Laparoscopic versus open right hemicolectomy with curative intent for colon carcinoma

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 use of laparoscopic right hemicolectomy (LRH) and open right hemicolectomy (ORH) in the treatment of colon carcinoma.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients undergoing right hemicolectomy for colon carcinoma. The exclusion criteria applied to the LRH group were:

- patients with tumours larger than 6 cm in diameter;
- patients with tumours infiltrating the adjacent organs, as detected by ultrasonography and/or computerised tomography;
- patients who did not consent to the procedure;
- patients with intestinal obstruction or perforation; and
- patients whose oncological staging was Duke's D.

Setting
The setting was a hospital. The economic study was carried out in China.

Dates to which data relate
The effectiveness and resource use data were gathered from September 2000 to February 2003. The price year was not reported.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was performed prospectively on the same sample of patients as that used in the clinical study.
Study sample
Power calculations were not performed to justify the size of the sample. The method used to select the sample was not described clearly. A group of 30 patients undergoing LRH was identified for the LRH group. The mean age was 60.18 (+/- 14.91) years and 53.3% were men. Thirty-four patients undergoing ORH during the same period were identified from a group of 87 cases and were matched to LRH patients by age, gender, Duke's staging, tumour size, prior abdominal operation and extent of resection. Their mean age was 60 (+/- 12.67) years and 58.8% were men). It was not stated whether some patients refused to participate.

Study design
This was a prospective cohort study that was carried out at a single centre, the Ruijin Hospital, Shanghai Second Medical University, in Shanghai. The 34 participating patients in the ORH group were randomly selected from the wider group of 87 potentially eligible patients. The mean follow-up was 27.15 months (range: 12 - 40) for LRH patients and 26.19 months (range: 13 - 40) for ORH patients. No patients were lost to follow-up.

Analysis of effectiveness
All of the patients included in the initial study sample were accounted for in the analysis of effectiveness. The outcome measures used were:

- the number of operative deaths,
- the operating time,
- the blood loss,
- the rate of analgesia requirement,
- the days of flatus passage,
- the time to resume normal diet,
- the length of hospital stay,
- the time to resume early activity,
- the length of incision,
- the rate of major complications,
- parameters of oncological clearance,
- the rate of local recurrence,
- the rate of metachronous metastasis, and
- the rate of cumulative survival (which was calculated using the Kaplan-Meier approach).

The patient groups were comparable at study entry in terms of their demographic and clinical characteristics.

Effectiveness results
The authors stated that two patients in LRH group required conversion to open surgery because of an unexpected bulky tumour and severe adhesion in the abdominal cavity.

No operative deaths occurred in either group.
The operating time was 152.65 (+/- 28.29) minutes in the LRH group and 147.25 (+/- 27.50) minutes in the ORH group, (p=0.561).

The blood loss was 112.94 (+/- 96.36) mL (LRH group) versus 274.50 (+/- 235.43) mL (ORH group), (p=0.005).

The rate of analgesia requirement was 46.7% (LRH group) versus 76.5% (ORH group), (p=0.014).

The days of flatus passage were 2.24 (+/- 0.56) in the LRH group and 3.25 (+/- 1.29) in the ORH group, (p=0.012).

The time to resume normal diet was 5.65 (+/- 2.40) days (LRH group) versus 7.30 (+/- 2.72) days (ORH group), (p=0.060).

The length of hospital stay was 13.94 (+/- 6.53) days (LRH group) versus 18.25 (+/- 5.96) days (ORH group), (p=0.043).

The time to resume early activity was 3.94 (+/- 1.64) days (LRH group) versus 5.45 (+/- 1.82) days (ORH group), (p=0.013).

The length of incision was 6.47 (+/- 4.11) cm (LRH group) versus 17.55 (+/- 1.61) cm (ORH group), (p<0.01).

The rate of major complications was 16.7% (LRH group) versus 29.4% (ORH group), (p=0.230).

There were no statistically significant differences between the groups in parameters of oncological clearance.

