Barrett's esophagus: a new look at surveillance based on emerging estimates of cancer risk

Provenzale D, Schmitt C, Wong J B

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
Five surveillance strategies (i.e. surveillance every 1-5 years) versus no surveillance to detect dysplasia and early cancer in Barrett's esophagus patients.

Type of intervention
Diagnosis.

Economic study type
Cost-utility analysis.

Study population
Hypothetical cohort of 10,000 55 year old men with Barrett's esophagus.

Setting
The practice setting was secondary care. The economic study was performed in the United States.

Dates to which data relate
Data used in the effectiveness and resource use analyses were collected from studies published between 1976 and 1998. 1995 price data were used.

Source of effectiveness data
Effectiveness data were derived from a review of the literature.

Modelling
A Markov model was used to model the annual risk of developing oesophageal adenocarcinoma in patients with Barrett's esophagus.

Outcomes assessed in the review
The outcomes assessed in the review were mortality from oesophageal cancer detected by surveillance and when symptomatic.

Study designs and other criteria for inclusion in the review
The parameters used in the model were based on published reports. No further details are provided in this paper.
Sources searched to identify primary studies
No details are provided in this paper.

Criteria used to ensure the validity of primary studies
No details are provided in this paper.

Methods used to judge relevance and validity, and for extracting data
No details are provided in this paper.

Number of primary studies included
Nine papers were used to provide the estimate for the probability of complete resection of oesophageal cancer detected by surveillance. Eight papers were used to provide the estimate for the probability of complete resection of oesophageal cancer detected when symptomatic, and nine papers were used to provide the estimate for the effectiveness of surveillance in reducing death from oesophageal cancer.

Methods of combining primary studies
Narrative method.

Investigation of differences between primary studies
No details are provided in this paper.

Results of the review
The probability of complete resection of oesophageal cancer detected by surveillance was estimated to be 75%, compared to 49% for cancer detected when symptomatic. The effectiveness of surveillance in reducing death from oesophageal cancer was estimated to be 78%. Complications from endoscopy were assumed to occur at the rate of 13 per 10,000 procedures and mortality at 0.21 per 10,000 procedures. The rate of perforations requiring surgery was taken to be 1.6 per 10,000 procedures.

Measure of benefits used in the economic analysis
Quality adjusted life-years (QALYs) were the outcome measure used in the economic analysis. To measure the quality of life after esophagectomy a utility assessment of patients who had undergone esophagectomy for high grade dysplasia or cancer up to one year previously was performed. The time-trade off approach was used in this utility assessment.

Direct costs
Costs were discounted at 5%. Quantities and costs were not analysed separately. The study perspective was that of a Health Maintenance Organisation and calculated the average lifetime cost per patient in each strategy. The model used costs as opposed to charges. Actual variable costs for endoscopic and surgical procedures and costs for inpatient postoperative care were obtained from the study centre. Outpatient visits and physicians fees were adjusted to reflect actual reimbursement. Costs for terminal cancer care were obtained from hospice fees.

Statistical analysis of costs
Not undertaken.

Indirect Costs
Not included.
Currency
US dollars ($).

Sensitivity analysis
The authors examined the effect of changing the value of each parameter through sensitivity analysis to test for variability in data. It seems likely that the method used was one-way sensitivity analysis.

Estimated benefits used in the economic analysis
No surveillance provides 12.64 discounted years of life. Surveillance every five years provides 12.74 years of life, an additional life expectancy increase of 0.10yr. The median quality of life for the group of patients who had undergone esophagectomy for high grade dysplasia or cancer was 0.97 (interquartile range: 25-75%, 0.83-1.0).

Cost results
No surveillance costs $4,100 whilst surveillance every five years costs $13,900. Thus, surveillance every five years incurs an additional cost of $9,800.

Synthesis of costs and benefits
The incremental cost-utility ratio was $98,000 per additional life year gained. Surveillance every 1-4 years was dominated by surveillance every 5 years. For patients with Short Segment Barrett's esophagus (SSBE) for an annual incidence of cancer of 1%, surveillance every two years provides the greatest gain in quality-adjusted life expectancy but has an incremental cost-utility ratio of nearly $600,000/QALY. Less frequent surveillance (every 3-5 years) has incremental cost-utility ratios ranging from $26,600/QALY to $121,600/QALY. Sensitivity analysis revealed two critical values in the decision for surveillance and esophagectomy: the lifetime incidence of cancer and the quality adjustment for life after an esophagectomy.

Authors' conclusions
The baseline analysis suggests that surveillance every five years with esophagectomy for high grade dysplasia increases both length and quality of life and has an incremental cost-utility ratio that is similar to that of accepted medical practices.

CRD COMMENTARY - Selection of comparators
The reason for the choice of comparator is clear.

Validity of estimate of measure of benefit
The estimate of the measure of benefit used in the economic analysis is likely to be valid.

Validity of estimate of costs
Cost results would be more transparent if details were given on resource quantities and costs associated with care.

Other issues
Generally this was a well conducted study but from an economics perspective little information was provided on costs.

Source of funding
Supported by a Department of Veterans Affairs Health Services Research and Development Career Development
Award (Dr Provenzale) and, in part, by the Walker-Inman Award from Duke University.

Bibliographic details

PubMedID
10445526

DOI
10.1111/j.1572-0241.1999.01276.x

Original Paper URL
http://www-east.elsevier.com/ajg/frames/search.htm

Indexing Status
Subject indexing assigned by NLM

MeSH
Adenocarcinoma /economics /epidemiology /pathology; Adult; Aged; Barrett Esophagus /economics /epidemiology /pathology; Cost-Benefit Analysis; Esophageal Neoplasms /economics /epidemiology /pathology; Esophagectomy /economics; Esophagoscopy /economics; Esophagus /pathology; Female; Follow-Up Studies; Humans; Male; Markov Chains; Middle Aged; Population Surveillance; Precancerous Conditions /economics /epidemiology /pathology; Quality-Adjusted Life Years; Risk

AccessionNumber
21999001542

Date bibliographic record published
31/08/2000

Date abstract record published
31/08/2000