Laparoscopic Surgery for Cancer
What are the issues?

R Sim
Centre for Advanced
Laparoscopic Surgery, TTSH
The Issues

• Feasibility and safety
• Adequacy - same radical surgery as open op.
• Efficacy - short term benefits and long term oncologic results
• Time and Cost - is it worth the effort?
• Training and certification - who can be accredited?
Basic science considerations

• Laparoscopic environment
• CO2 pneumoperitoneum
• Port-site metastases
• Immune function
Intraperitoneal exfoliated cancer cells in patients with colorectal cancer. Hase et al. DCR Sep 1998

Positive pre-cytology 15%, post-cytology 9%

Post-cytology stronger influence on LR than pre-cytology; LR rate in positive post-cytology higher than those with negative post-cytology, regardless of pre-cytology.

All with positive post-cytology had recurrence.

Features of tumor prone to exfoliate (1) macroscopic dissemination (2) liver mets (3) > 20ml ascites (4) ulcerated without definite borders (5) invade beyond serosa (6) semiannular or annular (7) lymphatic invasion

Colon cancer - Conventional cytology positive 35.5%
   Immunocytology positive 47.2%
Gastric cancer - Conventional cytology positive 42.3%
   Immunocytology positive 46.8%

Associated with pTNM staging

Microscopic peritoneal dissemination influences survival time after R0 resections only in gastric but not colon cancer.

I - midline laparotomy, IP injection
II – IP injection alone
III – pneumo after IP injection
IV – trocars inserted after pneumo and IP injection

Similar implantation rates of 50-60%

Pneumoperitoneum does not enhance implantation of free intraperitoneal malignant colon cancer cells in the rat.
**CO2 pneumoperitoneum does not enhance tumor growth and metastases - Study of a rat cecal wall inoculation model.** Tomita et al. DCR Sep 2001; 44(9):1297-1301.

<table>
<thead>
<tr>
<th></th>
<th>CO2 pneumo</th>
<th>Laparotomy</th>
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</thead>
<tbody>
<tr>
<td>Cecal tumor growth</td>
<td>1.043g</td>
<td>0.894g</td>
</tr>
<tr>
<td>Liver mets</td>
<td>32%</td>
<td>37%</td>
</tr>
<tr>
<td>Lung mets</td>
<td>34%</td>
<td>17%</td>
</tr>
<tr>
<td>Lymph node mets</td>
<td>84%</td>
<td>77%</td>
</tr>
<tr>
<td>Wound/port mets</td>
<td>20%</td>
<td>23%</td>
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Surgical technique plays a larger role in the development of port site tumors than CO2 pneumoperitoneum.

• After the abdominal cavity was entered, saline was instilled into the peritoneal cavity, and the fluid was collected (Specimen 1). During surgery, all irrigating fluids were collected (Specimen 2). Both were assessed for malignancy using four techniques: filtration process (ThinPrep), smear, cell block, and immunochemistry using Ber-EP4.

• Malignant cells were not detected in any Specimens 1 or, more importantly, in Specimens 2 in either surgical group.

<table>
<thead>
<tr>
<th>Procedure Type</th>
<th>Tumor Established (%)</th>
<th>Tumor Mass (mg ± std dev)</th>
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<tbody>
<tr>
<td>Control</td>
<td>5%</td>
<td>75±68 mg</td>
</tr>
<tr>
<td>Laparoscopic</td>
<td>30%</td>
<td>115±68 mg</td>
</tr>
<tr>
<td>Open</td>
<td>83%</td>
<td>180±132 mg</td>
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</tbody>
</table>
Port site metastases and recurrence after laparoscopic colectomy - A randomised trial.

End-points - mets at port-sites and laparotomy incisions
- recurrence rate
No wounds or port-site mets in both open and laparoscopic
RR 16.1% for LAC, 15% for OC

Reduce number of tumor cells deposited in port-sites
  • Minimise number of tumor cells in peritoneal cavity
  • Plastic ports rather than metal ports
  • Secure ports to prevent displacement
Beneficial in reducing port-site mets

Trocar fixation
Prevent gas leak
Povidone iodine rinse
  - instruments, trocars and wound
Wound protection
Peritoneal closure

Port-site implantation
13.8% (5/36) vs 63.8% (23/36)
Short-term Quality-of-Life Outcomes Following Laparoscopic-Assisted Colectomy vs Open Colectomy for Colon Cancer: A Randomized Trial

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Georgene Schroeder, MS
for the Clinical Outcomes of Surgical Therapy (COST) Study Group

ALTHOUGH LAPAROSCOPIC TECHNIQUES were first described in 1901, only in the past few years have newer optics and instrumentation allowed for the safe application of laparoscopic resection procedures. The first report of a successful laparoscopic cholecystectomy in 1987 was followed by rapid widespread adoption of the procedure. In recent years, laparoscopic procedures for a number of other nonmalignant abdominal diseases, including appendicitis, inguinal hernia, gastroesophageal reflux disease, hiatal hernia, and nonmalignant uterine conditions, have become routine. The interest in laparoscopic approaches for these conditions has been driven by the theoretical benefits, including reduced postoperative pain, shortened length of stay, and earlier return to work; and perhaps by the technological imperative.

