Perioperative Care of Older Adults

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We have no disclosures.
Objectives

- Recognize the challenges that a growing population of older adults poses for our current system of perioperative care

- Explain how a geriatrics preoperative assessment differs from a traditional preoperative assessment

- List the risk factors for postoperative delirium and describe how to identify and prevent postoperative delirium

- Discuss several models of care which address optimal perioperative care of the older adult
The US Population is Aging

- All Baby Boomers will be over the age of 65 by 2030
- At that point, 1 in 5 US residents will be over the age of 65
- Older adults are projected to outnumber children by 2035
Life Expectancy Gains in Late Life

<table>
<thead>
<tr>
<th>Age and year</th>
<th>Group 1: Non-Hispanic White and Asian or Pacific Islander</th>
<th>Group 2: Non-Hispanic Black and American Indian or Alaska Native</th>
<th>Group 3: Hispanic (of any race)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Males</td>
</tr>
<tr>
<td>Age 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>77.1</td>
<td>81.7</td>
<td>71.7</td>
</tr>
<tr>
<td>2050</td>
<td>82.2</td>
<td>86.2</td>
<td>79.0</td>
</tr>
<tr>
<td>Age 65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>18.1</td>
<td>20.7</td>
<td>16.3</td>
</tr>
<tr>
<td>2050</td>
<td>20.6</td>
<td>23.5</td>
<td>19.2</td>
</tr>
<tr>
<td>Age 85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>6.0</td>
<td>7.1</td>
<td>6.3</td>
</tr>
<tr>
<td>2050</td>
<td>7.0</td>
<td>8.5</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 2012 National Projections.
Increasing Prevalence of Chronic Conditions

Projected Growth in Population With Chronic Conditions, 2013–25

- History of stroke
- History of heart attack
- Cardiovascular disease
- Diabetes
- Hypertension
- Arthritis
- Dyslipidemia
- Total US population
- Asthma

Source: Health Care Demand Microsimulation Model projections.
Surgical Demographic

2010 costs of hospital charges with OR procedures
Patients over 65: $72 billion

Surgical Specialty | Age > 65 years
--- | ---
Cardiovascular | 51%
Thoracic | 48%
Urologic | 45%
Gastrointestinal | 43%
Orthopedic | 39%
Ophthalmologic | 34%
All | 35%

Ages >65: 37%
Ages 0 – 65: 63%

CDC. National Hospital Discharge Survey. United States, 2010
Surgical Outcomes in Older Adults

• Length of stay increased for increased decade in age
• Patients >80 had >1 day increase in LOS relative to other age groups
• Patients >80 were less likely to be discharged to their previous residence
The Coalition for Quality in Geriatric Surgery Project

- Project supported by the John A. Hartford Foundation and the American College of Surgeons (ACS)
- Goal is to improve surgical care for older adults
- Focus on developing patient-centered outcome measures – NSQIP Geriatric Surgery Pilot Project (26 centers collecting data in the following domains: cognition, decision-making, function and mobility)
- Creation of expert guidelines
Traditional Preoperative Assessment

- Assessment of cardiovascular and pulmonary risk
- Evaluation/optimization of other medical conditions
- Perioperative medication management
- Perioperative anticoagulation management
Geriatrics Preoperative Assessment

- All of the components of a traditional preoperative assessment AND
  - Evaluation of the patient’s goals and expectations for surgery
  - Evaluation of cognitive status and capacity to consent to the procedure
  - Screening for depression
  - Evaluation of nutritional status
  - Evaluation of functional status/falls
  - Evaluation of family and social support
  - Evaluation of frailty
  - Assessment of the patient’s risk of developing postoperative delirium
  - Advanced directives/Medical Power of Attorney
  - Focus on high risk medications and management of polypharmacy
  - Ideally would occur in a multidisciplinary setting (creation of care plan would include surgeon, anesthesiologist, physical therapist, nutritionist, social work, geriatrician, etc)

ACS NSQIP®/AGS
BEST PRACTICE GUIDELINES:
Optimal Preoperative Assessment of the Geriatric Surgical Patient

OPTIMAL PERIOPERATIVE MANAGEMENT
OF THE GERIATRIC PATIENT:
Best Practices Guideline from ACS NSQIP®/American Geriatrics Society

