ACS/AGS Best Practices Guideline

Optimal Preoperative Assessment of the Geriatric Surgical Patient

Warren B. Chow, MD, MS, MSHSOR

ACS NSQIP National Conference
July 22, 2012
Optimal Preoperative Assessment of the Geriatric Surgical Patient: A Best Practices Guideline from the American College of Surgeons National Surgical Quality Improvement Program and the American Geriatrics Society

Warren B Chow, MD, MS, MS, Ronnie A Rosenthal, MD, MS, FACS, Ryan P Merkow, MD, MS, Clifford Y Ko, MD, MS, MSHS, FACS, Nestor F Esnaola, MD, MPH, MBA, FACS

The population of the United States (US) is growing and aging. The US Census Bureau projects that the number of Americans age 65 years and older will more than double between 2010 and 2050. The percentage of Americans 65 and older will grow from 13% to more than 20% of the...

GERIATRIC SURGERY EXPERT PANEL
Recognizing the necessity for quality improvement in the geriatric surgical care, the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) and the American Geriatrics Society (AGS) col...
Expert Panel

Co-chairs:
• Nestor F. Esnaola, MD, MPH, MBA, FACS
• Ronnie A. Rosenthal, MD, MS, FACS

Members:
• Martin A. Makary, MD, MPH, FACS
• J. Patrick O’Leary, MD, FACS
• Walter E. Pofahl II, MD, FACS
• Peter Pompei, MD, FACP
• Karen E. Richards, BA
• Thomas N. Robinson, MD, MPH, FACS
• Nestor F. Esnaola, MD, MPH, MBA, FACS
• Ronnie A. Rosenthal, MD, MS, FACS
• James W. Davis, Jr., MD, FACP
• George W. Drach, MD, FACS
• Emily V.A. Finlayson, MD, MS, FACS
• Evelyn C. Granieri, MD, MPH, MSEd
• Mark R. Katlic, MD, MMM, FACS
• Clifford Y. Ko, MD, MS, MSHS, FACS
• Sandhya A. Lagoo-Deenadayalan, MD, PhD, FACS
• Nancy E. Lundebjerg, MPA
• Jeffrey H. Silverstein, MD, CIP
• Julie A. Sosa, MD, MA, FACS
• Lisa M. Walke, MD
• Michael E. Zenilman, MD, FACS
In addition to conducting a complete and thorough history and physical examination of the patient, the following assessments are strongly recommended:

☐ Assess the patient’s **cognitive ability** and **capacity** to understand the anticipated surgery.

☐ Screen the patient for **depression**.

☐ Identify the patient’s risk factors for developing postoperative **delirium**.

☐ Screen for **alcohol** and other **substance abuse/dependence**.

☐ Perform a preoperative **cardiac** evaluation according to the American College of Cardiology/American Heart Association algorithm for patients undergoing noncardiac surgery.

☐ Identify the patient’s risk factors for postoperative **pulmonary** complications and implement appropriate strategies for prevention.

☐ Document **functional status** and history of **falls**.

☐ Determine baseline **frailty** score.

☐ Assess patient’s **nutritional status** and consider preoperative interventions if the patient is at severe nutritional risk.

☐ Take an accurate and detailed **medication history** and consider appropriate perioperative adjustments. Monitor for **polypharmacy**.

☐ Determine the patient’s **treatment goals** and **expectations** in the context of the possible treatment outcomes.

☐ Determine patient’s **family** and **social support system**.

☐ Order appropriate preoperative **diagnostic tests** focused on elderly patients.
Preoperative Checklist:
Cognitive Function and Mental Health

- Assess the patient’s **cognitive ability** and **capacity** to understand the anticipated surgery.
- Screen the patient for **depression**.
- Identify the patient’s risk factors for developing postoperative **delirium**.
- Screen for **alcohol** and other **substance abuse/dependence**.
Preoperative Checklist: Cardiac and Pulmonary Evaluation

- Perform a preoperative **cardiac** evaluation according to the American College of Cardiology/American Heart Association algorithm for patients undergoing noncardiac surgery.

