Pulmonary lobectomy patient care pathway: a model to control cost and maintain quality


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
Patient care pathways in pulmonary lobectomy.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients undergoing pulmonary lobectomy.

Setting
Hospital setting. This study was carried out at the Massachusetts General Hospital, Boston, Massachusetts, USA.

Dates to which data relate
Effectiveness and resource use data were collected retrospectively during 1995 and prospectively during 1996. The price year was not stated.

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

Link between effectiveness and cost data
The costing was undertaken prospectively on the same patient sample as that used in the effectiveness study.

Study sample
147 patients underwent lobectomy in 1995 before institution of the pathway, and 130 patients were channelled through the patient care pathway in 1996. Neither the method of sample selection nor power calculations were reported.

Study design
This was a retrospective and prospective cohort study carried out at a single centre. Prolonged stay and patient satisfaction data were only available for the first 96 patients in 1996.

Analysis of effectiveness
The analysis of the clinical study was based on the intention to treat principle. The primary health outcomes used included length of stay, mortality and readmission rates, number of patients discharged by day 7, number of patients admitted on the day of operation, and the number of days admitted pre-operatively. At analysis, the case mix of patients was almost identical with a mean age of 60 years and 55% men. The all-payer refined diagnosis-related group morbidity and mortality risks were very similar for the two groups.

**Effectiveness results**

Length of stay in 1995 (mean: 10.6; median: 7) significantly (p=0.03) exceeded that of 1996 (mean: 7.5; median: 6). Mortality rates (1.4% versus 1.5%) and 7-day emergency readmission rates (2% versus 1.5%) were unchanged in 1995 and 1996. In 1996, 68% of patients were able to be discharged by day 7, an increase of 16% from 1995. 90% of patients in 1996 and 78% of patients in 1995 were admitted on the day of operation. The mean number of days admitted pre-operatively was 0.51 in 1996 compared with 0.69 in 1995. In 1996, reasons for failure to discharge by day 7 were inadequate pain control (27 patients), prolonged air leak (18 patients), severe nausea (16 patients), fever (15 patients), debility (12 patients), and atrial arrhythmia (7 patients). In 1996, 83 patients were discharged to home and 13 were discharged to a rehabilitation facility. Patients rated preparation for discharge by verbal instruction from the surgeon (85 patients satisfied) higher than from the printed instruction materials (69 patients satisfied). Once at home, 68 patients suffered pain, 55 suffered dyspnea, 51 constipation, and 21 nausea.

**Clinical conclusions**

Patient care pathways for pulmonary lobectomy achieves modest reductions in length of stay. Gross indices of quality were unchanged. A patient satisfaction survey demonstrated that the majority of patients were comfortable with earlier discharge.

**Modelling**

No modelling was undertaken.

**Measure of benefits used in the economic analysis**

The primary measure of benefit was length of stay.

**Direct costs**

Discounting was not relevant due to the short period of the study (less than 1 year). Quantities and costs were not reported separately. Direct costs included hospital bed costs, operating room costs, intensive care unit bed costs, anaesthesia costs, laboratory costs, and radiology costs. The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. Quantity/cost data were provided by the hospital administration. The price year was not reported.

**Statistical analysis of costs**

Costs and length of stay were compared using an unpaired t-test.

**Indirect Costs**

No indirect costs were included.

**Currency**

US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was undertaken.

**Estimated benefits used in the economic analysis**
Length of stay in 1995 (mean: 10.6; median: 7) significantly (p=0.03) exceeded that of 1996 (mean: 7.5; median: 6).

**Cost results**
Costs in 1995 ($16,063) were non-significantly (p=0.47) higher than in 1996 ($14,792). The institution of patient care pathways represented a potential cost saving to the hospital of $165,230 in this patient group for 1 year. There was no change in the operating room or anaesthesia cost data. Cost savings arose primarily from a reduction in hospital room costs ($763), in pharmaceuticals ($140), in intensive care unit room costs ($114), and in laboratory charges ($105).

**Synthesis of costs and benefits**
Costs and benefits were not combined into a cost-effectiveness ratio.

**Authors' conclusions**
The institution of a lobectomy patient care pathway appeared to reduce length of stay and costs. The pathway provided a framework to begin systematic quality control measures to enhance patient care.

**CRD COMMENTARY - Selection of comparators**
The rationale for the choice of the comparator was clear.

**Validity of estimate of measure of benefit**
The measure of benefit would appear to be valid. However, the reporting of outcome measures could have been more extensive. No statistical results were provided for the main outcome measures. Patient satisfaction data for patients undergoing lobectomy in 1995 were not reported. This makes comparison between the two groups impossible and does not allow conclusions to be drawn with regard to patient satisfaction or health outcomes after discharge.

**Validity of estimate of costs**
All direct costs seem to have been included. Indirect costs falling to the hospital, to rehabilitation facilities, or to patients and their families were not included. The robustness of the results cannot be assessed since no sensitivity analysis was carried out.

**Other issues**
The study design comparing patients undergoing lobectomy in 1995 and 1996 has inherent weaknesses. Changes in the lobectomy procedure over time or in other factors which are assumed to remain constant may account for some of the differences observed. It is difficult to see which specific elements of the patient care pathway were responsible for the changes in costs and outcome measures. This is of great importance when trying to optimise the pathway. In general, the generalisability of the results to other settings or countries was not assessed by the authors.

**Implications of the study**
A more extensive study which examines a wider range of effectiveness and cost measures should be undertaken to verify these results.

**Source of funding**
None stated.
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Other publications of related interest


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