Safety and cost effectiveness of early hospital discharge of lower risk children with cancer admitted for fever and neutropenia
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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
Early hospital discharge of children with cancer admitted for fever and neutropenia.

Type of intervention
Other: early discharge.

Economic study type
Cost-effectiveness analysis.

Study population
Patients with cancer admitted for management of fever during a period of neutropenia (ANC < 500 cells3). The mean age was 7.2 years (range 1 month - 17.3 years), with equal admissions of boys (n=66) and girls (n=65).

Setting
Acute hospital for children and home (primary care). The economic study was carried out in Dallas.

Dates to which data relate

Source of effectiveness data
Single study.

Link between effectiveness and cost data
Same patient sample with prospective costing.

Study sample
It was not stated if power calculations determined the sample size. The recruited population was 76 patients with 134 consecutive admissions. Patients were selected for early discharge (before ANC recovered to > 500 cells/mm3) if they fulfilled the following criteria: 1) aférile for at least 24 hours; 2) appeared clinically well; 3) had negative cultures for at least 48 hours; 4) exhibited control of local infection; and 5) had evidence of bone marrow recovery for at least 1 day.

Study design
Prospective case-series study undertaken in a single centre. Patients with early discharge were followed up until ANC
recovered to more than 500 cells/mm³. There was loss to follow up due to 3 deaths.

**Analysis of effectiveness**
The analysis of effectiveness was based on treatment complters. The primary health outcome was fever recurrence and readmission rates. Statistical analysis showed clinical difference in subgroups (p<0.05).

**Effectiveness results**
Intravenous antibiotics (ceftazidime) were discontinued in 82 cases (63%) before the recovery of the ANC, and 78 children were discharged immediately. Of these, eight discharges represented protocol violations. Only one of the 70 patients who were discharged according to protocol guidelines developed recurrent fever and required readmission.

**Clinical conclusions**
Low risk children with cancer who were hospitalized and treated for fever and neutropenia but appear clinically well may have intravenous antibiotics discontinued and be discharged safely irrespective of the ANC, as long as their granulocyte count is rising.

**Measure of benefits used in the economic analysis**
Readmission rates and other benefits such as reduction of fungal super infection etc.

**Direct costs**
Only hospital costs were considered. Quantities and costs were given separately. Hospital costs avoided through early discharge were estimated. Each patient's total hospital charges during the 24 hour period prior to discharge were measured. The number of post-discharge days each patient remained neutropenic was then multiplied by their final day's cost to approximate savings in comparison to charges had the patient remained hospitalized until their ANC reached 500 cells/mm³. 1990 charges were used.

**Statistical analysis of costs**
The estimated average total costs and their standard deviations were reported.

**Currency**
US dollars.

**Sensitivity analysis**
No sensitivity analysis was carried out.

**Estimated benefits used in the economic analysis**
Only one patient out of 70 cases discharged early according to the protocol, required readmission.

**Cost results**
20 of the 78 children discharged before ANC recovery were excluded from the cost savings analysis due to unavailable or incomplete data. For each of the 58 evaluable patients, the estimated average total savings was $5,058 +/- $4,890 (SD).

**Synthesis of costs and benefits**
Synthesis was not performed.

**Authors' conclusions**

Low risk children with cancer who are hospitalised and treated for fever and neutropenia, but appear clinically well may have intravenous antibiotics discontinued and be discharged safely irrespective of the ANC, as long as the fever has resolved and bone marrow recovery is apparent. In this 8 month study, 70 patients met the early discharge criteria, extrapolating to an annual cost saving of $530,000 in 105 patients. Nation-wide, an estimated $27 million in hospital charges could be saved annually by the patients' families and third-party insurers.

**CRD Commentary**

a) The clinical study was a case-series and this might weaken clinical conclusions.

b) Power calculations for the sample size and analysis of the statistical significance of the effectiveness result provided were not undertaken.

c) There is inaccuracy in reporting the sample size after loss to follow up (numbers do not add up). Moreover analysis of treatment completers may bias results.

d) Costs were not exhaustive.

e) Reducing length of stay in the UK only saved variable costs unless beds are filled by other patients. This was an issue of best alternative use (the opportunity costs) of freed resources which has not been addressed.

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