Surgery in Frail Elders

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What we’re going to cover

- Mortality after surgery in the elderly
  - Fact v Fantasy
- Recovery after surgery
  - Longer than your surgeon said it was going to be
- What patients value
  - Not always the same as the surgeon
- Room for improvement
  - Where to do we start?
Context

- **Population is aging**
  - 274 million $\rightarrow$ 352 million
  - 13% of population $\rightarrow$ 20% of population

- **An increasing number of very elderly patients will be candidates for major surgery**

- **Are these patients undergoing surgery?**
It’s a cancer, so it has to come out, right?
Some Decisions are Pretty Easy

Colon Cancer
Some Decisions are Pretty Easy
Other Decisions are Not so Easy
O’Connell et al, Ann Surg Oncol, 2004
Assumptions

• Surgery in the elderly is getting safer

• ‘Esophageal resection for carcinoma in patients older than 70 years old.’

• ‘Pancreateicoduodenectomy in the very elderly.’
Are Published Results Generalizable?

- Selective submission, publication bias

- Consider the source
  - Centers of Excellence

- Trial data
  - Sick and elderly patients often excluded

- “Real world” mortality and survival data
  - The ‘benefits’ side of the equation
National Benchmark Data: Mortality after Major Cancer Surgery

- Retrospective cohort study of patients 65+ undergoing major cancer resections (n=14,088)
  - Lung
  - Esophageal
  - Pancreas


- Outcomes
  - Operative mortality
  - 5-year survival

If Elderly Cancer Patients Make It Through Surgery, Do They Survive Long Term?
5 year survival for age 80+ with cancer cohort - Lung, Pancreas and Esophagus
## Comorbidity Counts

<table>
<thead>
<tr>
<th>Cancer</th>
<th>5 year survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lung</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;2 comorbidities</td>
<td>37</td>
</tr>
<tr>
<td>2+ comorbidities</td>
<td>28</td>
</tr>
<tr>
<td><strong>Esophagus</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;2 comorbidities</td>
<td>21</td>
</tr>
<tr>
<td>2+ comorbidities</td>
<td>17</td>
</tr>
<tr>
<td><strong>Pancreas</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;2 comorbidities</td>
<td>18</td>
</tr>
<tr>
<td>2+ comorbidities</td>
<td>5</td>
</tr>
</tbody>
</table>
National Benchmark Data: Discharge Disposition

- Retrospective cohort study of patients undergoing major cancer resections (N= 601,081)
  - Lung
  - Esophageal
  - Pancreas

  - Discharge disposition stratified by age

## Discharge to SNF after Surgery, by age

<table>
<thead>
<tr>
<th>Operation</th>
<th>Age 65-69</th>
<th>Age 70-80</th>
<th>Age 80+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung resection</td>
<td>4%</td>
<td>8%</td>
<td>16%</td>
</tr>
<tr>
<td>Pancreatectomy</td>
<td>8%</td>
<td>16%</td>
<td>24%</td>
</tr>
<tr>
<td>Esophagectomy</td>
<td>6%</td>
<td>12%</td>
<td>30%</td>
</tr>
</tbody>
</table>
OK…but those are big operations.

What about the bread and butter stuff?
GI surgery in NH Residents

- NH residents 65+ undergoing GI surgery in the US
- Medicare inpatient file + MDS (1999-2006), N=70,719
  - Bleeding DU
  - Benign colon disease
  - Cholecystitis
  - Appendicitis
- Operative mortality compared to 1.1 million Medicare beneficiaries 65+

Outcomes of Interest

• Operative mortality
• Secondary interventions
  – Mechanical ventilation
  – Feeding tube placement
  – Tracheostomy placement
## Mechanical Ventilation (%)

