Testing for occult cancer in patients with idiopathic deep vein thrombosis: a decision analysis

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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
Testing for occult cancer in patients with idiopathic deep vein thrombosis (IDVT)

Type of intervention
Screening and diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
Patients with idiopathic deep vein thrombosis.

Setting
Secondary care. The economic study was carried out in Italy.

Dates to which data relate
Effectiveness and resource use data were based on studies published between 1988 and 1995. 1995 prices were used.

Source of effectiveness data
The estimate for final outcomes was based on a review of previously completed studies.

Modelling
A decision model was used to obtain the optimal sequence of decisions regarding the cancers to be investigated and the tests to perform, compared to no testing.

Outcomes assessed in the review
The sensitivity and specificity of tests, the cancer risk in IDVT patients and the life expectancy of cancers by detection mode were the outcomes assessed in the review.

Study designs and other criteria for inclusion in the review
Prospective controlled trials in which deep vein thrombosis was the reference condition, the diagnosis was venographically documented and idiopathic and secondary forms were considered separately were included in the review.
Sources searched to identify primary studies
A MEDLINE search was conducted to identify articles published between 1970 to May 1996.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
Six studies met the inclusion criteria.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not stated.

Results of the review
The sensitivity and specificity of the following tests were reported in the paper: fecal occult blood test, colonoscopy, prostate-specific antigen, transrectal ultrasonography, transvaginal ultrasonography, cytologic analysis, cystoscopy, and mammography. The life expectancy of the cancers was also provided (cancers of the colon, prostate, bladder, breast, endometrium). In the baseline analysis, only colon and breast cancer investigation were considered since the current literature did not provide enough evidence for a gain in life expectancy for prostate, bladder and endometrial cancer when the lead time is taken into consideration.

Measure of benefits used in the economic analysis
Life years gained was the outcome measure used in the economic analysis. A decision analysis tree was used to compare different testing programmes for candidate cancers (colon and breast) with an approach of no testing.

Direct costs
Costs were not discounted. Quantities and costs were not reported separately. The estimation of costs was derived using modelling studies. The authors used a third party payer perspective which incorporated only direct medical costs: the cost of examination, and the cost of staying in the hospital for the study plan. Test costs were obtained from the hospital’s 1995 rate book. The actual costs for diagnostic procedures included costs for professionals’ time, equipment and supplies. Hospitalisation costs were calculated from total cost estimates (variable costs plus fixed costs) from the hospital cost accounting system.

Indirect Costs
Not included.

Currency
Italian Lire (L). An exchange rate of L1,600 Lire per US dollar was used but calculations were made principally in Lire. The results were then reported in US dollars ($).
Sensitivity analysis
The variables in the decision analysis model were tested using univariate sensitivity analysis over the range of values reported in the literature when data were numerous. When no variability was reported, a 20% variation of the individual variables was tested.

Estimated benefits used in the economic analysis
In the case of a 60-69 year old female with IDVT, a diagnostic plan that included colonoscopy and mammography in any order produced a marginal discounted life expectancy (LE) of 70 days. All the strategies including both colon and breast proved to be effective regardless of the tests used. The marginal effectiveness of cancer investigation was lower for both the 50-59 year old group for all strategies (range: 9 - 51 days) and for those aged 70 years and over (range: 15 - 51 days). A 60-69 year old male with IDVT and a negative routine work-up has a 14.54 year LE (discounted 11.77), which is 215 days less than the general population. No testing strategy for men provides the desired utility. The greatest gain, 27 days, comes from colonoscopy alone.

Cost results
The cost of testing in the strategies for candidate cancers (colon and breast) ranged from $255 to $647.

Synthesis of costs and benefits
The incremental cost-effectiveness ratio ranged from $1,789 per year of life gained for mammography alone in women aged 60-69 years, to $6,979 per year of life gained for faecal occult blood testing followed by mammography at the same age. From the sensitivity analysis, changes in the magnitude of cancers affected the magnitude of gain. The results of the baseline analysis were most affected by the benefit of early detection. Small decreases in the benefit of early detection for colon and breast cancer would produce a sensible decrease in the overall benefit, making any testing undesirable.

Authors’ conclusions
The study provided evidence that investigating for occult cancer in IDVT is effective, according to the authors’ pre-defined criterion of utility, for only a very limited number of cancer sites: in females tested for breast and colon cancer. In this study only indirect evidence that a limited investigative strategy could be efficiently pursued was reported.

CRD COMMENTARY - Selection of comparators
The reason for the choice of no testing as the comparator is clear

Validity of estimate of measure of benefit
Some details about the methods of the literature review were provided by the authors. However, it is not clear how the studies used to derive specificity and sensitivity of tests were identified.

Validity of estimate of costs
Insufficient details of the methods of cost estimation were provided. A third party payer perspective was adopted in the analysis and costs to others in society such as patients and care-givers were not considered. Also, some costs were not included in the analysis: the cost of therapy for an early diagnosed cancer, the cost of cancer treatment for a non-investigated cancer that will appear later in patient’s life. Costs may not be generalisable to other settings or countries.

Other issues
Sensitivity analyses were performed to allow for the uncertainties in the data and some comparisons with other relevant studies were made by the authors.
Implications of the study
The authors noted that the most direct and convincing evidence of the value of testing for an occult cancer in IDVT patients would emerge from a randomized controlled trial.

Source of funding
None stated.

Bibliographic details

PubMedID
9408012

Indexing Status
Subject indexing assigned by NLM

MeSH
Aged; Cost-Benefit Analysis; Decision Support Techniques; Humans; Male; Middle Aged; Neoplasms, Unknown Primary /diagnosis /economics /epidemiology; Prevalence; Prospective Studies; Risk Assessment; Sensitivity and Specificity; Thrombophlebitis /diagnosis /economics

AccessionNumber
21998006264

Date bibliographic record published
31/10/2000

Date abstract record published
31/10/2000