Home intravenous antibiotic therapy: a safe and effective alternative to inpatient care

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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
Intravenous antibiotic therapy administered at home to early-discharge patients with serious bacterial infections.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis

Study population
To be eligible for home intravenous therapy, patients had to satisfy the following criteria: stable clinical and psychological condition; established long-term venous access; requirement for ongoing parenteral antibiotic treatment, though optimal antibiotic dosing not to exceed twice daily; and adequate social support. The study sample comprised twenty patients, with mean age (range) of 58 (19-84) years, with one of the following conditions:

- osteomyelitis (10 patients);
- endocarditis (5);
- vascular graft and pacemaker sepsis (4); or
- chronic cellulitis (1).

Setting
Hospital and primary care (nursing service). The economic study was carried out in Australia.

Dates to which data relate
Effectiveness and resource use data were gathered concurrently during 1992-93. No price year was stated.

Source of effectiveness data
Single study.

Link between effectiveness and cost data
Imputed cost and effectiveness data were gathered prospectively on the same patient sample as that used in the effectiveness study.

Study sample
Twenty patients satisfying the programme's eligibility criteria for treatment at home were selected from two provider units: Monash Medical Unit or Austin Hospital. No power calculations were presented. Exclusions and refusals (if any) were not reported.

**Study design**
Prospective case series. Mean (SD) and range of treatment duration at home were, respectively, 26.9 (9.4) and 11-44 days. Any comprehensive follow-up thereafter was not detailed.

**Analysis of effectiveness**
Intention to treat analysis. The outcome measures used were: clinical and microbiological cure of infection after therapy, and the incidence of major infective complications relating to parenteral antibiotic administration.

**Effectiveness results**
Eighteen (90%) of the 20 patients were cured. Two with staphylococcal vascular graft sepsis relapsed after 2 and 22 weeks after completion of intravenous therapy. A further patient developed soft-tissue infection around the catheter site, which was resolved with oral antibiotics. Home therapy was ceased in another patient who developed progressive renal dysfunction. All patients reported a strong preference for home intravenous therapy.

**Measure of benefits used in the economic analysis**
The outcome measures used were: clinical and microbiological cure of infection after therapy, and the incidence of major infective complications relating to parenteral antibiotic administration.

**Direct costs**
Patient-specific costs under each alternative included those relating directly to patient care and overheads for lighting, water, administration, etc. It was unclear if capital elements were included or costs discounted. The costs of home therapy excluded those of the nurse coordinator and the Infectious Disease Service but included elements for antibiotics (including all hospital pharmacy and laboratory costs), consumables and district nursing (DN) visits. The cost of a DN home visit included: initial assessment; first 30 minutes of visit; and each subsequent 10 minute period. Consumables (needles, syringes, dressings, etc.) for each day of intravenous therapy were also included. The costs of continued inpatient therapy at Monash Medical Centre were estimated for patients who actually received home care, by multiplying the number of days of home therapy by the cost of inpatient ward care incurred at Monash Medical Centre immediately before discharge. Daily ward costs comprised costs for basic nursing care, routine ward expenses, catering and pharmacy. The costs of surgical procedures, investigations, imaging, physicians' time and care in specialist units were excluded. The projected costs of inpatient care for Austin Hospital patients were estimated by calculating the daily cost of medically comparable patients (as identified by ICD-9-CM code and the diagnosis-related groups used at Monash Medical Centre).

**Indirect Costs**
Not considered (although authors referred to overhead costs as indirect costs').

**Currency**
Dollars ($). The authors did not state whether the currency was the American or Australian dollar.

**Sensitivity analysis**
No sensitivity analysis was carried out.
Estimated benefits used in the economic analysis
Eighteen (90%) of the 20 patients were cured. Two with staphylococcal vascular graft sepsis relapsed after 2 and 22 weeks after completion of intravenous therapy. A further patient developed soft-tissue infection around the catheter site, which was resolved with oral antibiotics. Home therapy was ceased in another patient who developed progressive renal dysfunction. All patients reported a strong preference for home intravenous therapy.

Cost results
The mean (SD) daily cost of home therapy was $147 ($57); the median was $139; range $71-$244. The mean (SD) daily cost of continued inpatient therapy was $259 ($76); the median was $267; range $140-$432.

Synthesis of costs and benefits
Mean cost saving for home therapy relative to continued inpatient therapy was $112 per day. Mean (SD) cost saving for each treatment course was $2974 ($2826), median $2196.

Authors' conclusions
Home intravenous antibiotic therapy appears to be a safe, efficient and cost effective means of therapy for an important subpopulation of patients, and is likely to play an increasing role in the delivery of health care in Australia in the future.

CRD Commentary
The authors have assumed that the outcomes experienced by patients continuing their treatment at home and as inpatients are identical, and that the daily costs of continuing inpatient care will be constant and equal to those inpatient costs incurred by home patients on their day of discharge. The most reliable way to test these assumptions would be to randomise a sufficiently large number of patients between these options, at the beginning of their antibiotic therapy, and collect comprehensive costs and outcomes data on them concurrently, over a prespecified follow-up period. In addition to collecting data on the costs to the hospital and district nursing team (which should include the staff costs and price year that the authors omitted from their study), estimates of the travel and treatment costs incurred by patients and their relatives or carers should also be obtained, given that these are likely to differ significantly between the alternatives. A full sensitivity analysis involving all major variables should also be carried out to test the assumptions under different circumstances. Finally, it is not clear whether the authors expressed the costs using American or Australian dollars.

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