Fast-Tracking the Esophagectomy Patient

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The presenter has no commercial or financial interests or obligations, and is not a paid or unpaid consultant to a commercial entity.
Content

- Fast Track - a new buzzword or true clinical concept?
- What is the evidence that it works?
- What are FT parameters in esophageal resection?
- What do I need to change?
Risk-Adjusted Combined Morbidity/Mortality for Esophagectomy

Standardized Incidence Ratio + 95% CI

MGH

STS National Thoracic Database – Fall 2009
Fast-Tracking
Standardized surgical procedure
Coordination among care personnel
Based on outcomes research
Primary aim to reduce morbidity, shorten recovery

Physician-Directed Critical Pathways
Standardized surgical procedure
Coordination among care personnel
Based on organizational efficiency (TQM)
Primary aim to reduce variation in care, cost

General Goals of Fast-Track

• To subtract from perioperative care what is not essential to recovery

• To add to perioperative care what accelerates recovery and early discharge from hospitalization

• To coordinate the care process among all care personnel

• To replace institutional or individual with national or international standards of care

• To identify who is on the slow track
Fast Tracking After Ivor Lewis Esophagogastrectomy

Successful in 77% of patients

Cerfolio et al., Chest, 2004
Physiologic FT Targets

- Patient expectation and apprehension
- Pain
- Hypothermia
- Pulmonary dysfunction
- Increase of cardiac workload
- Catabolic phase

“Surgical Stress”

Fast-Track: The Example of Colon Resection

Colon Resection
Randomized Clinical Trials 4
Controlled Clinical Trials 7
11 Studies 1021 Patients

Esophageal Resection
Clinical Case Series 3 Studies
260 Patients

<table>
<thead>
<tr>
<th>FT: Care Process Targets After Colon Resection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preop</strong></td>
</tr>
<tr>
<td>Counseling</td>
</tr>
<tr>
<td>Feeding up to 2 hours preop</td>
</tr>
<tr>
<td>Omit bowel prep</td>
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<tr>
<td>Fluid restriction</td>
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<tr>
<td>Symbiotics</td>
</tr>
<tr>
<td>Omit premedication</td>
</tr>
<tr>
<td><strong>Periop</strong></td>
</tr>
<tr>
<td>Epidural analgesia</td>
</tr>
<tr>
<td>Minimal invasive/transverse incisions</td>
</tr>
<tr>
<td>High O2 concentrations</td>
</tr>
<tr>
<td>Prevention of hypothermia</td>
</tr>
<tr>
<td><strong>Postop</strong></td>
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<tr>
<td>Enforced postoperative oral feeding</td>
</tr>
<tr>
<td>Enforced postoperative mobilization</td>
</tr>
<tr>
<td>No routine NG tube</td>
</tr>
<tr>
<td>Early removal of bladder drainage</td>
</tr>
<tr>
<td>No systemic morphine use</td>
</tr>
<tr>
<td>Standard laxatives</td>
</tr>
<tr>
<td>No drains</td>
</tr>
</tbody>
</table>

Fast Track Protocol for Colon Resection

Change in Variables Identified by Meta-Analysis

- Shorter length of initial hospital stay
- Shorter total hospital stay
- Increased readmission rates
- Lower morbidity

Are Colon And Esophageal Resection Comparable?

Care parameters:
- Preoperative counseling
- Perioperative fluid restriction
- Early / immediate extubation
- Nasogastric decompression
- Early enteral alimentation / Early oral alimentation
- Enforced physical mobilization

Operative parameters:
- Minimal invasive vs. open
- Pyloric drainage vs. no pyloric drainage
Potential FT Targets - Esophagectomy

Care parameters:
• Preoperative counseling
• **Perioperative fluid restriction**
• Early / immediate extubation
• **Nasogastric decompression**
• Early enteral alimentation / Early oral alimentation
• Enforced physical mobilization

Operative parameters:
• Minimal invasive vs. open
• Pyloric drainage vs. no pyloric drainage
- Liberal vs. restrictive fixed-volume regimens are poorly defined
- Volumes of liberal and restrictive regimen overlap
- Periods of fluid therapy are inconsistent

Goal-Directed Perioperative Fluid Management

- Individualized goals
  Flow-related parameters: stroke volume optimization
- Fixed goals
  supraphysiologic cardiac index
  systemic O2 delivery (CI x arterial O2 content)
  mixed venous O2 saturation ≥70%
- Monitoring
  PA catheter (MVO2)
  Esophageal Doppler (stroke volume)
  Pulse contour analysis (pulse pressure, CI, stroke volume variation)
Cardiac Index-Directed Operative Fluid Management

Each graph represents one patient.
Data calculated every 20 s from FloTrac device.
X-axis represents duration of operation.

