analysis, and they compared the incidence of preseptal cellulitis in their centre with that in another published study, with similar findings. The differences between the groups were adequately tested, using appropriate statistical methods, but it was unclear if adjustments were made for differences in the patients' baseline characteristics, some of which were not reported, such as the patients' gender.

Concluding remarks:
The methods were reasonably well reported, but had some drawbacks, which should be considered when assessing the validity of the authors’ conclusions.

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