Clinical care pathway for head and neck cancer: a valuable tool for decreasing resource utilization


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
A clinical care pathway (CCP) for head and neck cancer (HNC) was examined. The CCP was a structured patient health care plan that involved a team comprising surgeons, nurses and allied health care representatives. The aim of the intervention was to standardise patient care and to define the steps required to limit length of stay (LOS) in the hospital.

Type of intervention
Other: patient care management.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients with HNC. Eligibility was determined by procedure, including total or partial laryngectomy, major intraoral resection, and composite resection with or without reconstruction. Patients requiring a tracheostomy and/or a feeding tube were also included.

Setting
The setting was a tertiary-care academic medical centre. The economic study was carried out at the Hospital of the University of Pennsylvania, Philadelphia, USA.

Dates to which data relate
The effectiveness and resource use data were gathered from 1995 to 1999. No price year was reported.

Source of effectiveness data
The effectiveness evidence came from two studies. The cohort analysis (conducted by the authors of this study) was added to effectiveness data derived from a study (see Other Publications of Related Interest) published by several authors participating in the present study.

Link between effectiveness and cost data
The costing was performed 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. All eligible patients admitted to the study hospital were enrolled. Eighty-seven patients, admitted from January to December 1995, were included in the study before the CCP was implemented (group 1). Their median age was 65 years and 29% were women. Forty-three patients, admitted
from July 1996 to July 1997, were enrolled the year after the CCP had been implemented (group 2). Their median age was 61 years and 21% were women. Eighty-two patients, admitted from January to December 1999, were enrolled three years after the implementation of CCP (group 3). Their median age was 60 years and 27% were women. Data for groups 1 and 2 had already been analysed in the study by Husbands et al. (see Other Publications of Related Interest).

Study design
This was a retrospective comparative study with a historical control, which was carried out in a single centre (the Hospital of the University of Pennsylvania). The length of follow-up was not reported but was at least 30 days. No loss to follow-up appears to have occurred. The outcomes were assessed through the retrospective analysis of inpatient medical charts.

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

- the total LOS;
- the LOS in the intensive care unit (ICU);
- the non-ICU LOS;
- readmission rates within 30 days;
- complications, such as wound infection, haematoma, pneumonia and death);
- destination at discharge (home, skilled nursing facility or visiting nursing assistance); and
- conditions at discharge (tracheostomy, gastric feeding tube or nasogastric feeding tube).

Groups 1 and 3 were shown to have been comparable in terms of demographics, comorbidities, and site and stage of primary cancer. However, group 3 had a lower percentage of patients consuming alcohol and a higher percentage of patients suffering from hypertension.

Effectiveness results
The median total LOS was 13 days (range: 5 - 152) in group 1, 8 days (range: 3 - 30) in group 2, and 8 days (range: 3 - 27) days in group 3, (p<0.01 when comparing groups 1 and 3).

The median total ICU LOS was 2.2 days (range: 0 - 38.4) in group 1, 1.8 days (range: 0 - 20) in group 2, and 1.1 days (range: 0 - 14.3) in group 3, (p=0.01 when comparing groups 1 and 3).

Readmission rates within 30 days were 18% in group 1, 21% in group 2, and 11% in group 3, (p=0.37 when comparing groups 1 and 3).

The total incidence of complications did not vary significantly. It was 44% in group 1 and 40% in group 3. However, the rate of pneumonia decreased significantly from 11% (group 1) to 1% (group 3).

There was a significant increase in visiting nursing assistance at the patients' homes, (p<0.001). This ranged from 33% in group 1 to 85% in group 3. Also, significantly more patients had tracheostomy. This ranged from 46% in group 1 to 80% in group 3.

Clinical conclusions
The effectiveness analysis showed that the new CCP was effective in significantly reducing LOS without affecting...
readmission rates. The incidence rate of pneumonia was further reduced.

**Measure of benefits used in the economic analysis**
The health outcomes were left disaggregated and no summary benefit measure was used in the economic study. A cost-consequences analysis was therefore conducted.