American College of Surgeons
Inspiring Quality: Highest Standards, Better Outcomes

AGS Geriatrics Healthcare Professionals
Leading Change, Improving Care for Older Adults.
Patient Goals and Preferences

- Discuss the patient’s goals for surgery and expectations for recovery/rehabilitation

- Discuss Advance Directives and Medical Power of Attorney

Example of a Best Case/Worst Case graphic aid that the surgeon would create and use during a decision-making discussion for an older patient with a serious surgical problem. The box represents the worst case scenario, the star represents the best case scenario, and the oval indicates the most likely outcome. ICU indicates intensive care unit.

Baseline Cognition

- Assessment of baseline cognition – AGS/NSQIP guidelines recommend Mini-Cog and referral to geriatrician/PCP if positive; SLUMs/MOCA are reasonable alternatives

- Assessment of capacity to consent to the surgical procedure
Frailty

State of decline and vulnerability related to age; reduced reserve and ability to tolerate stressors

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shrinkage</td>
<td>Unintentional weight loss ≥10 pounds in past year</td>
</tr>
<tr>
<td>Weakness</td>
<td>Decreased grip strength</td>
</tr>
<tr>
<td>Exhaustion</td>
<td>Self-reported poor energy and endurance</td>
</tr>
<tr>
<td>Low physical activity</td>
<td>Low weekly energy expenditure</td>
</tr>
<tr>
<td>Slowness</td>
<td>Slow walking</td>
</tr>
</tbody>
</table>

**Interpretation of the Frailty Score**

The patient receives 1 point for each criterion met.

- 0–1 = Not Frail
- 2–3 = Intermediate Frail (Pre-frail)
- 4–5 = Frail

Fried’s Frailty

Frailty present in
- 7% of population >65
- 26% of population >85

Frailty predictive of
- Death
- Hospitalizations
- Falls
- Disability


Slide courtesy of Tom Dalton
<table>
<thead>
<tr>
<th></th>
<th>Intermediately Frail</th>
<th>Frail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative Complications</td>
<td>OR 2.06 (95% CI 1.18-3.60)</td>
<td>OR 2.54 (95% CI 1.12-5.77)</td>
</tr>
<tr>
<td>Length of Stay</td>
<td>Incidence rate ratio 1.49 (95% CI 1.24-1.80)</td>
<td>Incidence rate ratio 1.69 (95% CI 1.28-2.23)</td>
</tr>
<tr>
<td>Discharge to SNF or ALF</td>
<td>OR 3.16 (95% CI 1.0-9.99)</td>
<td>OR 20.48 (95% CI 5.54-75.68)</td>
</tr>
</tbody>
</table>

Intraoperative management

- Consider regional anesthetic techniques
- Multimodal, opioid-sparing analgesic techniques
- Assessment of risk for postoperative nausea and vomiting and implement prevention techniques
- Positioning to avoid pressure ulcers and nerve injury
- Prevent postop pulm complications and hypothermia
- Conservative intraoperative fluid management - maintain normovolemia

Many recommendations overlap with Enhanced Recovery After Surgery (ERAS) Protocols

Postoperative Management

Delirium and cognitive impairment
Perioperative pain management
Pulmonary complications
Fall Risk
Nutrition
UTI Prevention
Functional Decline
Pressure Ulcers

Delirium: A Definition

Acute disorder of attention and cognition

“Acute brain failure”

DSM-5 Criteria

- Disturbance in attention and awareness
- Disturbance develops over a short period of time, represents an acute change from baseline and tends to fluctuate in severity over the course of a day
- An additional disturbance in cognition
- The disturbances are not better explained by a pre-existing, established or evolving neurocognitive disorder and do not occur in the context of severely reduced level of arousal such as coma
- There is evidence from the history, physical examination or laboratory findings that the disturbance is a direct physiological consequence of another medical condition, substance intoxication or withdrawal (i.e. due to a drug of abuse or to a medication), or exposure to a toxin, or is due to multiple etiologies.
Rates of Postoperative Delirium by Specialty

