Evaluation of the National Training Programme for Laparoscopic Colorectal Surgery of England (Lapco)

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National Training Programme for Laparoscopic Colorectal Surgery
Lapco

• Aims:
  » Disseminate LCS
  » Shorten the learning curve
  » Minimise patient morbidity and mortality

• Incorporates:
  » Expert supervised intraoperative training
  » Formative competency assessment – monitoring of training progression
  » Summative competency assessment at end of training
  » Continuous clinical audit of patient outcomes
## Competency Assessment

Formative assessment of training progression

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not performed, step had to be done by trainer</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Partly performed, step had to be partly done by trainer</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Performed, with substantial verbal support</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Performed with minor verbal support</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Competent performance, safe (without guidance)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Proficient performance, couldn't be better</td>
<td></td>
</tr>
</tbody>
</table>

### Exposure

- B1 Correct theater setup
- B2 Appropriate patient positioning
- B3 Safe access technique
- B4 Exposure of operating field

### Vascular

- B5 Safe dissection of vascular pedicle
- B6 Dissection of mesentry (retrocolic)
- B7 Safe identification of ureter or duodenum

### Mobilisation

- B8 Dissection of hepatic or splenic flexure
- B9 Mesorectal dissection (where applicable)
- B10 Safe dissection of bowel

### Anastomosis

- B11 Safe extraction of specimen
- B12 Anastomosis

### Overall Performance

- B13 Overall Performance

### Comment

- C. Comment

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**National Training Programme in Laparoscopic Colorectal Surgery**

**FORM A**

**GLOBAL ASSESSMENT BY TRAINER (GAT)**

**Overall Performance**

**Assessing the Assessment**

How difficult was the operation:

- Very easy
- Easy
- Medium
- Difficult
- Very difficult

How useful was this form:

- Not useful
- Slightly useful
- Useful
- Very useful

How long did I take to fill in this form:

- Less than 5 minutes
- 5-10 minutes
- 10-15 minutes
- More than 15 minutes

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**Note:** This document includes an assessment form for evaluating the competency of training progression in laparoscopic colorectal surgery. The form allows trainers to rate different steps on a scale of 1 to 6, with each level describing the level of performance required. The form also includes sections for overall assessment and comments from the trainer.
**Aim**: safe and solid technique for straightforward case (R/Hemi and L/Hemi)

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**Competency Assessment**

**Summative assessment – sign-off**

1. **Trainer/trainee agree to enter sign off process**
2. **Trainee is invited to submit 2 videos of independently performed procedures**
3. **Educational centre (Imperial College)**
   - **Assessor 1**
   - **Assessor 2**

   If positive result, recommend solo training, if negative, recommend further supervised training
# Competency Assessment

## Summative assessment – Competency Assessment Tool

### LAPAROSCOPIC COLORECTAL RESECTION

<table>
<thead>
<tr>
<th>TASK</th>
<th>INSTRUMENTATION:</th>
<th>SKILLS</th>
<th>ERRORS</th>
<th>END-PRODUCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port insertion/placement</td>
<td>Dangerous insertion or wrong position</td>
<td>Uncontrolled movements, insufficient view</td>
<td>Perforation/bleeding</td>
<td>Anatomical landmarks not properly identified</td>
</tr>
<tr>
<td>Hazardous</td>
<td>Incompetent insertion or ergonomically poor position</td>
<td>Laborious</td>
<td>Bloody dissection, too close to sensitive structures</td>
<td></td>
</tr>
<tr>
<td>Imprecise</td>
<td>Safe insertion and ergonomically good position</td>
<td>Effective</td>
<td>No damage to bowel, major blood vessels</td>
<td></td>
</tr>
<tr>
<td>Safe</td>
<td>Versatile</td>
<td>Masterful insertion, ideal positioning</td>
<td>Tissue-protective</td>
<td>Anatomically</td>
</tr>
<tr>
<td>Versatile</td>
<td>Expeditious</td>
<td>Strategic and intelligent adjustments by NDH</td>
<td>Performed with best possible tissue protection</td>
<td></td>
</tr>
</tbody>
</table>

### INSTRUMENTATION:
- **Use of haemostatic tool (clip applier/diathermy/stapler):**
  - **Dissection of vessels:**
    - **Hazardous:** Insufficient view, uncontrolled movements
    - **Laborious:** Awkward and repeated unnecessary attempts
    - **Efficent:** Instrument accurately placed and engaged
    - **Masterly:** Highly efficient and safe use of instrument
    - **N/A**

### SKILLS:
- **Use of graspsers/dissection tools:**
  - **Anatomical dissection technique:**
    - **Hazardous:** Insufficient views, uncontrolled movements
    - **Skilful:** Smooth, controlled and meaningful movements
    - **Versatile:** Masterful instrument use, effective movements
    - **Meticulous:** Consistently stays in correct tissue plane
    - **N/A**