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Nursing Home Resident</th>
<th>General Medicare Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding DU</td>
<td>33.2</td>
<td>15.7</td>
</tr>
<tr>
<td>Benign colon disease</td>
<td>20.0</td>
<td>8.4</td>
</tr>
<tr>
<td>Cholecystitis</td>
<td>6.9</td>
<td>2.2</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>11.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Feeding Tube Placement (%)</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nursing Home Resident</td>
<td>General Medicare Population</td>
</tr>
<tr>
<td>Bleeding DU</td>
<td>15.7</td>
<td>7.5</td>
</tr>
<tr>
<td>Benign colon disease</td>
<td>7.6</td>
<td>2.3</td>
</tr>
<tr>
<td>Cholecystitis</td>
<td>2.9</td>
<td>0.4</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>2.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Nursing Home Resident</td>
<td>General Medicare Population</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Bleeding DU</td>
<td>1.3</td>
<td>1.1</td>
</tr>
<tr>
<td>Benign colon disease</td>
<td>1.1</td>
<td>0.8</td>
</tr>
<tr>
<td>Cholecystitis</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
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<td>0.4</td>
<td>0.1</td>
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</tbody>
</table>
What other choice do we have?

• Life and death situations….
• Consider alternative therapies
  – Antibiotics
  – Cholecystostomy tube
  – Colonic stents
  – IR for bleeding
What do we know about the trajectory of recovery after major surgery?
Functional Status after Surgery

- 372 patients age 60+
- Elective major abdominal operations (GS, GYN)
- Functional assessments
  - Preoperative
  - 1, 3, and 6 weeks, 3 and 6 months

What About the Very Frail?

• Nursing home residents undergoing colectomy for cancer

• Medicare claims-linked to nursing home registry (MDS), 1999-2005
  – 6822 residents

• Late mortality

• Functional trajectories
  – MDS-ADL score (high is BAD)
    • 0=independent
    • 28=completely dependent
Functional Trajectory and 1 yr Mortality
Functional Trajectory and Mortality: Stratified by Baseline Function
What outcomes are really valued by older patients with limited life expectancy?
Treatment Preferences in Patients with Limited Life Expectancy

- 226 subjects with limited LE given hypothetical scenarios
- Burden of treatment
  - LOS, testing, invasive procedures
- Expected outcome
  - Restoration of current health
  - Death
  - Functional impairment
  - Cognitive impairment

<table>
<thead>
<tr>
<th>Treatment Intensity</th>
<th>Health Outcome</th>
<th>Wants treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Burden</td>
<td>Return to Current Health</td>
<td>98.7%</td>
</tr>
<tr>
<td>High Burden</td>
<td>Return to Current Health</td>
<td>88.9%</td>
</tr>
<tr>
<td>Low Burden</td>
<td>Functional Impairment</td>
<td>25.6%</td>
</tr>
<tr>
<td>Low Burden</td>
<td>Cognitive Impairment</td>
<td>11.2%</td>
</tr>
</tbody>
</table>
Are These Preferences Stable over Time?
Factors Associated with Participants who Refused Treatment

<table>
<thead>
<tr>
<th>Factor</th>
<th>Participants who refused n (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHF (n=66)</td>
<td>11 (17)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>COPD/Cancer (n=160)</td>
<td>5 (3)</td>
<td></td>
</tr>
<tr>
<td>Wants prognostic Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (n=121)</td>
<td>12 (10)</td>
<td>.02</td>
</tr>
<tr>
<td>No (n=96)</td>
<td>2 (2)</td>
<td></td>
</tr>
<tr>
<td>Self-rated longevity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2 years (n=33)</td>
<td>6 (18)</td>
<td>.02</td>
</tr>
<tr>
<td>≥2 years (n=191)</td>
<td>10 (5)</td>
<td></td>
</tr>
</tbody>
</table>

Rothman et al, J Gen Intern Med, 2007
## Reasons Given for Treatment Refusal

<table>
<thead>
<tr>
<th>Reason</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thought the side effects would be too much</td>
<td>24 (41)</td>
</tr>
<tr>
<td>Thought the treatment would not work</td>
<td>11 (19)</td>
</tr>
<tr>
<td>Did not want to do anything to prolong my life</td>
<td>7 (12)</td>
</tr>
<tr>
<td>Thought I would do better with a different treatment</td>
<td>4 (7)</td>
</tr>
<tr>
<td>Had some other reason</td>
<td>12 (21)</td>
</tr>
</tbody>
</table>

Rothman et al, J Gen Intern Med, 2007
There are Important Differences Between Decisions Made by Elder Patients and Their Surrogates
Patient-Surrogate Agreement about Acceptable Outcomes

