Preoperative Evaluation of Elderly Patients in 2017

Fred Rubin, MD
Professor of Medicine
University of Pittsburgh
The New Imperative

Traditional Pre-Op Evaluation

Co-management with surgeons

Geriatric Pre-Op Evaluation

Bundled payments from Medicare

Patient Safety Initiatives
Objectives for today

• Multidimensional elements of pre-op evaluation of elderly people
• Appreciate central role of functional status and frailty in prognosis
• Useful tools in pre-op evaluation
• Updated approach to cardiac risk
Background:
Patients over age 65

- 13% of population, but 35% of all surgeries
- 48% of inpatient days
- Longer LOS
- Increased risk of functional decline
- Overall perioperative mortality 3-5%, versus <1% for age < 65
- Wide spectrum of fitness among elderly
Question:
which of these is most predictive of 30 day mortality post-op?

• Cardiac risk factors
• Patient age
• Presence of co-morbidities
• Functional status of patient
• Something else
Factors influencing the risk of surgery

• Type of procedure
  – Intra-abdominal, intra-thoracic, vascular
• Elective or emergency
• Co-morbidities
• Functional status/frailty
• Age
  – The least important of these, but still an independent risk.
80 year old woman

Chief complaint: left knee pain

History of Present Illness: Gradually worsening pain for 5 years, now interfering with walking. Uses a cane. Has had 3 falls from knee “giving way”. Ortho recommends TKR.

Past Medical History:

• Hypertension
• Hyperlipidemia
• Obesity
• COPD. Quit smoking 20 years ago. FEV1 65% predicted several years ago.
80 year old woman

Medications:

- HCTZ 25 mg qd
- amlodipine 5 mg qd
- simvastatin 40 mg qhs
- fluticasone/salmeterol (Advair) 250/50 1 puff q12h
- albuterol inhaler 2 puffs q4h prn

Allergies: none

Social History: Lives alone. Can climb one flight of stairs.
80 year old woman

Exam:

ht 5’3”, wt 170# (BMI 30), b.p. 150/80, P 80, R 16
awake & alert, MMSE 23/30
lungs clear, but decreased air entry bilaterally
heart in NSR, Grade 2/6 SEM at right 2\textsuperscript{nd} ICS
left knee enlarged, mildly valgus, no warmth

Lab:

BUN 21, creatinine 1.5
CBC, LFTs, PT, PTT, EKG, urinalysis all normal
What are the issues?

- Cardiac
  - Possible CAD
  - Possible aortic stenosis
  - High blood pressure, presently 150/80

- Pulmonary
  - Known COPD, but stable

- Renal
  - Creatinine 1.5
When to delay surgery?

- Systolic blood pressure < 90 or > 180
- AF or SVT > 121
- Pneumonia with fever
- New MI on EKG
- Acute CHF
- Respiratory failure: pO2 < 60 or pCO2 > 55
- Na < 125 or > 155. K < 2.5 or > 6.1
- Glucose > 600. Hgb < 7.5 gm
- BUN > 50 or creatinine > 2.6 without history of CKD

Recent ischemic stroke

• Danish cohort study of all patients > 20 undergoing elective noncardiac surgery between 2005-2011. n = 481,183

• Outcomes: risk of major adverse cardiovascular events (MACE) and all cause mortality up to 30 days post-op

• Odds ratio approximately triple for 9 months after an acute ischemic stroke

Jorgensen, ME et al. JAMA 2014;312(3):269-277.
Recent cardiac event

- Delay surgery if acute M.I. within 4-6 weeks
- Delay surgery if bare metal stent PCI within 30 days or DES within 6 months. Aspirin (without P2Y12 inhibitor) should be continued through surgery, if possible.

Geriatric Issues

• Life expectancy
• Functional status/frailty
• Personal values and goals of care
  – Advance directive?
• Competency to give informed consent
  – Has cognition been evaluated?
• Signs of depression?
• Polypharmacy, OTC medications or alcohol?
• Pre and post-hospitalization rehab needs
<table>
<thead>
<tr>
<th>age</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>76.2</td>
<td>81.0</td>
</tr>
<tr>
<td>65</td>
<td>17.7</td>
<td>20.3</td>
</tr>
<tr>
<td>70</td>
<td>14.2</td>
<td>16.5</td>
</tr>
<tr>
<td>75</td>
<td>11.0</td>
<td>12.9</td>
</tr>
<tr>
<td>80</td>
<td>8.2</td>
<td>9.7</td>
</tr>
<tr>
<td>85</td>
<td>5.8</td>
<td>6.9</td>
</tr>
<tr>
<td>90</td>
<td>4.1</td>
<td>4.8</td>
</tr>
<tr>
<td>95</td>
<td>2.9</td>
<td>3.3</td>
</tr>
<tr>
<td>100</td>
<td>2.1</td>
<td>2.3</td>
</tr>
</tbody>
</table>
Global indices of risk

