Cost minimization in endoscopy center scheduling: a case-controlled study

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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 study investigated an early morning fast-track triage endoscopy unit (FTEU) for non-emergent gastrointestinal (GI) inpatients. This was compared with the standard add-on scheduling practice, whereby patients are scheduled to endoscopy late in the day after the outpatient cases are completed.

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients entering the hospital under formal or "short-term" admission to the GI and hepatology service. Specific inclusion and exclusion criteria for entering the FTEU were reported. Only patients who would be eligible for discharge on the same day as the procedure, or who would have considerable treatment plan changes if there were unexpected endoscopy findings, underwent procedures in the FTEU. Patients requiring ERCP, fluoroscopy, PEG, stenting, argon plasma coagulation, general anaesthesia, or advanced interventional procedures were not eligible for FTEU treatment. Patients with haemodynamic or respiratory compromise, ASA Class IV or greater, or requiring care in the intensive care unit (ICU) for another reason, were also excluded.

Setting
The study setting was a tertiary care referral centre. The economic study was carried out at the University of Virginia, USA.

Dates to which data relate
The effectiveness and resource use data for patients undergoing procedures in the FTEU were collected during September 2000 and March 2001. The effectiveness and resource use data for patients undergoing standard practices related to the 3 years immediately prior to the opening of the FTEU (no precise dates were reported). The price year was 2001.

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

Link between effectiveness and cost data
The costing was undertaken retrospectively on the same patient sample as that used in the effectiveness study.
Study sample
No sample size appeared to have been determined. In addition, no power calculations were performed retrospectively. A total of 144 patients were included in the study. The first 72 consecutive patients (30 males; 41.7%) undergoing procedures in the FTEU were enrolled into the study. The mean age for this group was 58.9 years (standard deviation, SD=16.4). The FTEU patients were matched with controls for procedure performed, disease process, age, gender, major co-morbidities and insurance status. There were 30 (41.7%) males in the control group, and the mean age for this group was 58.5 years (SD=15.6).

Sub-groups within these groups were formed with patients from the same sample who were admitted for less than 3 days. This sub-group analysis was performed to select the patient population that would be most likely to benefit from rapid access to endoscopy and least likely to have other major medical issues. In each group there were 27 patients who were admitted for less than 3 days. In the control sub-group, there were 14 (51.9%) males and the mean age was 55.8 years (SD=14.9). In the FTEU sub-group, there were 11 (40.7%) males and the mean age was 54.5 years (SD=16.9).

Study design
This was a retrospective cohort study with matched historical controls that was undertaken at a tertiary care referral centre (University of Virginia Hospital, USA). The duration of follow-up was up to 30 days. There was no loss to follow-up as this was a retrospective study.

Analysis of effectiveness
All of the patients included in the study were accounted for in the analysis. The primary health outcomes used were days to endoscopy and LOS in the hospital. The secondary outcomes were readmission within 30 days, transfer to an ICU, and the number requiring blood transfusion. The authors reported that cases and controls were similar in age, gender, race distribution and payer, in both the main groups and within the sub-groups. The short-stay sub-groups were, however, slightly younger and tended to be more represented by managed care insurers. There were no statistically significant differences between the cases and controls in either group.

Effectiveness results
In comparing the FTEU total population with controls, there was no statistical differences between:

days to endoscopy (1.58 +/- 1.92 versus 1.80 +/- 1.77; p=0.44),

hospital LOS (3.70 +/- 3.05 days versus 3.99 +/- 2.54 days; p>0.5),

readmission to the hospital within 30 days (19.4% versus 26.4%; p=0.38),

transfer to an ICU (4.2% versus 16.7%; p=0.5), and

the proportion requiring blood transfusion (33.3% versus 38.9%; p=0.46).

However, when comparing FTEU cases admitted for less than 3 days with controls also being admitted for less than 3 days:

there were statistically significant differences in days to endoscopy (0.63 +/- 0.63 versus 1.00 +/- 0.74; p=0.01), and hospital LOS (1.22 +/- 0.80 days versus 1.78 +/- 0.51 days; p=0.05); but

no statistically significant differences in terms of readmission within 30 days (18.5% versus 29.6%; p>0.5), transfer to an ICU (3.7% versus 14.8%; p>0.5), and the proportion requiring blood transfusion (22.2% versus 29.6%; p=0.07).