R. Pino, M.D., MGH
Comparing early extubation with mandatory ventilation:

- Lower rate of reintubation (Caldwell)
- Lower rate of prolonged ventilation (Caldwell)
- Shorter ventilation and ICU time (Caldwell)
- Shorter LOS (Caldwell)
- Higher mortality (Bartels): 9.8 vs. 1.9% after transthoracic esophagectomy

FT Target Early Extubation

MGH 102 patients 2 year period
50% neoadjuvant chemoradiation

90% extubated in OR
3 reintubated for respiratory failure
10% delayed extubation

ICU stay 1 day median
Pneumonia 14.7%
Respiratory failure 2.9%
30 day mortality 1.9%

FT Target Early Extubation

Aim: Extubation in OR

Extubation as part of multimodal management:

- Pre-induction thoracic epidural placement
- Intraoperative use epidural
- Forced air warming
- Limit intraoperative fluid administration
- Low dose vasopressors
- Close communication during hand-off of care
- Individualized decision to extubate
FT Target Early Extubation

Newcastle UK    76 patients   8 year period

96% extubated in OR, avoiding ICU
10% (7/73) reintubated for respiratory failure

3% delayed extubation

ARDS         9.2%
Chest infection 7.9%
Hospital mortality 2.6%

Nasogastric Decompression After Esophagectomy

Randomized clinical trial 46 patients
- Left TA approach
- Supraaortic anastomosis
- No pyloric drainage
- Cricothyroid placement of pH probe
- Gastrotracheal reflux: reversible pH<5.5 for >1 min.
- No acid suppression
- Total NG drainage time not stated

Groups:
- Single lumen NG gravity + q 4 H aspiration
- Sump NG
- No NG
- Thoracotomy, lung resection

Nasogastric Decompression After Esophagectomy

Nasogastric Decompression After Esophagectomy

<table>
<thead>
<tr>
<th></th>
<th>Single-lumen tube (n = 11)</th>
<th>Sump-type tube (n = 11)</th>
<th>No tube (n = 12)</th>
<th>Thoracotomy only (n = 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total no. of reflux episodes</td>
<td>117.5 (198)</td>
<td>56.5 (123)</td>
<td>126.5 (303)</td>
<td>1.0 (3)</td>
</tr>
<tr>
<td>Median (i.q.r.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>5–26b</td>
<td>1–280</td>
<td>1/–4/0</td>
<td>0–31*</td>
</tr>
<tr>
<td>No. of reflux episodes &gt; 5 min</td>
<td>14.0 (19)</td>
<td>10.0 (21)</td>
<td>18.8 (11)</td>
<td>0 (1)</td>
</tr>
<tr>
<td>Median (i.q.r.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>0–37</td>
<td>0–31</td>
<td>1–44</td>
<td>0–31*</td>
</tr>
<tr>
<td>Total time pH &lt; 5.5 (min)</td>
<td>1144.5 (1812)</td>
<td>124.0 (581)</td>
<td>1162.5 (1041)</td>
<td>2.5 (10)</td>
</tr>
<tr>
<td>Median (i.q.r.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>3–2573</td>
<td>1–978</td>
<td>16–2701</td>
<td>0–1416*</td>
</tr>
<tr>
<td>Longest reflux episode (min)</td>
<td>339.5 (795)</td>
<td>54.0 (128)</td>
<td>207.0 (339)</td>
<td>1.5 (9)</td>
</tr>
<tr>
<td>Median (i.q.r.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>1–1526</td>
<td>1–389</td>
<td>5–1894</td>
<td>0–340*</td>
</tr>
</tbody>
</table>
# Nasogastric Decompression After Esophagectomy

## Clinical Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Single-lumen tube (n = 11)</th>
<th>Surpr-type tube (n = 11)</th>
<th>No tube (n = 12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient stay (days)*</td>
<td>10-5 (10-12-5)</td>
<td>15 (12-5-18)</td>
<td>15 (12-5-11)</td>
</tr>
<tr>
<td>High-dependency/ICU stay (days)*</td>
<td>2 (2-2)</td>
<td>3 (2-3)</td>
<td>2 (2-11 5)</td>
</tr>
<tr>
<td>Anastomotic leak</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Death</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Respiratory complication</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Gastric dilatation on chest radiograph</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Nasogastric tube (re)inserted</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
</tbody>
</table>
Conclusions:
1. Tracheal aspiration of acid is common
2. Nasogastric decompression lowers total tracheal acid exposure
3. Nasogastric decompression decreases respiratory complications

Next questions:
Minimum duration of NG drainage

Fast Tracking After Esophagectomy

1. Limited evidence after esophagectomy.

2. Potential targets: fluid restriction, nasogastric decompression, and dietary progression.

3. Present differences in operative mortality after esophageal resection cannot be explained by postoperative care alone.

4. STS mortality after esophagectomy is low and postoperative care should be amenable to FT research.
Fast Tracking Cannot Solve All Problems

Different solutions for different problems:

Higher-mortality centers:
Improve patient selection and operative product.

Low-mortality centers:
Fast track research to shorten postoperative recovery.
Individualized care by well-trained surgeons after esophagectomy should not yet be abandoned.
Is Fast Track Based On Existing Scientific Concepts?