An analysis of cost and clinical outcome in palliation for advanced pancreatic cancer

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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
The health technology examined comprised palliative surgical procedures in patients who underwent exploration for presumed resectable pancreatic cancer. These included biliary bypass, duodenal bypass and double bypass.

Type of intervention
Palliative care.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients with unresectable pancreatic cancer who had undergone exploratory laparotomy in anticipation of a pancreaticoduodenectomy for a localised tumour of the pancreatic head.

Setting
The setting was tertiary care. The study was conducted in the USA.

Dates to which data relate
The effectiveness data were derived from a retrospective review of charts pertaining to the period from 1993 to 2002. The price year was 2004.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

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

Study sample
Power calculations were not conducted. The patients were identified as those treated at the study centre between the set dates. Twelve patients had a biliary bypass, 40 had a duodenal bypass, 38 had a double bypass and 12 had no bypass.

Study design
This was a study based on a single-centred, retrospective, chart review. The choice of procedure (intervention) was at the surgeon's discretion. The duration of follow-up was not explicitly reported, but it was likely to have been up to the point of mortality. The loss to follow-up was not reported.
Analysis of effectiveness
The analysis of effectiveness was based on follow-up data for study patients. The data were derived from hospital chart, tumour registry information and social security records. Postoperative length of hospital stay, perioperative morbidity, complications, procedures for treating complications and overall survival were evaluated. The authors did not compare the characteristics of the groups in the text.

Effectiveness results
Fifty per cent of the 40 patients who had preoperatively-placed, endoscopic, biliary stents underwent surgical biliary bypass whereas, 43% of the 56 patients who did not have preoperatively-placed endoscopic stents underwent surgical biliary bypass, (p=0.54).

The incidence of complications was 17% with biliary bypass, 27% with duodenal bypass, 24% with double bypass and 17% with no bypass.

The postoperative length of stay was similar in all groups (11 to 13 days; p=0.82), as was mean survival (5.0 to 8.0 months; p=0.24).

Perioperative complications were also similar between the groups (17 to 28%; p=0.85).

Clinical conclusions
The groups had equivalent clinical outcomes in terms of the postoperative length of stay, perioperative complications and mean survival.

Modelling
A Markov decision tree analysis was used to estimate the average cost of each intervention, based on the incidence of development of symptoms. This was not well described.

Measure of benefits used in the economic analysis
The authors did not use a summary benefit measure in the economic analysis. In effect, a cost-consequences analysis was performed.

Direct costs
Only the hospital costs were evaluated. The quantities were estimated using data from the study, while the resource costs were based on Resource-Based Relative Value (RVU) Scale from the Health Care Financing Administration National Physician Fee Schedule Relative Value file for the year 2004. The quantities and the costs were not reported separately. Discounting was not carried out. The duration over which the costs were incurred was not reported, but discounting would have been relevant for costs incurred during a period of over 2 years. The estimation of costs was derived using modelling based on the incidence of development of recurrent symptoms and the RVU of the initial procedure, the chance of developing recurrent symptoms, and the RVU of secondary palliative procedures.

Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The indirect costs were not included.
Currency
The authors did not report a currency, though presumably it was US dollars ($).

Sensitivity analysis
No sensitivity analysis was carried out.

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

Cost results
The cost data for combined operative and non-operative procedures for initial exploration and subsequent treatment was highest for those patients undergoing double bypass (47.08), followed by biliary bypass (35.41), duodenal bypass (35.11) and no surgical bypass procedure (32.93).

The costs of adverse effects and knock on-costs were included in this analysis.

Synthesis of costs and benefits
The costs and benefits were not combined because of the cost-consequences approach adopted.

Authors' conclusions
The double surgical bypass procedure to palliate biliary and duodenal obstruction from unresectable pancreatic cancer is a durable method of palliation but involves higher costs. A single bypass procedure (either biliary or duodenal) does not significantly add to the total cost of palliation in comparison with exploratory laparotomy alone. Patients who undergo a duodenal bypass procedure alone will require at least a planned definitive endoscopic biliary stenting procedure. The several options for palliation have equivalent outcomes in terms of their durability and cost.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparator was clear. It was chosen because it represented the routine care for patients with advanced pancreatic cancer detected on laparotomy. You should consider whether it is a widely used technology in your own setting.

Validity of estimate of measure of effectiveness
The analysis of effectiveness was based on a retrospective study of case notes. The choice of the palliative procedure was at the surgeon's discretion. Although the numbers of patients with metastatic and locally advanced cancer in the different groups were given, no statistical evidence of comparability was provided. Statistical evidence showed that survival was different in those with locally advanced cancer compared with those with metastatic cancer at the time of exploratory laparotomy. Given that the choice of procedure used (and therefore allocation to the groups) was dependent on the surgeon's discretion, it is conceivable that patient allocation to the groups might have been biased by the clinical situation and the surgeon's perception of the optimal method of treatment in that situation. This and with the retrospective nature of the study represent limitations to the internal validity of the analysis. The single-centred nature of the study can affect its external validity. These limitations imply that the effectiveness results should be treated with some caution.

Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis so, in effect, a cost-consequences analysis was conducted. Please refer to the comments in the 'Validity of estimate of measure of effectiveness' field (above).
Validity of estimate of costs
The perspective adopted in the study was not explicitly reported, but appears to have been that of the American health care system. The indirect costs were not included. In the context of palliative care, a societal perspective would have been more appropriate. The details of the analysis of resources used and unit costs were not reported, which means that it would be difficult to replicate the study in other settings. However, the use of RVUs allows for a standardised estimate of the resource cost, independent of health care provider system, region or payer source. The cost estimates are likely to be specific to the American setting. Although unclear, the time horizon might have been until death, which occurred on average within one year. Therefore, discounting might not have been appropriate.

Other issues
The authors compared their findings with those from other studies. The issue of generalisability to other settings was not explicitly addressed. The authors did not present their results selectively. The authors’ conclusions appear to have understated the value of exploratory laparotomy alone as it had the highest (though not significant) mean survival and the lowest cost.

Implications of the study
When unresectable pancreatic cancers are found at exploratory laparotomy, the surgeon has several options for palliation with equivalent outcomes in terms of durable palliation and cost. The choice may depend on factors such as access to endoscopic resources or the patient’s wishes.

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