Clinical conclusions
The study showed that for patients most likely to benefit from rapid access to endoscopy (i.e. those admitted for less
than 3 days), fast track endoscopy lead to faster scheduling of endoscopy and shorter LOS than the standard add-on scheduling practices.

Measure of benefits used in the economic analysis
The authors did not derive a measure of health benefit. The analysis was therefore categorised as a cost-consequences analysis.

Direct costs
The direct costs included in the analysis were those of the hospital. These comprised physician, pharmacy and hospital equipment costs. The costs were measured using the hospital's financial database utilising micro-costing, and non diagnostic-related group-based algorithms. The costs and the quantities were not reported separately. Since the costs were incurred during a short time, discounting was not necessary and was not performed. The study reported the mean costs. The costs were adjusted to year 2000 prices using the US Consumer Price Index (CPI).

Statistical analysis of costs
The costs were treated stochastically. The mean costs were compared using Student's t-test (significance set at p</= 0.05).

Indirect Costs
The indirect costs were not included in the analysis.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analyses were performed.

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

Cost results
In comparing the FTEU total population with controls, there was no statistical difference in the mean total costs, $6,610 (+/- 4,977) versus $6,851 (+/- 7,235), (p>0.5).

However, when comparing FTEU cases admitted for less than 3 days with controls also being admitted for less than 3 days, there was a statistically significant difference in the mean total costs, $2,793 (+/- 1,104) versus $3,586 (+/- 1,505), (p=0.02).

Synthesis of costs and benefits
The costs and benefits were not combined.

Authors' conclusions
When routine endoscopy is the rate-limiting step for hospital discharge in the general gastrointestinal (GI) patient, early morning scheduling with a reserved time and space for inpatient endoscopy is a cost-minimising factor in a busy endoscopy centre, and may save significant hospital costs while preserving optimal patient outcomes.
CRD COMMENTARY - Selection of comparators
A justification was given for the comparator used. It represented current practice in the authors' setting. You should decide if the comparator used is a widely used health technology in your own setting.

Validity of estimate of measure of effectiveness
The analysis was based on a retrospective cohort study with matched controls. The authors stated that this was likely to have been affected by biases and confounding factors, and changes in the health care system. The use of a randomised controlled trial or a prospective cohort study would have minimised such biases. However, the statistical similarity of all demographic and patient characteristics between the patient groups minimised the extent of these limitations. The authors also reported that during the years that controls were drawn for the study, there was minimal change in the endoscopy system. The authors performed appropriate statistical analyses to test whether differences between the two groups were statistically significant. However, as no power calculations were reported, the study might have had insufficient power to detect differences in outcomes between the two groups.

Validity of estimate of measure of benefit
The authors did not derive a measure of health benefit. The analysis was therefore categorised as a cost-consequences analysis.

Validity of estimate of costs
All the categories of cost relevant to the hospital perspective adopted were included in the analysis. No major costs appear to have been omitted from the analysis. Resource use and costs were not reported separately, which will limit the generalisability of the authors' results. The costs were derived from the authors' settings, with cost-differences between the two groups being tested for significance using appropriate statistical analyses. Since the costs were incurred during a short time, discounting was not relevant and was not performed. The price year was reported, which will aid inflation exercises in the future. However, the authors used the CPI to adjust costs to the same price year whereas it would have been more appropriate to have used the medical component of the CPI, as medical prices have been increasing at a faster rate than overall prices.

Other issues
The authors reported that the study demonstrated that endoscopy performed shortly after inpatient admission resulted in shorter hospital stays and lower costs. The issue of generalisability to other settings was not addressed. The authors do not appear to have presented their results selectively and their conclusions reflected the scope of the analysis.

The authors reported that the main limitation of their study was that it was a retrospective study with matched controls. Hence, it was likely to have been affected by bias and confounding. However, the authors minimised such limitations by matching controls and, as a result, the patient groups were statistically similar. The authors also reported that an innate bias existed when using administrative data to define procedures due to the likelihood of inaccuracies in the collection methods, although such a bias should have been accounted for by the case-control methodology employed.

Implications of the study
The authors stated that it is likely that rapid access to endoscopy in non-critically ill patients is the key rate-limiting step to hospital discharge and cost-effective endoscopic therapy.

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None stated.

Bibliographic details

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**Other publications of related interest**


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