### ERRORS:
- **Use of intestinal stapler:**
  - **Preparation of large bowel for resection:**
    - **Hazardous:** Awkward and repeated unnecessary attempts
    - **Efficient:** Highly efficient and safe use of instrument
    - **N/A**

### END-PRODUCT:
- **Use of mobilisation:**
  - **Mobilisation following anatomical planes:**
    - **Hazardous:** Insufficient views, uncontrolled movements
    - **Efficient:** Smooth and efficient dissection technique
    - **Masterly:** Tissue-protective
    - **N/A**

- **Resection:**
  - **Hazardous:** Awkward and repeated unnecessary attempts
  - **Efficient:** Smooth and efficient dissection technique
  - **N/A**

- **Preparation of large bowel for resection:**
  - **Hazardous:** Insufficient views, uncontrolled movements
  - **Efficient:** Smooth and efficient dissection technique
  - **Masterly:** Tissue-protective
  - **N/A**

- **Resection:**
  - **Hazardous:** Awkward and repeated unnecessary attempts
  - **Efficient:** Smooth and efficient dissection technique
  - **Masterly:** Tissue-protective
  - **N/A**

- **Preparation of large bowel for resection:**
  - **Hazardous:** Insufficient views, uncontrolled movements
  - **Efficient:** Smooth and efficient dissection technique
  - **Masterly:** Tissue-protective
  - **N/A**

- **Resection:**
  - **Hazardous:** Awkward and repeated unnecessary attempts
  - **Efficient:** Smooth and efficient dissection technique
  - **Masterly:** Tissue-protective
  - **N/A**

- **Preparation of large bowel for resection:**
  - **Hazardous:** Insufficient views, uncontrolled movements
  - **Efficient:** Smooth and efficient dissection technique
  - **Masterly:** Tissue-protective
  - **N/A**

- **Resection:**
  - **Hazardous:** Awkward and repeated unnecessary attempts
  - **Efficient:** Smooth and efficient dissection technique
  - **Masterly:** Tissue-protective
  - **N/A**
Study Objectives

• Clinical Safety
  » Prospectively collected, clinical outcomes for the supervised NTP training

• Efficiency
  » Learning CUSUM curves, derived from a Global Assessment Score (GAS)

• Efficacy
  » Influence of training volume on CAT score
  » Impact of technical performance in sign-off on clinical outcomes
  » Analysis of clinical outcomes of cases performed independently within 12 months of ‘sign-off’
## Clinical Safety

### Training clinical outcomes

<table>
<thead>
<tr>
<th>Clinical Outcome</th>
<th>NTP Training Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cases</td>
<td>1560</td>
</tr>
<tr>
<td>Conversion</td>
<td>76 (4.9%)</td>
</tr>
<tr>
<td>Complications</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>217 (13.9%)</td>
</tr>
<tr>
<td>Overall Surgical</td>
<td>190 (12.2%)</td>
</tr>
<tr>
<td>Leak</td>
<td>34 (2.2%)</td>
</tr>
<tr>
<td>Re-operation</td>
<td>61 (3.9%)</td>
</tr>
<tr>
<td>Re-admission</td>
<td>47 (3.0%)</td>
</tr>
<tr>
<td>Median Hospital Stay</td>
<td>5 (4-7)</td>
</tr>
<tr>
<td>Mortality</td>
<td>8 (0.5%)</td>
</tr>
</tbody>
</table>
Clinical Safety

Clinical Learning curves

A) Conversion

B) Complication

CUSUM (Obs - Exp)

C) Re-operation

NTP training Cases

Case Number
Regime shift detection - competency (GAS score of 5) is reached:

- theatre set-up – case 6
- exposure – case 11
- transection and anastomosis – case 25
- mobilisation of colon – case 30,
- vascular pedicle – case 31.
- Flexure and mesorectal dissection do not reach a plateau.
Efficacy

‘Sign-off’ outcomes

• 89 trainees have submitted videos for ‘sign-off’

• 63 have been signed off.

• Pass rate is 71%
Efficacy

‘Sign-off’ outcomes

A) Post-Operative Complications
CUSUM (Obs - Exp)

B) Number of NTP Training Cases
CUSUM (Obs - Exp)

C) Total Number of LCS Cases
CUSUM (Obs - Exp)