- **>80% for health states**
  - Current health, mild memory impairment
  - Coma
- **61-65% for severe pain**
  - Patients/surrogates equally likely to rate as acceptable
- **58-62% for severe functional impairment**
  - Surrogates more likely to rate as acceptable

Fried et al, Arch Intern Med, 2003
How Can We Improve Surgical Care in Frail Elders?
Developing Quality Indicators for Elderly Surgical Patients

- **RAND/UCLA project**
  - Expert panel from surgery, geriatrics, anesthesia, critical care, internal, and rehabilitation medicine
  - Formally rated the indicators using a modification of the RAND/UCLA Appropriateness Methodology
  - Identified 91 candidate indicators rated as valid

Developing Quality Indicators for Elderly Surgical Patients

- 8 Domains
  - Comorbidity assessment
  - Evaluation of elderly issues
  - Medication use
  - Patient-to-provider discussions
  - Intraoperative care
  - Postoperative management
  - Discharge planning
  - Ambulatory surgery

Elderly-Specific Process Measures

• Comorbidity assessment
  – Cardiovascular risk assessment per ACC/AHA guidelines
  – Estimation of creatinine clearance

Elderly-Specific Process Measures

- **Evaluation of elderly issue**
  - Screening: nutrition, cognition, delirium risk, pressure ulcer risk
  - Assessment: ADL, IADL, vision, hearing
  - Referral of patients with impaired cognition, functional status, delirium risk, polypharmacy

Elderly-Specific Process Measures

• Medication use
  – Evaluation of medication and polypharmacy
  – Avoid delirium-triggering medications
  – Avoid potentially inappropriate medications (PIMs)

Elderly-Specific Process Measures

- **Patient-to-provider discussions**
  - Assess patient’s decision-making capacity
  - Specific discussions on expected functional outcomes
  - Advanced directives: life-sustaining preferences, surrogate decision maker
  - Clarify goals of care

Elderly-Specific Process Measures

• Intraoperative factors
  – Prevention of hypothermia
  – Time limitations for laparoscopic surgery

Elderly-Specific Process Measures

- **Postoperative management**
  - Prevent: malnutrition, delirium, deconditioning, pressure ulcers, infection
  - Daily screening for postoperative delirium
  - Make staff aware of hearing/vision impairment
  - Patient access to glasses, hearing aid, dentures
  - Infection prevention: remove lines, foley
  - Early mobilization

Elderly-Specific Process Measures

- Discharge planning
  - Education about medications
  - Social support evaluated prior to operation
  - Home health visit within 3 days of discharge
  - Assess nutrition, cognition, ambulation, and ADLs prior to discharge
  - Communication with primary MD about surgery

Elderly-Specific Process Measures

• Ambulatory surgery
  – Assessment of readiness for discharge using validated post anesthesia scoring system
  – Follow-up phone call within 24 hours of surgery

So...
How Are We Doing?
Inappropriate Medication Use in Older Adults Undergoing Surgery

- Retrospective cohort study of 272,351 elders (65+) undergoing surgery
  - Abdominopelvic, orthopedic surgery

- Nationally representative Perspective database (2006-2008)

- Outcome of interest
  - Receipt of PIM during surgical hospitalization
    - Always avoid
    - Rarely appropriate
    - Some indications

Frequency of PIM Use

• Overall, 55% of elders received a PIM
  – Always avoid 18%
    • Meperidine 13%
  – Rarely appropriate 9%
    • Diazepam 3%
  – Some indications 43%
    • Diphenhydramine 22%
    • Promethazine 19%

Distribution of PIM and Meperidine Prescribing Rates Across Hospitals
Summary

• Nationwide, operative mortality remains high and survival is low among the very elderly undergoing major cancer surgery

• Even for less complex procedures, mortality is very high in frail patients

• Functional recovery after major surgery is protracted in elders

• Patients with poor prognosis value function, cognition, and quality of life very highly
Implications

• Comprehensive assessment
  – Medical
  – Functional
  – Cognitive

• Realistic expectations essential for true informed consent

• Need for multidisciplinary approach