<table>
<thead>
<tr>
<th>Specialty</th>
<th>N (Postop Delirium)/ N (Total)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall (all specialties)</td>
<td>2427/20,212</td>
<td>12.0</td>
</tr>
<tr>
<td>Cardiothoracic surgery</td>
<td>71/520</td>
<td>13.7</td>
</tr>
<tr>
<td>Orthopedic surgery</td>
<td>1217/9384</td>
<td>13.0</td>
</tr>
<tr>
<td>General surgery</td>
<td>743/5728</td>
<td>13.0</td>
</tr>
<tr>
<td>Vascular surgery</td>
<td>220/1934</td>
<td>11.4</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>90/1119</td>
<td>8.0</td>
</tr>
<tr>
<td>Plastics and otolaryngology</td>
<td>9/127</td>
<td>7.1</td>
</tr>
<tr>
<td>Urology</td>
<td>39/594</td>
<td>6.6</td>
</tr>
<tr>
<td>Gynecology</td>
<td>38/806</td>
<td>4.7</td>
</tr>
</tbody>
</table>
Table 4. Association of Adverse Hospital Outcomes by Complication and Delirium Status\textsuperscript{a}

<table>
<thead>
<tr>
<th>Status</th>
<th>Adjusted Relative Risk (95% CI)\textsuperscript{b}</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length of Stay &gt;5 d</td>
</tr>
<tr>
<td>No complications or delirium (n = 404)</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>Complications only (n = 27)</td>
<td>2.8 (1.9-4.0)</td>
</tr>
<tr>
<td>Delirium only (n = 115)</td>
<td>1.9 (1.4-2.7)</td>
</tr>
<tr>
<td>Complications and delirium (n = 20)</td>
<td>3.4 (2.3-4.8)</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Adjusted for age, sex, race, Charlson Comorbidity Index score, surgery type (orthopedic vs all others), and anesthesia type (general vs spinal).

\textsuperscript{b} Relative risks were calculated with a generalized linear model, Poisson error term, log-link, and robust error variance.

<table>
<thead>
<tr>
<th>Major Complications, Excluding Delirium</th>
<th>Patients, No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstable arrhythmia&lt;sup&gt;a&lt;/sup&gt;</td>
<td>23 (4.1)</td>
</tr>
<tr>
<td>New heart block&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td>NSTEMI</td>
<td>4 (0.7)</td>
</tr>
<tr>
<td>Respiratory failure&lt;sup&gt;c&lt;/sup&gt;</td>
<td>11 (1.9)</td>
</tr>
<tr>
<td>Pulmonary embolism</td>
<td>5 (0.9)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>2 (0.4)</td>
</tr>
<tr>
<td>Sepsis</td>
<td>2 (0.4)</td>
</tr>
<tr>
<td>New renal failure&lt;sup&gt;d&lt;/sup&gt;</td>
<td>2 (0.4)</td>
</tr>
<tr>
<td>Stroke</td>
<td>2 (0.4)</td>
</tr>
<tr>
<td>Surgical complications&lt;sup&gt;e&lt;/sup&gt;</td>
<td>8 (1.4)</td>
</tr>
<tr>
<td>Any complication</td>
<td>47 (8.3)</td>
</tr>
</tbody>
</table>

Abbreviation: NSTEMI, non-ST segment elevation myocardial infarction.

<sup>a</sup> New atrial fibrillation and/or flutter or other supraventricular tachycardia requiring treatment.

<sup>b</sup> Requiring a pacemaker.

<sup>c</sup> Includes pulmonary edema, respiratory distress, reintubation, and inability to wean from a ventilator.

<sup>d</sup> Requiring dialysis.

<sup>e</sup> Surgical wound infection, surgery-specific complications, and unplanned return to the operating room.
Expected scores on the MMSE after Cardiac Surgery in Patients with and those without Postoperative Delirium

-225 patients over the age of 60 planned to undergo CABG or valve replacement; patients assessed preoperatively, daily during hospitalization beginning hospital day 2, and at 1, 6 and 12 months post-op; delirium assessed using CAM

-patients without delirium returned to preoperative level of cognitive function by one month post-op

-patients with delirium had not returned to their baseline cognitive function at one year post-op