Change Points at CAT scores 2.69 and 3.09
## Efficacy

### ‘Sign-off’ outcomes

<table>
<thead>
<tr>
<th>CAT score&lt; 2.69</th>
<th>P-value</th>
<th>CAT score 2.69 – 3.09</th>
<th>P-value</th>
<th>CAT score &gt; 3.09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td></td>
<td>76</td>
<td></td>
<td>57</td>
</tr>
<tr>
<td>Complications</td>
<td>11 (25.0%)</td>
<td>9 (12.9%)</td>
<td>2 (3.5%)</td>
<td></td>
</tr>
<tr>
<td>Surgical Complication</td>
<td>8 (18.2%)</td>
<td>7 (10.0%)</td>
<td>1 (1.8%)</td>
<td></td>
</tr>
<tr>
<td>Lymph node count</td>
<td>13 (8 – 20)</td>
<td>15 (11 – 22)</td>
<td>20 (16 – 25)</td>
<td></td>
</tr>
<tr>
<td>Distal Resection Margin (cm)</td>
<td>4.0 (2.0 – 6.0)</td>
<td>4.0 (3.0 – 7.0)</td>
<td>5.0 (3.0 – 6.3)</td>
<td></td>
</tr>
<tr>
<td>Number of NTP Cases</td>
<td>9 (2 – 13)</td>
<td>15 (6 – 23)</td>
<td>20 (13 – 28)</td>
<td></td>
</tr>
</tbody>
</table>
## Efficacy

Post-program clinical outcomes

<table>
<thead>
<tr>
<th>Clinical Outcome</th>
<th>NTP Training Cases</th>
<th>Post ‘Sign-off’ Cases</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cases</td>
<td>1560</td>
<td>603</td>
<td></td>
</tr>
<tr>
<td>Conversion</td>
<td>76 (4.9%)</td>
<td>72 (11.9%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>217 (13.9%)</td>
<td>80 (13.3%)</td>
<td>0.697</td>
</tr>
<tr>
<td>Overall Surgical</td>
<td>190 (12.2%)</td>
<td>72 (11.9%)</td>
<td>0.878</td>
</tr>
<tr>
<td>Leak</td>
<td>34 (2.2%)</td>
<td>13 (2.2%)</td>
<td>0.973</td>
</tr>
<tr>
<td>Re-operation</td>
<td>61 (3.9%)</td>
<td>32 (5.3%)</td>
<td>0.151</td>
</tr>
<tr>
<td>Re-admission</td>
<td>47 (3.0%)</td>
<td>24 (4.0%)</td>
<td>0.258</td>
</tr>
<tr>
<td>Mean Hospital Stay</td>
<td>5 (4-7)</td>
<td>5 (4-7)</td>
<td>0.381</td>
</tr>
<tr>
<td>Mortality</td>
<td>8 (0.5%)</td>
<td>4 (0.7%)</td>
<td>0.673</td>
</tr>
</tbody>
</table>
## Efficacy

### Case Complexity

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Category</th>
<th>NTP Training Cases</th>
<th>Post ‘Sign-off’ Independent Cases</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Cases</td>
<td>-</td>
<td>1560</td>
<td>603</td>
<td></td>
</tr>
<tr>
<td>Lapco Risk Score</td>
<td>No. of High Risk Cases</td>
<td>123 (8.3%)</td>
<td>71 (11.8%)</td>
<td>0.012</td>
</tr>
<tr>
<td>Age</td>
<td>Mean (S.D)</td>
<td>66.7 (13.8)</td>
<td>66.7 (13.0)</td>
<td>0.273</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>833 (53.4%)</td>
<td>309 (51.2%)</td>
<td>0.543</td>
</tr>
<tr>
<td>BMI</td>
<td>Mean (S.D)</td>
<td>27.4 (5.0)</td>
<td>27.0 (3.4)</td>
<td>0.068</td>
</tr>
<tr>
<td>Urgency</td>
<td>Emergency</td>
<td>31 (2.0%)</td>
<td>17 (2.8%)</td>
<td>0.239</td>
</tr>
<tr>
<td>ASA grade</td>
<td>1</td>
<td>307 (19.7%)</td>
<td>124 (24.4%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>988 (63.3%)</td>
<td>265 (52.4%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>261 (16.7%)</td>
<td>114 (22.4%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4 (0.3%)</td>
<td>5 (1.0%)</td>
<td></td>
</tr>
<tr>
<td>Prior abdominal Surgery</td>
<td>Yes</td>
<td>395 (25.3%)</td>
<td>97 (16.1%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Resection</td>
<td>Right colectomy</td>
<td>589 (37.8%)</td>
<td>206 (34.2%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Left Colectomy/ High AR/ Sigmoid Colectomy</td>
<td>675 (43.3%)</td>
<td>219 (36.3%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Low AR /APER</td>
<td>165 (10.6%)</td>
<td>130 (21.6%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>131 (8.4%)</td>
<td>48 (8.0%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cancer</td>
<td>1252 (80.3%)</td>
<td>480 (79.6%)</td>
<td></td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Diverticular disease</td>
<td>82 (5.3%)</td>
<td>57 (9.5%)</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>IBD</td>
<td>94 (6.0%)</td>
<td>26 (4.3%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Benign Polyp</td>
<td>117 (7.5%)</td>
<td>33 (5.5%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conclusions

• Structured supervised intraoperative training in laparoscopic colorectal surgery was safe for patients
• The learning curve is reduced
• Training improves technical performance and clinical outcomes in ‘sign-off’
• Clinical outcomes are maintained in independent practice