A prospective randomized study of inpatient IV antibiotics for community-acquired pneumonia: the optimal duration of therapy

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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.

Health technology
Shortened course of inpatient IV antibiotic therapy prior to switching to oral antibiotic in the patient with community-acquired pneumonia (CAP).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients with community acquired pneumonia (CAP).

Setting
Hospital. The economic study was carried out in New York, USA.

Dates to which data relate
The effectiveness data were collected between September 1993 and March 1995. The data related to resource utilisation covered a broader period than the effectiveness data but the range of years covered was not specified. The prices corresponded to fiscal year 1994.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was based on a broader patient sample including that used for the effectiveness data. Only length of hospital stay (LOS) was recorded prospectively, the costing related to other elements of resource utilisation being performed retrospectively.

Study sample
Power calculations were carried out to detect a difference in LOS of 4 days between group 1 and the combined groups 2 and 3, having an effect size of 1.2 and 94% power. 73 patients, representing 75 episodes of CAP in total, were originally randomised to the three treatment strategies under consideration: group 1, 27 episodes; group 2, 28 episodes and group 3, 20 episodes.
Study design
The study was a prospective randomised controlled trial, carried out in two centres. The duration of follow up was 28 days. The overall loss to follow up was 24% (18 patients representing 18 episodes of CAP), the distribution by treatment group being as follows; group 1, 25.9% (7/27); group 2, 28.5% (8/28); and group 3, 15% (3/20).

Analysis of effectiveness
The analysis of effectiveness was based on treatment completers only. The health outcome used was 'treatment success', defined as CAP resolved, with resolution of fever and leukocytosis by day 28. Therapeutic failure was, therefore, determined whenever the persistence of fever or leukocytosis, by day 28, required additional antibiotic therapy or a readmission to the hospital for the same infection. Groups were shown to be comparable with respect to age, sex, smoking history, maximum temperature at hospital admission, number of patients with fever, creatinine, WBC count, the number with WBC count elevation, the number of lobes involved, and the presence of a pleural effusion. All of these measures were reported as having differences with p>0.05.

Effectiveness results
The rates of therapeutic success were reported as follows: Group 1, 90%; group 2, 85%; group 3, 94%. The differences were reported as having p>0.05 (the authors reported that "the confidence limits for the hypothesis that there was no significant difference between the 2-day (group 1) versus the combined 5- and 10-day antibiotic treatment groups were -16% (lower) and 17% (upper)").

Clinical conclusions
A course of IV antibiotic therapy for the treatment of CAP "can be shortened without compromising a satisfactory clinical outcome".

Measure of benefits used in the economic analysis
The main benefit measure was 'treatment success'.

Direct costs
Quantities were not reported separately. The cost items measured were not clearly reported. The authors only reported that "the cost per day (overall estimate of cost) includes all direct and indirect costs of patient care. Indirect costs include overhead hospital and labor costs". The estimation of quantities was only related to length of hospital stay (LOS). The boundary adopted was the hospital. The cost per day estimate was based on the 1994 "cost per day of acute medical ward admissions at the Bronx VAMC and nationally in the Department of Veterans Affairs (DVA)". The LOS measurement for the study group was based on study measurements, which were carried out between September 1993 and March 1995.

Indirect Costs
Not considered.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
The rates of therapeutic success were reported as follows: Group 1, 90%; group 2, 85%; group 3, 94%. The differences were reported as having \( p > 0.05 \) (the authors reported that "the confidence limits for the hypothesis that there was no significant difference between the 2-day (group 1) versus the combined 5- and 10-day antibiotic treatment groups were -16% (lower) and 17% (upper)").

### Cost results

The cost per day for medical acute medical ward admissions at the Bronx VAMC and for all DVA facilities were $797 and $718, respectively. The cost saving due to the use of a shortened IV therapy was reported to be 54.1% and 53.9% for Bronx VAMC and DVA, respectively. The differences in LOS between groups were reported as having \( p < 0.05 \). The duration of costs was until day 12 after initiation of therapy.

### Synthesis of costs and benefits

No synthesis of costs and benefits was reported.

### Authors' conclusions

The authors concluded that "Larger studies with an increased female: male ratio, a private sector setting, and a more intensive risk stratification need to be performed to confirm our findings before these results are applied nationally. Our study further suggests that the use of this clinical treatment protocol in patients with CAP could reduce hospital LOS and cost of care without compromising quality of care".

### CRD COMMENTARY - Selection of comparators

The reason for the choice of the comparator is clear.

### Validity of estimate of measure of effectiveness

The clinical results are likely to be internally valid.

### Validity of estimate of costs

Resource quantities were not reported separately. Adequate details of methods of cost estimation were not given. The authors treated "overhead hospital and labor costs" as indirect costs, while in actual fact they are categorised as direct costs.

### Other issues

The issue of generalisability to other settings or countries was not addressed.

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### Bibliographic details


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### Other publications of related interest

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MeSH
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