Outpatient management of malignant pleural effusion by a chronic indwelling pleural catheter


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
The use of a chronic indwelling pleural catheter (PC, Pleurx) for the outpatient management of recurrent malignant pleural effusions (MPEs).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients with recurrent MPEs proven by cytologic examination of the fluid, or the presence of an exudate in a patient with prior malignancy. Special eligibility for PC required prior thoracentesis with confirmation of malignancy (or exudate) that relieved dyspnoea, and bilateral decubitus chest roentgenograms. CT patients who were admitted primarily for other medical problems, in addition to their recurrent MPE, were excluded.

Setting
The setting was a hospital. The economic study was carried out at the University of Texas M D Anderson Cancer Center in Houston (TX), USA.

Dates to which data relate
The effectiveness and resource use data were gathered from January 1994 to December 1997 for CT patients, and from March 1994 to September 1998 for PC patients. The price year was not reported.

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

Link between effectiveness and cost data
The costing was carried out retrospectively on the same sample of patients as that used in the effectiveness study.

Study sample
Power calculations to determine the sample size were not reported. Eligible patients were identified at the study hospital during the relevant study periods and were included in the effectiveness study. A group of 100 consecutive PC patients (49 men) with a mean age of 58.2 (+/- 1.1) years was identified. Of these, 40 (20 men) were treated as inpatients and 60 (31 men) were treated as outpatients. The mean age was 54.52 (+/- 10.38) years in the inpatient group and 60.66 (+/-...
11.41) years in the outpatient group. A group of 68 consecutive CT patients (24 men) with a mean age of 59.7 (+/- 12.06) years was also identified.

**Study design**
This was a retrospective cohort study that was carried out in a single centre. The PC patients were followed at 1-month intervals while the catheter was in place, until catheter removal or until death. The CT patients were discharged when the chest tubes were removed (drainage less than 200 cm³ in a 24-hour period). No loss to follow-up was observed.

**Analysis of effectiveness**
It appears that all the patients included in the study have been accounted for in the analysis of effectiveness. The health outcomes used were:

- mortality and morbidity related to PC placement and during the follow-up;
- the rate of pleural symphysis;
- the length of stay; and
- survival.

Postoperative survival and disease-free survival were calculated using the Kaplan-Meier method. The study groups appear to have been comparable at baseline in their age and gender distribution. The authors added that no racial differences were observed across the groups. However, a greater number of lung cancer patients were treated by outpatient PC than by inpatient CT, while more lymphoma patients were treated by inpatient PC than by outpatient PC or inpatient CT. Moreover, the performance status suggested that PC inpatients were more symptomatic than PC outpatients.

**Effectiveness results**
No mortality associated with PC placement was observed, but 19% of the PC patients had one or more events after catheter placement.

During the follow-up, 2 PC inpatients had one event, 1 patient had two events, and 1 patient had three events. Seven PC outpatients had one event, 4 had two events, and 4 had three or more events.

The overall rate of pleural symphysis was 21% in the PC group, 17.5% in the inpatient group and 28.3% in the outpatient group, (p=0.436).

The length of stay (inpatients only) was 8.36 (+/- 5.52) days (median: 7) in the CT group and 8.85 (+/- 8.89) days (median: 7) in the CT group, (p=0.728). There was no difference in hospital stay between patients treated with CT or PC.

The overall median survival was 3.48 (+/- 0.81) months. No survival differences were noted according to treatment group.

Median survival was 2.24 (+/- 0.72) months in the CT group and 4.18 (+/- 1.04) months in the PC group, (log rank p=0.49).

Median survival was 2.66 (+/- 0.89) months in PC inpatients and 5.85 (+/- 2.67) months in PC outpatients, (log rank p=0.148, Breslow p=0.0237).

**Clinical conclusions**
Compared with both inpatient PC and CT, outpatient PC proved to be a safe procedure and an effective option for the
treatment of patients with recurrent MPEs.

**Measure of benefits used in the economic analysis**
No summary benefit measure was used in the economic evaluation. In effect, a cost-consequences analysis was conducted.

**Direct costs**
Discounting was not relevant since most of the costs per patient were incurred in less than two years. The unit costs and the quantities of resources used were not presented separately. The categories of costs included in the analysis were catheters, clinic fees, professional fees, laboratory, diagnostic imaging, and room charges. The cost/resource boundary of the study was not reported. It appears that charges rather than costs have been considered. The resource use data were estimated using actual data coming from the sample of patients involved in the effectiveness study. The charges came from the billing system of the University of Texas M D Anderson Center. The price year was not reported.

**Statistical analysis of costs**
The costs were presented as mean values and standard deviations. The costs observed in the study groups were compared using statistical tests.

**Indirect Costs**
The indirect costs were not considered.

**Currency**
US dollars ($).

**Sensitivity analysis**
Sensitivity analyses were not performed.

**Estimated benefits used in the economic analysis**
See the 'Effectiveness Results' section.

**Cost results**
Early (7-day) hospital charges were $7,830 (+/- 4,497) in the CT group, $3,391 (+/- 1,753) in the PC outpatient group, and $11,188 (+/- 7,964) in the PC inpatient group, (p<0.001 for all three groups).

The total hospital charges (until death or last follow-up examination) were $32,252 (+/- 56,682) in the CT group, $21,161 (+/- 32,617) in the PC outpatient group, and $34,626 (+/- 51,306) in the PC inpatient group, (p=0.294).

**Synthesis of costs and benefits**
Not relevant.

**Authors’ conclusions**
Compared with inpatient pleural catheters (PCs) and inpatient chest tubes (CTs), outpatient PCs represented a safe, effective and inexpensive means of treating patients with malignant pleural effusions (MPEs).
CRD COMMENTARY - Selection of comparators
The choice of CT as the basic comparator was implicitly justified since it represented the standard approach for patients with recurrent MPEs. The authors noted that several treatment methods were available and each of them carried some advantages and disadvantages. You should decide whether it represents a valid comparator in your own setting.

Validity of estimate of measure of effectiveness
This was a retrospective cohort study, but the use of a prospective randomised study would have been more appropriate for the study question. The study sample comprised consecutive patients who represented the overall study population. However, it was unclear whether the study intervention also represented a feasible alternative for patients in the comparison group, as special eligibility criteria were used for the control patients. Power calculations were not carried out. This represents the main drawback of the analysis, as some differences in the outcome measures failed to reach statistical significance. A further limitation was the fact that the study groups were not comparable at baseline. Statistical analyses were undertaken to compare survival rates between the groups. However, confounding factors and potential biases were not analysed.

Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis because, in effect, a cost-consequences analysis was carried out.

Validity of estimate of costs
The perspective of the study was not stated. Thus, it was not possible to assess whether all the relevant categories of costs were included in the analysis. Details on the unit costs, quantities of resources used and price year were not reported. This limits the transferability of the economic analysis to other settings. The evaluation of the indirect costs would have been appropriate given the study question. The cost-effectiveness of inpatient and outpatient therapies may have been overestimated due to the exclusion of the indirect costs. Other costs were excluded from the analysis because they were common to both therapies. Discounting was not relevant and was not carried out. Sensitivity analyses were not performed on the costs. Charges were used to estimate the costs.

Other issues
The authors compared their results with other published studies, but did not address the issue of the generalisability of the study results to other settings. Sensitivity analyses to consider variability in the cost or effectiveness data were not performed. The analysis reflected treatment patterns at the study hospital.

Implications of the study
The authors stated that outpatient PC has become the preferred management for recurrent MPEs at their institution. They recommended that PC be considered the standard approach for this group of patients with limited life expectancy.

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