Surviving Catastrophe

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John wasn't actually working in theatre today...

...he just didn't want to talk to anybody.
Surgery for Colon and Rectal Cancer - Surgeon Specific Outcomes Published 2013

Hull & East Yorkshire Hospitals NHS Trust
The Hull & East Yorkshire Hospitals NHS Trust incorporates Hull Royal Infirmary, Castle Hill Hospital Hull.

Mortality by trust

Adjusted 90-day mortality by trust

Mortality by surgeon

Adjusted 90-day mortality by surgeon

http://www.acpgbi.org.uk
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- Reoperation rate 6.5% (15986/246469)
- 14.1% of Trusts outliers for adjusted reoperation rates
- Wide variation between surgeons and institutions
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Value of failure to rescue as a marker of the standard of care following reoperation for complications after resection for colorectal cancer.

- HES data 144542 pts (150 NHS Trusts)
- Risk adjusted mortality 5.4 vs 9.3% (p=0.02)
- Reoperation rate 4.8%
- “Failure to rescue” 11.1 vs 16.8% (p=0.002)


Catastrophe - postoperative Sepsis

- Causes of sepsis post colorectal surgery
- Intra-abdominal complications
  - Leak +/- collection
  - Enterotony
  - Ischaemia
- Respiratory tract infection
- Urinary tract infection
- Intravenous catheter infection
- \textit{C. difficile}
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**Principles**

- Problems start in the operating theatre
- Complications in large part predictable
- Don’t let complications become complicated
  - Early recognition
  - Aggressive management
  - Do only what is necessary at re-operation
## Small Bowel Crohn’s Disease

### Risk factors for intra-abdominal sepsis after surgery for CD
343 pts, 566 operations 1980-1997
13% sepsis rate (leak, abscess, ECF)

<table>
<thead>
<tr>
<th>Independent risk factors</th>
<th>Sepsis rate (pts)</th>
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<tbody>
<tr>
<td>• Preop albumin &lt;30g/l</td>
<td>• 50% if all 4 factors (8/16)</td>
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<tr>
<td>• Preop steroid usage</td>
<td>• 29% if 3 (10/35)</td>
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<tr>
<td>• Abscess at laparotomy</td>
<td>• 14% if 2 (14/98)</td>
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<tr>
<td>• Fistula at laparotomy</td>
<td>• 16% if 1 (33/209)</td>
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<td>• 5% if none (11/208)</td>
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Yamamoto T, Allan RN, Keighley MR
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- Early recognition
- Appropriate decision making
- Facilities to intervene
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- **Anastomotic Leak**
- *Clinical Signs - may be non-specific*
- Clinical leak in 22 of 379 pts (6%) undergoing surgery for CRC
  - 7 (32%) obvious peritonitis
  - 15 (68%) initial misdiagnosis for mean of 4 days (range 0-11), 13 treated for cardiac problems
  - 30 patients (8%) developed cardiac symptoms of whom 13 had a leak

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• Recognition of anastomotic Leak
• **Anticipation**
  • “Off colour”
  • Failure to diurese
  • Prolonged ileus
  • (diarrhoea)
  • Fever
  • Failure to meet milestones
Initial Resuscitation

- Resuscitation should begin as soon as condition is recognised
- In first 6 hours should include all of the following:
  - CVP 8-12mmHg
  - MAP > 65mmHg
  - UO > 0.5ml.kg\(^{-1}\).hr\(^{-1}\)
  - CvO\(_2\) > 70%
- Where lactate elevated targeting resuscitation to normalise lactate

Dellinger et al, Crit Care Med 2013 Vol 41:580-637
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Diagnosis

• Cultures as clinically appropriate before starting antimicrobials

• At least 2 sets of blood cultures (peripheral and central) and from all vascular access sites (unless <48hrs old), before starting antimicrobials

• Antibody assays for candidiasis if suspected

• Imaging studies undertaken promptly to identify source

Dellinger et al, Crit Care Med 2013 Vol 41:580-637
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Antimicrobial therapy

• Appropriate antimicrobial therapy should be started within 1 hour of recognition of septic shock and severe sepsis

• Initial empirical therapy

• Focussed after 48-72 hours
  – ? Monotherapy
  – 7-10 day course

• Stop if non-infective cause found

Dellinger et al, Crit Care Med 2013 Vol 41:580-637
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Source control

- Evaluate all patients for the presence of a focus of infection amenable to ‘source control measures’ (SCM) as rapidly as possible.
- Once a source of infection identified, SCM should be instituted as soon as possible – within 12 hrs if feasible.
- Method of SCM must weigh benefits & risks
- IV access devices should be removed promptly

Dellinger et al, Crit Care Med 2013 Vol 41:580-637
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Abdominal sepsis – methods of source control

- Drainage of localised collection
  - Image guided
  - Transrectal
- **Laparotomy** if generalised contamination

A myriad of factors will influence decision
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“Localised” collection
• Non-specific presentation
• Minimal signs
  - Ileus
  - Organ failure etc

Management
• Drainage
• Antibiotics
• Nutritional support
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Postoperative peritonitis - management

- Rapid resuscitation to enable

- Source control followed by

- Physiological support until recovery (or death)
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Laparotomy for post-operative peritonitis

- Generous access
- Remove particulate matter
- Generous lavage
- Identify source
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Source control at laparotomy for peritonitis

• Enterotomy
  – Exteriorise

• Anastomotic leak
  – Disconnect
  – Bring out one or both end

• **Avoid primary anastomosis/repair**

• **Occasionally** - drainage, lavage, proximal diversion
Postoperative Sepsis

Abominal Closure or laparostomy?

- Consider laparostomy when
  - Can’t close the abdomen
  - Concern over source control
  - Concern over ischaemia

- Beware abdominal compartment syndrome
Kaplan-Meier curves showing survival of patients assigned to the on-demand or planned relaparotomy strategy over 12 months of follow-up. In both groups 1 patient died on the day of the index laparotomy, leaving 111 and 112 patients at risk at day 0, respectively.
Postoperative Sepsis

Aftercare

- ICU support
- Steady improvement or:
- Failure to progress
- +/- Signs ongoing sepsis
- Progressive MOF
- **Usually not a surgically remediable cause**

  - CT scan +/- percutaneous drainage
  - Re-laparotomy
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Summary

• Complications inevitable
• Established guidelines for the care of the septic patient
• “Failure to rescue” important
• “Salvage” requires multidisciplinary approach
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Conclusions

- Problems start in the operating theatre
- Complications in large part predictable
- Don’t let complications become complicated
  - Early recognition
  - Aggressive management
  - Do only what is necessary at re-operation
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Enterocutaneous fistula – early management

• Treat sepsis
• Consider proximal control/exteriorisation
• Feeding line with specialist nursing
• Fluid and electrolyte management
• Specialised skin / stoma care
• Help from fistula unit
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Established enterocutaneous fistula

- Sepsis
- Nutrition
- Anatomy
- Procedure
Postoperative Sepsis

Planned re-laparotomy or laparotomy as required?

- No randomised studies
- Non-significant reduction in mortality with the latter approach
- Little role for scheduled re-laparotomies
- Clear source at first operation