Value and cost of follow-up after adjuvant treatment of patients with Dukes’ C colonic cancer


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
Several diagnostic tools used to identify potentially curable recurrent disease in patients treated adjuvantly for curative resected Dukes’ C colonic cancer were examined: physical examination; liver ultrasonography or computed tomography (CT) every 3 months in the first year, every 6 months in the second and third years, and yearly thereafter; colonoscopy performed after 2 and 5 years; chest radiography performed after 6 and 12 months; and measurement of carcinoembryonic antigen (CEA) levels performed as for CT.

Type of intervention
Diagnosis; Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients treated with 1-year chemotherapy for resected Dukes’ C colonic cancer.

Setting
The setting was hospital. The economic study was carried out in The Netherlands.

Dates to which data relate
Effectiveness and resource use data were gathered between 1991 and 1999. The price year was 1998.

Source of effectiveness data
The effectiveness evidence was derived from a single study, whose results were published in a different article (see "other publications of related interest" below).

Link between effectiveness and cost data
The costing was undertaken prospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
Power calculations were not reported. Five-hundred patients were included in the study from 1991 to July 1999. Four patients were excluded because the disease was at a more advanced stage than that permitted by the protocol guidelines. Of the 496 patients in the study, 283 did not develop any recurrent disease and 213 patients were diagnosed with recurrent disease, which was amenable to surgery only in 42 subjects.
Study design
The study was a diagnostic test evaluation carried out on the back of a multicentre randomised clinical trial started in 1991 and closed in December 1997. The follow-up of all patients in the present analysis was closed in July 1997. The median follow-up at analysis was 43 months (range: 18 - 96). Methods of assessments were not reported.

Analysis of effectiveness
The basis of the effectiveness analysis (intention to treat or treatment completers only) was not reported, although there appeared to be no loss to follow-up. The primary health outcomes used in the analysis were the 5-year survival rate (Kaplan-Meyer curves) and number of recurrent diseases first detected by any diagnostic instrument, number of recurrent diseases treatable with salvage surgery, and median time to diagnosis in patients suitable for salvage surgery. Groups were shown to be similar with respect of recurrence rate.

Effectiveness results
The effectiveness results were as follows:

Overall, among the 213 patients with recurrent disease, only 42 were eligible for salvage surgery with a 5-year survival rate equal to 40% and a median survival of 38 months.

Ultrasonography/CT detected the greatest number of recurrent tumours (87), but only 14 patients were eligible for surgery and the median time to diagnosis in patients suitable for salvage surgery was 14.3 months.

Although colonoscopy detected less recurrent diseases (13), 8 were eligible for surgery and the median detection time for surgery was 15.2 months.

CEA testing detected 40 recurrent diseases, but only 3 patients were eligible for surgery and the detection time was 16.2 months.

The presence of specific symptoms permitted the detection of 49 recurrences, 12 patients were eligible for surgery, and the detection time to surgery was 12.8 months.

Clinical conclusions
Liver imaging (CT and ultrasonography) and colonoscopy were the most successful techniques for detection of curable recurrent tumours.

Measure of benefits used in the economic analysis
The summary measure of benefit was number of curative resections detected.

Direct costs
Discounting was methodologically relevant but was not reported. Quantities and costs were not reported separately and the resource/cost boundary adopted was not specified. Only total costs of each diagnostic instrument and cost per curative recurrence were reported. The sources of the resource and cost data were not indicated. The resource use data were gathered between 1991 and 1999. The price year was 1998.

Statistical analysis of costs
No statistical analysis of costs was reported.

Indirect Costs
No indirect costs were included.
Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
See effectiveness results above.

Cost results
The total costs were $15,600 for CEA measurement, $43,050 for chest radiography, $119,616 for colonoscopy, $139,763 for ultrasonography/CT, and $60,450 for the physical examination.

The cost per curative recurrence was $5,200 for CEA measurement, $21,525 for chest radiography, $14,952 for colonoscopy, $9,963 for ultrasonography/CT, and $60,450 for the physical examination.

Synthesis of costs and benefits
Not applicable.

Authors' conclusions
Ultrasonography/CT and colonoscopy appeared to be the most cost-effective diagnostic tools for follow-up of recurrent tumours in patients with Duke’s C colonic cancer. "The yield of routine CEA testing, chest radiotherapy and routine physician visits was low and at relatively high cost”.

CRD COMMENTARY - Selection of comparators
The reason for the selection of comparators was not clear. The diagnostic techniques were chosen because they seemed to represent the most common alternatives for the detection of recurrent tumours, but the timings could be crucial. You should consider whether they are widely used in your own setting.

Validity of estimate of measure of effectiveness
The design of this study is flawed in that all diagnostic tests were not applied at the same time on the same cohort of patients. It is highly likely that the timing of a given test is strongly associated with its accuracy. We do not know what this association is and therefore cannot estimate the direction of any bias, i.e., if tests had been performed at the same time, how the results would have been affected.

Validity of estimate of measure of benefit
The summary measure of benefit was valid for this technology. However, it does not explicitly measure preferences, life years or quality of life, and would be difficult to compare with other technologies.

Validity of estimate of costs
Costs and quantities were not reported separately and sensitivity analyses were not carried out. As a consequence, the external validity of the study is somewhat limited. In addition, the perspective adopted by the authors was not specified, therefore some categories of costs may have been omitted. Overall, details and comments on the cost analysis were not reported satisfactorily in the study. An incremental analysis was also not properly carried out, so that it is not clear what additional cost would be incurred for what additional benefit by changing from one technology to another. This is
because not all tests were carried out at the same time.

**Other issues**
The generalisability of the study results to other settings was not specifically addressed and sensitivity analyses were not performed. However, the authors made numerous and appropriate comparisons of their findings with those from other published studies.

**Implications of the study**
The authors suggest that CEA tests, chest radiography and physician visits should not be recommended. A multiple diagnostic approach should be adopted to identify the majority of patients with treatable recurrent disease. These recommendations should be viewed with some caution in light of the design flaws discussed above.

**Source of funding**
Supported by a grant from the Netherlands Cancer Foundation (NKB/KWF).

**Bibliographic details**

**PubMedID**
11136320

**DOI**
10.1046/j.1365-2168.2001.01638.x

**Other publications of related interest**

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Antineoplastic Combined Chemotherapy Protocols /therapeutic use; Carcinoembryonic Antigen /blood; Chemotherapy, Adjuvant; Colonic Neoplasms /diagnosis /drug therapy; Costs and Cost Analysis; Fluorouracil /administration & dosage; Follow-Up Studies; Humans; Leucovorin /administration & dosage; Levamisole /administration & dosage; Liver Neoplasms /secondary /ultrasongraphy; Neoplasm Metastasis /diagnosis; Neoplasm Recurrence, Local /diagnosis; Physical Examination; Survival Analysis; Tomography, X-Ray Computed /economics

**AccessionNumber**
22001000347

**Date bibliographic record published**
30/11/2002

**Date abstract record published**
30/11/2002