• ASA scale
  – Ref: Dripps, Anesthesiology, 1963
• Functional status > 4 METS
  – Ref: ACC/AHA Guidelines, 2014
• Frailty indices
• Gait speed
• ACS NSQIP surgical risk calculator
  – Includes cardiac risk evaluation
ASA scale

• 1 = normal healthy individual
• 2 = mild systemic disease (x: HTN)
• 3 = severe systemic disease (x: CAD)
• 4 = incapacitating systemic disease that is a constant threat to life (x: CHF)
• 5 = moribund and not expected to live
• 6 = organ donor
• Add E to any class for emergency surgery
ASA III patients by functional status versus mortality

Frailty predicts surgical outcomes

• Chronological age and physiological age are not the same

• “frailty” can be measured:
  – Unintentional weight loss of >10 pounds
  – Decreased grip strength
  – Feelings of exhaustion
  – Low level of physical activity
  – Slowed walking speed

Frailty predicts surgical outcomes

• Preoperative frailty was associated with increased risk for postoperative complications, longer LOS, and increased risk for transfer to a nursing home

• Frailty index improves the predictive power of other indices
  – ASA scale
  – Revised Cardiac Risk Index

Frailty predicts post-operative mortality at one year


Bars represent numbers of patients (and deaths); black line, mortality rate. As scores increase, the occurrence of the primary outcome (death) increased, and the slope for mortality rates suddenly became steep for patients with scores of 5 or above.
Slow gait speed predicts increased post-op risk in cardiac surgery

Slow gait speed predicts increased post-op risk in cardiac surgery

Gait Speed measurement

• I. Timed Up and Go (TUG)
  – Rise from chair, walk 3 meters, turn, return and sit back down.
  – Slow = greater than 15 seconds

• II. Timed walk
  – Walk 4 meters
  – Slow = greater than 0.8 m/sec

• Both require a stop watch, but are office measurements
UPMC Center for Pre-Surgical Care

• Still in pilot phase at SHY, only for surgical oncology patients
• Based on Risk Analysis Index (RAI) developed from VASQIP
• Questionnaire score 0-81.
  – >21 = frailty trigger
• Evaluating usefulness of hand dynamometer, MiniCog and TUG
• Frailty → Anesthesiologist evaluation
Prehabilitation

- Anesthesiologist may consult cardiology, pulmonology, PCP, nutrition, PT
- Quit smoking
- Reduce polypharmacy
- Physical conditioning
- Palliative care consult when appropriate
- VA multi-site data shows reduced peri-op, 30 day, 180 day, and 365 day mortality
Risk Assessment Index

• Online calculator based on Gagne Index
• Combines the Charlson and Elixhauser scores
• Includes presence of metastatic cancer, CHF, dementia, renal failure, weight loss, hemiplegia, alcohol abuse, and 13 others
• Predicts 1 year mortality with C-statistic 0.79

ACS NSQIP surgical risk calculator

- 1,414,006 patients in 393 hospitals from 2009-2012
- Input 21 variables into web-based tool
- Include age, sex, functional status, ASA status, and medical comorbidities, but does not include cognitive status or NSTEMI. May underestimate risk.
- riskcalculator.facs.org
- Could promote shared decision making

Surgical Risk Calculator

Enter Patient and Surgical Information

- Procedure
  - Begin by entering the procedure name or CPT code. One or more procedures will appear below the procedure box. You will need to click on the desired procedure to properly select it. You may also search using two words (or two partial words) by placing a '+' in between, for example: "cholecystectomy+cholangiography"
  - Clear
  - Reset All Selections

- Are there other potential appropriate treatment options?
  - Other Surgical Options
  - Other Non-operative options
  - None

Please enter as much of the following information as you can to receive the best risk estimates. A rough estimate will still be generated if you cannot provide all of the information below.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Under 65 years</th>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Female</td>
<td>Hypertension requiring medication</td>
</tr>
<tr>
<td>Functional status</td>
<td>Independent</td>
<td>Previous cardiac event</td>
</tr>
<tr>
<td>Emergency case</td>
<td>No</td>
<td>Congestive heart failure in 30 days prior to surgery</td>
</tr>
<tr>
<td>ASA class</td>
<td>Healthy patient</td>
<td></td>
</tr>
</tbody>
</table>
80 year old woman

- Per ACS NSQIP risk calculator:
  - Serious complication risk 6.3%
  - Any complication risk 7.8%
  - Death risk < 1%
  - Discharge to post-acute care risk 54%

