Economic implications or an early postoperative enteral feeding protocol
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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
Placing a jejunal feeding tube during surgery and initiating tube feedings within 12 hours after bowel resections (an early postoperative feeding protocol).

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Patients undergoing bowel resections.

Setting
Hospital. The economic study was carried out in Texas, USA.

Dates to which data relate
Effectiveness and resource use data corresponded to patients treated between July 1994 and January 1996. The fiscal year was not explicitly specified.

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

Link between effectiveness and cost data
Costing was prospectively performed on the same patient sample as that used in the effectiveness analysis.

Study sample
Power calculations were used to determine the sample size (study size was determined to detect an expected difference of 20% in infection rate between groups with a power of 80% and alpha equal to 5%). The intervention group consisted of 66 patients versus 159 in the control group (receiving usual care). The intervention surgery group consisted of 10 surgeons (out of 20 on staff) participating in the study.

Study design
This was a prospective, non-randomised study with concurrent controls, carried out in a single centre. The duration of the follow-up was until 3 months after discharge. No loss to follow-up was reported. An independent surgery nurse,
blinded to the study group, analysed the readmission data. A dietitian closely monitored nutritional status of the intervention group on a daily basis.

**Analysis of effectiveness**
The principle (intention to treat or treatment completers only) used in the analysis of effectiveness was not explicitly specified. The clinical outcome measures were reduction in nosocomial bacteremia, and infection rate. The groups were found to be comparable in terms of age, sex, DRG severity index, serum albumin level at the time of hospital admission, percentage having a preexisting comorbidity, and payer type. A multiple regression analysis was used to assess whether the demographic variable difference between the study group could be the outcome predictors.

**Effectiveness results**
The treatment group showed a reduction in nosocomial bacteremia of 7.5% when compared with the control group, (p=0.02). The infection rate was 9% in the treatment group versus 17% in the control group.

**Clinical conclusions**
Early nutrition and regular monitoring by the dietitian were shown to be effective in reducing the infection rate when compared with the usual care in patients undergoing bowel resections.

**Measure of benefits used in the economic analysis**
The benefit measure was success rate, defined as the percentage discharged without a complicating infection.

**Direct costs**
Costs were not discounted because of the short duration of the study. Quantities of resources were only reported in terms of time required for the placement of jejunal feeding tubes, surgery time, dietitian's time and nursing time for patient monitoring. Cost items were not reported separately "because of the sensitive nature of the data". The cost analysis covered the variable and fixed costs of the two alternative strategies considered in the study. The perspective adopted in the cost analysis was that of the hospital, the physician, and the third-party payer. Time studies were performed to estimate the additional time requirement for the intervention compared to the usual care in terms of surgeon's time, nursing time and dietitian's time. Actual costs, as opposed to charges, were included in the cost analysis. The source of cost data was the study hospital's accounting system. The date to which the price data referred was not explicitly specified. The cost of physicians' professional fees was not included in the cost analysis. An extra cost analysis was performed comparing the costs of patients with confirmed infection (n=33) versus those who had no infection (n=196).

**Statistical analysis of costs**
The significance of cost of an infection was investigated using nonparametric Mann-Whitney test.

**Indirect Costs**
Not considered.

**Currency**
US dollars ($).

**Sensitivity analysis**
Sensitivity analyses were performed on the criteria for defining a successful discharge and cost variables.
Estimated benefits used in the economic analysis
The successful discharge rate (uncomplicated discharge) was 91% in the intervention group versus 83% in the control group.

Cost results
The additional nutrition care cost was reported to be $108.30. The average total costs for the two study groups were not reported. In the extra cost analysis performed, it was reported that an infection was associated with a $13,327 average variable direct cost (p<0.0001) and a total cost of $32,834, (p<0.0001).

Synthesis of costs and benefits
The incremental cost per successful treatment was used as the measure of cost-effectiveness. The intervention was associated with a reduction in variable cost of $1,531 (p=0.02 using t test) per successful treatment and a total cost saving of $4,450 per successful treatment compared with usual care. The sensitivity analysis showed the sensitivity of the results to the changes in cost variables.

Authors’ conclusions
An early postoperative enteral feeding protocol as part of an outcomes management programme for patients undergoing bowel resection is cost-effective.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparator is clear. Usual care in the authors' setting was regarded as the comparator. You, the database user, should consider whether this is relevant to your own setting.

Validity of estimate of measure of benefit
The internal validity of the estimate of benefit cannot be guaranteed given the non-randomised design adopted in the study. Although a randomized design would have been less prone to bias, the sample size was determined using power calculations, and groups were also shown comparable in their baseline characteristics.

Validity of estimate of costs
Quantities of resource use were not fully reported separately from the costs, although adequate details of methods of cost estimation were given. A societal perspective for the cost analysis could have been useful. Cost results may not generalisable to other settings or countries.

Other issues
The authors’ conclusion seems to be justified. The issue of generalisability to other settings or countries was not fully addressed. However, appropriate comparisons were made with other studies.

Implications of the study
Further study may be necessary to determine if the reduction in infection seen here and in other studies in which enteral support replaces parenteral nutrition in surgical patients, is due to the immune-enhancing effects on gut mucosa and the reduction of bacterial translocation or simply to the lack of the central line and its associated risks.

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