-Bottom line: Delirium can have long term impact on cognition

Saczyinski et al, NEJM 2012
Predisposing Factors

Dementia
Cognitive Impairment
History of Delirium
Functional Impairment
Visual Impairment
Hearing Impairment
Comorbidity or severity of Illness
Depression
History of Transient Ischemia or Stroke
Alcohol Abuse
Older age
Precipitating Factors

Drugs
Use of Physical Restraints
Use of a Bladder Catheter
Electrolyte Imbalances
Iatrogenic events
Surgery/Trauma
Uncontrolled pain
Constipation/Urinary Retention
Immobility
Hospital
Confusion Assessment Method (CAM)

1) Acute Onset and Fluctuating Course

2) Inattention

3) Disorganized Thinking

4) Altered Level of Consciousness

1 And 2 and 3 Or 4

Sensitivity 94%
Specificity 89%

Delirium as a Quality Indicator

Berian JR et al. Annals of Surgery. 2018
Delirium Prevention

- Identify any potentially modifiable risk factors (ex. high risk medications, untreated depression, inadequately controlled preoperative pain)

-Family Education
  ◦ High rates of postoperative delirium
  ◦ Encourage family at bedside
  ◦ Bring eye glasses, hearing aides and dentures to the hospital
  ◦ Encourage adequate PO intake
  ◦ The importance of pain control
  ◦ The importance of mobility
  ◦ Stay awake during the day and sleep at night
  ◦ Discontinue/avoid high risk medications (eg benzos and anticholinergics)

-Education of the Health Care Team
  ◦ Avoid high risk medications
  ◦ Maintain adequate nutrition/hydration/oxygenation
  ◦ Minimize tethers
  ◦ Pain management

Exemplary Perioperative Models

- Proactive care of older people undergoing surgery – “POPS”
- England, 2007

**Design:**
- Before and after
- Consecutive patients undergoing elective orthopedic surgery

**Subjects:**
- 54 consecutive patients, age 65+
- Compared to 54 consecutive pre-intervention patients
- Post-intervention group had slightly more comorbidities (HTN and CKD statistically significant)

Harari et al. Age and Ageing. 2007;36:190-96
POPS Preoperative Intervention

**Assessment:**
- Abbreviated mental status score
- GDS
- Barthel index (ADLs)
- TUGT, 180-degree turn
- BMI
- Continence screen
- Orthostatic vitals
- Numeric pain score
- Peak expiratory flow rates

**Team:**
- Geriatric nurse*
- Occupational therapist*
- Geriatrician (consultant)
- Physical therapist
- Social worker

**Targeted treatment:**
“Identified issues and medical co-morbidities (e.g. HTN, ischemic heart disease, COPD, diabetes, anemia) were optimised according to evidence-based practice.”

**Management plans and goals** agreed upon with the patient and disseminated to the team within 48hrs.

**Most patients received home visits by OT and PT providing aid and equipment.**

**All patients received education in optimizing post-op recovery: pre-op home exercises and nutrition, relaxation and pain mgmt techniques.**

**Pre-op plan used to plan post-op discharge needs.**

Harari et al. Age and Ageing. 2007;36:190-96
POPS - outcomes

Medical complications

Harari et al. Age and Ageing. 2007;36:190-96
POPS - outcomes

Process Measures

- D/C delayed due to medical comp's
- D/C delayed due to slow rehab
- D/C delayed due to equipment needs
- Mean LOS

Harari et al. Age and Ageing. 2007;36:190-96
Exemplary Perioperative Models

- Perioperative Optimization of Senior Health – “POSH”
- Duke University Medical Center and Durham VA Medical Center
- Multidisciplinary collaborative care model
- Bridges the perioperative period
POSH

Geriatrics pre-op:
- Comprehensive assessment
- Risk factor identification and modification
- Medication and disease management
- Delirium prevention education for family
- Seamless communication between IDT, patient/family, and inpatient providers

Geriatric comanagement:
- Medication stewardship
- Delirium prevention
- Medical management
- Mobilization and maintenance of function
- Care transition
POSH Outcomes

2a. Median Length of Stay

- Days
  - Historical Controls: 6.0
  - POSH: 4.0

2c. Readmission at 7 Days and 30 Days

- Percent
  - 7 Days: 9.9% vs. 2.8%
  - 30 Days: 18.3% vs. 7.8%

Questions?