**Direct costs**
Discounting was irrelevant since the costs per patient were incurred in less than two years. The unit costs were not reported separately from the quantities of resources used. The health service costs included in the economic evaluation were the hospital room, pharmacy, operating room, laboratory and other charges. It was unclear whether the cost of visiting nursing assistance at patients' homes was included. Professional fees were not included. The cost/resource boundary adopted in the study was not reported, but it appears to have been that of the hospital. The resource use was estimated using actual data derived from the charts of the patients used in the effectiveness study from 1995 to 1999. The costs were estimated using actual charges from hospital data. The authors knew that a 25% increase in charge rates occurred from 1997 to 1999, but no adjustment was made for this increase. No price year was reported. No power analysis was reported.

**Statistical analysis of costs**
The costs were treated deterministically.

**Indirect costs**
The indirect costs were not included.

**Currency**
US dollars ($).

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

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

**Cost results**
The median total charges were $105,410 in group 1, $78,930 in group 2 and $65,919 in group 3. This trend was observed in each cost component.

**Synthesis of costs and benefits**
Not relevant as a cost-consequences analysis was conducted.

**Authors' conclusions**
The clinical care pathway (CCP) was effective in reducing both the length of stay (LOS; ordinary ward and intensive care unit) and hospital charges for head and neck cancer (HNC) patients undergoing major resection surgery. The quality of the care, as assessed using readmission rates, was as good as before the implementation of the intervention. In addition, the incidence of pneumonia, the major complication observed in the study patients, decreased significantly in the years following the introduction of the CCP.
CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparator was clear. "No CCP" was selected since it represented the standard care before the introduction of the study intervention. You should decide whether it represents a valid comparator in your own setting.

Validity of estimate of measure of effectiveness
The analysis of effectiveness used a comparative study with a historical control, which was appropriate for the study question. However, the retrospective design could have limited the internal validity of the analysis. The time lag of 3 years (although integral to the study) may have made the control group less effective in controlling for confounding. The study sample appears to have been representative of the study population. It appears that all the patients included in the study have been accounted for in the clinical analysis. However, power calculations were not performed. Also, the method used to allocate the patients to the study groups was not reported. The study groups were fairly comparable at baseline, but the authors did not investigate whether any factors other than the study intervention affected the clinical outcomes. The length of follow-up was not explicitly reported. These issues may limit the internal validity of the analysis.

Validity of estimate of measure of benefit
No summary benefit measure was used in the economic analysis. The analysis was therefore categorised as a cost-consequences study.

Validity of estimate of costs
The cost analysis is likely to have been carried out from the perspective of the hospital, as charges were used in the study. It was unclear whether the costs of visiting nursing assistance were included. This was important since the quantity of nursing assistance significantly increased three years after the introduction of the CCP. The unit costs were not reported separately from the quantities of resources used and no price year was given. Thus, the reproducibility of the study in other contexts is somewhat limited. Charges rather than true costs were used in the analysis. Resource consumption was retrospectively evaluated on the same sample of patients as that used in the effectiveness study. The costs were treated deterministically and no sensitivity analyses were performed. Thus, the cost-estimates were specific to the study setting. The authors admitted that they did not consider the inflation rate observed in the hospital costs, so costs from different years were compared without adjustment.

Other issues
The authors compared their findings with one other study of a critical path method. This was used for stroke rehabilitation and it found no improvement in outcomes. The authors investigated the differences in the studies. They did not address the issue of the generalisability of the study results to other settings. The overall external validity of the analysis is low. The study enrolled patients with HNC who were undergoing specific procedures and this was reflected in the conclusions of the analysis. The authors commented on some limitations of their analysis. For example, the use of data not specifically gathered for the purpose of the study, and the change in the organisation of charge summaries. Also, data on readmission to other hospitals were not recorded in the follow-up.

Implications of the study
The study suggests that, in three years after its implementation, the CCP intervention led to a substantial reduction in the costs and LOS in patients undergoing resection for HNC, without affecting the quality of the care. The authors note that future studies should be carried out to evaluate further evidence aimed at optimising patient care within the CCP.

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Other publications of related interest

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