- Graphic of risks can be printed for patient and family to review
Cardiac Evaluation

• CAD:
  – RCRI (Revised Cardiac Risk Index)
  – One point for each:
    • High risk surgery
    • Known ischemic heart disease
    • History of CHF
    • History of stroke
    • Diabetes, on insulin
    • Serum creatinine > 2.0
  – Ref: Lee et al. Circulation 1999;100:1043-1049
  – Cohort was mostly younger patients undergoing elective surgery
RCRI Score

Updated scoring system

<table>
<thead>
<tr>
<th>RCRI score</th>
<th>Risk of Major Cardiac Outcomes (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.4% (0.1-0.8)</td>
</tr>
<tr>
<td>1</td>
<td>1% (0.5-1.4)</td>
</tr>
<tr>
<td>2</td>
<td>2.4% (1.3-3.5)</td>
</tr>
<tr>
<td>&gt;3</td>
<td>5.4% (2.8-7.9)</td>
</tr>
</tbody>
</table>

Devereaux, PJ et al., CMAJ 2005;173(6):627-634.
Cardiac Evaluation

• Gupta risk calculator
  – Multivariate analysis based on ACS 2007 National Surgical Quality Improvement Program database, including 183 hospitals and 211,410 patients.
  – Validated on 2008 database
  – Endpoints: peri-op MI or cardiac arrest within 30 days of surgery
  – Variables did not include results of stress test, echo, use of beta blocker, NSTEMI, or presence of aortic valve disease (not in NSQIP database).
  – May under-estimate risk
Cardiac Evaluation

• Gupta risk calculator:
  – Presence of CHF or diabetes were not predictive
  – 5 key variables:
    • Type of surgery
    • Dependent functional status
    • Elevated creatinine
    • ASA class
    • Age
  – C statistic 0.88 (versus 0.75 for the RCRI)
Cardiac Evaluation

• Gupta risk calculator:
  – For our patient, risk of MI or cardiac arrest following TKR is 0.74%
  – Available for smartphone in QxCalculate app


Caveat: all risk calculators provide guidelines only, and do not replace clinical judgment
Who needs a pre-op stress test?

- Patient calculated risk of peri-op major adverse cardiac event (MACE) >1%
- Poor functional capacity: unable to exercise to 4 METS
- Proposed procedure is intermediate or high risk
- AND, information from stress test would affect management

Fleisher, LA et al., J Am Coll Cardiol. 2014;64(22):e77-e137. doi:10.1016/j.jacc.2014.07.944
Beta-blockers: ACC/AHA guidelines

• Continue for patients already on a beta-blocker (Class I recommend.)
• “it may be reasonable” to begin pre-op in a high risk patient and high risk surgery, but initiate at least several days pre-op (Class IIb recommendation)

Perioperative Statin Therapy: the ACC/AHA guidelines

- Continue in patients already on statin
- Perioperative initiation of statin is reasonable in patients undergoing vascular surgery
- Perioperative initiation of statin “may be considered” in patients with clinical indications and high risk procedures

Fleisher, LA et al., J Am Coll Cardiol. 2014;64(22):e77-e137. doi:10.1016/j.jacc.2014.07.944
Peri-op statin use

• Retrospective observational cohort analysis of 180,478 pts for noncardiac surgery from VASQIP database
• Administrative data to identify pts on statin
• 30 day all-cause mortality reduced in statin group to 0.82. NNT 244.
• Reduced risk for any complication to 0.82. NNT 67.

STOP-BANG screen for OSA

• Snoring loudly
• Tired or sleepy in daytime
• Observed apnea during sleep
• High blood Pressure
• BMI > 35
• Age > 50
• Neck circumference > 40 cm
• Male Gender
STOP-BANG and OSA

• 3-4 points = intermediate risk
• ≥ 5 points = high risk
• Pre-op consideration of CPAP, weight loss, quit smoking, oral appliance
• Intra-op: GA with intubation safer than moderate or deep sedation
• Post-op: observe in PACU. Consider CPAP or ICU. Limit sedation.

Summary

• Traditional pre-op evaluation inadequate for complex elderly patients.
• Consider functional status, frailty, life expectancy, personal values
• Shared decision-making for risks/benefits
• Consider both short-term post-op hazards and longer term potential declines in function and in cognition.
Complications are common

- Symptomatic cardiac event: 1-2%
  - Half are fatal
- DVT: 20-70% (without prophylaxis)
- Fall: 2-12%
  - One third are injurious
- Delirium: 20-90%
- Post-operative cognitive dysfunction: 40%
- Pressure ulcer: 15%
- Nosocomial infection 17%
- Deconditioning: 100%
Best reference:


• https://www.facs.org/quality-programs/acsnsqip/geriatric-periop-guideline