Improvements in both technology and surgeons' comfort and skill with laparoscopic techniques have led to an interest in extending the indications for laparoscopic surgery to include curative resection of colon cancer. In laparoscopic-assisted colectomy (LAC), mobilization of the bowel is conducted laparoscopically and then the bowel is externalized for resection and anastomosis. Laparoscopic-assisted colectomy has emerged as the preferred minimally invasive strategy for colonic cancer compared with standard open colectomy. Until ongoing trials establish that LAC is as effective as open colectomy in preventing recurrence and death from colon cancer, this procedure should not be offered to patients with colon cancer.

Context Laparoscopic-assisted colectomy (LAC) has emerged as the preferred minimally invasive surgical strategy for diseases of the colon. The safety and efficacy of LAC for colon cancer are unknown, and the nature and magnitude of any quality-of-life (QOL) benefit resulting from LAC for colon cancer is also unknown.

Objective To compare short-term QOL outcomes after LAC vs open colectomy for colon cancer.

Design, Setting, and Participants Multicenter, randomized controlled trial (Clinical Outcomes of Surgical Therapy [COST]). Between September 1994 and February 1999, 37 of 48 centers provided data for the QOL component of the trial for 449 consecutive patients with clinically resectable colon cancer.

Main Outcome Measures Scores on the Symptom Distress Scale (SDS). Quality of Life Index, and a single-item global rating scale at 2 days, 2 weeks, and 2 months postoperative; duration of postoperative in-hospital analgesic use; and length of stay.

Results Of 449 patients, 428 provided QOL data. In an intention-to-treat analysis comparing SDS pain intensity, SDS summary, QOL Index summary, and global rating scale scores at each time point, the only statistically significant difference observed between groups was the global rating scale score for 2 weeks postsurgery. The mean (median) global rating scale scores for 2 weeks postsurgery were 76.9 (80) for LAC vs 74.4 (75) for open colectomy (P=.009). While in the hospital, patients assigned to LAC required fewer days of both parenteral analgesics compared with patients assigned to open colectomy (mean [median], 3.2 [3] vs 4.0 [4] days; P=.001) and oral analgesics (mean [median], 1.9 [1] vs 2.2 [2] days; P=.03).

Conclusion Only minimal short-term QOL benefits were found with LAC for colon cancer compared with standard open colectomy. Until ongoing trials establish that LAC is as effective as open colectomy in preventing recurrence and death from colon cancer, this procedure should not be offered to patients with colon cancer.

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www.jama.com
Laparoscopy-assisted colectomy versus open colectomy for treatment of non-metastatic colon cancer: a randomised trial

Antonio M Lacy, Juan C García-Valdecasas, Salvador Delgado, Antoni Castells, Pilar Tauri, Josep M Piqué, Josep Vila

Summary
Background Although early reports on laparoscopy-assisted colectomy (LAC) in patients with colon cancer suggested that it reduces perioperative morbidity, its influence on long-term results is unknown. Our study aimed to compare efficacy of LAC and open colectomy (OC) for treatment of non-metastatic colon cancer in terms of tumour recurrence and survival.

Methods From November, 1993, to July, 1998, all patients with adenocarcinoma of the colon were assessed for entry in this randomised trial. Adjunct therapy and postoperative follow-up were the same in both groups. The main endpoint was cancer-related survival. Data were analysed according to the intention-to-treat principle.

Findings 219 patients took part in the study (111 LAC group, 108 OC group). Patients in the LAC group recovered faster than those in the OC group, with shorter postoperative ileus times (p=0.001) and shorter hospital stays (p=0.005). Morbidity was lower in the LAC group (p=0.001), although LAC did not influence perioperative mortality. Probability of cancer-related survival was higher in the LAC group (p=0.02). The Cox model showed that LAC was independently associated with reduced risk of tumour relapse (hazard ratio 0.39, 95% CI 0.19–0.82), death from any cause (0.48, 0.23–1.04), and death from a cancer-related cause (0.38, 0.16–0.91) compared with OC. This superiority of LAC was due to differences in patients with stage III tumours (p=0.04, p=0.02, and p=0.006, respectively).

Interpretation LAC is more effective than OC for treatment of colon cancer in terms of morbidity, hospital stay, tumour recurrence, and cancer-related survival.

Lancet 2002; 359: 2224–29

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LAC is more effective than OC for treatment of colon cancer in terms of morbidity, hospital stay, tumour recurrence, and cancer-related survival.

This superiority of LAC was due to differences in patients with stage III tumours.
Conclusion

We have to work harder so that patients heal better