The rate of local recurrence was 6.7% in the LRH group and 5.9% in the ORH group, while the rate of metachronous metastasis was 13.3% versus 14.7% (both rates were comparable between groups).

The rate of cumulative survival was 76.50% (LRH group) versus 74.04% (ORH group), (p=0.851).

**Clinical conclusions**
Fewer complications, shorter hospital stay, shorter time to resume activity, and more favourable operative outcomes were observed in LRH patients in comparison with ORH patients.

**Measure of benefits used in the economic analysis**
The health outcomes were left disaggregated and no summary benefit measure was used in the economic evaluation. In effect, a cost-consequences analysis was carried out.

**Direct costs**
Discounting was not relevant since the costs per patient were incurred during a short timeframe. The unit costs were not presented separately from the quantities of resources used. The economic evaluation considered the costs of the operations and drugs. The cost/resource boundary of the study was unclear. Resource consumption was estimated using patient-level data derived from the sample of patients included in the effectiveness analysis. The source of the costs was unclear and the price year was not reported.

**Statistical analysis of costs**
Statistical analyses were used to test the statistical significance of differences in the total costs.

**Indirect Costs**
The indirect costs were not considered in the economic evaluation.
Currency
Chinese RMB yuan (RMB).

Sensitivity analysis
No sensitivity analyses were carried out.

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

Cost results
The cost of the operation was RMB 7,810.70 (+/- 1,719.07) with LRH and RMB 5,018.92 (+/- 845.62) with ORH, (p<0.01).

The cost of drugs was RMB 3,687.85 (+/- 1,977.42) with LRH and RMB 5,209.42 (+/- 2,212.37) with ORH, (p=0.035).

The total costs were RMB 11,498.54 (+/- 2,618.86) with LRH and RMB 10,228.34 (+/- 2,372.57) with ORH, (p=0.131).

Synthesis of costs and benefits
A synthesis of the costs and benefits was not relevant since a cost-consequences analysis was performed.

Authors' conclusions
In comparison with open right hemicolectomy (ORH), laparoscopic right hemicolectomy (LRH) was a safe and attractive strategy for the treatment of colon carcinoma.

CRD COMMENTARY - Selection of comparators
The authors justified the choice of the comparators, which represented the standard approach for treatment of colon carcinoma (i.e. ORH) and a new procedure (i.e. LRH). You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness evidence came from a cohort study, with one of the study groups being identified from a larger group of patients using a random allocation process. The evidence came from a single institution, thus it was unclear whether the study sample was representative of the patient population. The authors showed the comparability of the study groups at baseline. Details on the follow-up (i.e. length and loss of patients) were reported. However, a small sample of patients was considered and power calculations were not performed. Further, the authors noted that some selection bias, caused by a lack of random allocation of the patients to the study groups, might have affected the results of the analysis. These issues tend to limit the internal validity of the study.

Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis because a cost-consequences analysis was conducted. Please refer to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
The perspective adopted in the study was unclear and a detailed breakdown of the cost items was not reported. Only two
macro-categories of costs were given. It was unclear whether hospital stay, which was significantly longer for ORH patients, was included in the calculation of the costs. The source of the costs was not explicitly stated, although it could have been the authors’ institution. Overall, there was limited information on the cost analysis. The price year was not reported, which limits the possibility of performing reflation exercises in other time periods.

**Other issues**
The authors reported the results of other published studies, highlighting the advantages of LRH. The issue of the generalisability of the study results to other settings was not addressed and sensitivity analyses were not performed. This reduces the external validity of the analysis. The study referred to patients undergoing right hemicolecction because of colon carcinoma and this was reflected in the authors' conclusions.

**Implications of the study**
The study results suggested that LRH for right-sided colon cancer has the same oncological clearance, surgical safety, cost-effectiveness and patient survival as ORH. Further, patients can benefit from quicker postoperative recovery with laparoscopic surgery. The authors noted that the results of their study should be confirmed in a prospective, randomised study.

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**Other publications of related interest**


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