- Identify the patient’s risk factors for postoperative **pulmonary** complications and implement appropriate strategies for prevention.
Preoperative Checklist: Functional Status, Frailty, Nutrition, and Medications

- Document **functional status** and history of falls.
- Determine baseline **frailty** score.
- Assess patient’s **nutritional status** and consider preoperative interventions if the patient is at severe nutritional risk.
- Take an accurate and detailed **medication history** and consider appropriate perioperative adjustments. Monitor for **polypharmacy**.
Preoperative Checklist:
Treatment Goals, Social Support, and Diagnostic Testing

- Determine the patient’s **treatment goals** and **expectations** in the context of the possible treatment outcomes.
- Determine patient’s **family** and **social support system**.
- Order appropriate preoperative **diagnostic tests** focused on elderly patients.
Selected Issues for Geriatric Surgical Patients

- Cognitive Function
- Postoperative Delirium
- Functional Status
- Frailty
- Malnutrition Risk
- Medications and Polypharmacy
- Patient Counseling
Selected Issues for Geriatric Surgical Patients

- Cognitive Function
- Postoperative Delirium
- Functional Status
- Frailty
- Malnutrition Risk
- Medications and Polypharmacy
- Patient Counseling
Cognitive Impairment and Dementia

• For Americans >70 years:
  - Prevalence of cognitive impairment = 22.2%
  - Prevalence of dementia = 13.9%

• The prevalence of dementia increases exponentially with increasing age over 65 years.

Plassman BL, 2008
Plassman BL, 2007
Corrada MM, 2008
Brookmeyer R, 2011
Cognitive Impairment and Dementia

Preexisting cognitive impairment

Increased risk of postoperative delirium

Worse surgical outcomes:
  - Increased mortality
  - Longer length of stay (LOS)
  - Postoperative functional decline

Ansaloni L, 2010
Marcantonio, 1994
Robinson TN, 2009
Rudolph JL 2010
Cognitive Function

Assessment:

1. Ask about any history of cognitive deficits.

2. If possible, interview a knowledgeable informant (e.g. spouse or family member) about evolution of cognitive or functional decline.

3. If no known history of cognitive impairment or dementia, perform Mini-Cog Exam

Do this EARLY!!!
Mini-Cog™:
3 Item Recall and Clock Draw

1. GET THE PATIENT’S ATTENTION, THEN SAY:
   “I am going to say three words that I want you to remember now and later. The words are
   
   **Banana   Sunrise   Chair.**

   **Please say them for me now.**”

   (Give the patient 3 tries to repeat the words. If unable after 3 tries, go to next item.)

2. SAY ALL THE FOLLOWING PHRASES IN THE ORDER INDICATED:
   “Please draw a clock in the space below. Start by drawing a large circle. Put all the numbers in the circle and set the hands to show 11:10 (10 past 11).”

   If the subject has not finished clock drawing in 3 minutes, discontinue and ask for recall items.

3. SAY: “What were the three words I asked you to remember?”

Mini-Cog™ copyright and permission from S. Borson (soob@uw.edu).

Borson S, 2000
Mini-Cog™: Clock Draw

A normal clock has all of the following elements:
All numbers 1-12, each only once, are present in the correct order and direction (clockwise) inside the circle.
Two hands are present, one pointing to 11 and one pointing to 2.

Normal Clock

Abnormal Clocks

Abnormal Hands

Missing Number
Mini-Cog\textsuperscript{TM}: Interpretation

**Scoring** (0 to 5 points)
- 3 Item Recall: 1 point for each correct word
- Clock Draw:
  - 0 points for abnormal clock
  - 2 points for normal clock

**Interpretation**
- 0-2 points suggests possible cognitive impairment
- 3-5 points suggests no cognitive impairment

Borson S, 2000
Cognitive Impairment

Recommendations:

• If the patient has any history of cognitive decline or evidence of new cognitive impairment on Mini-Cog then:

• Consider a referral to an internist, geriatrician, or mental health specialist.
Audience Question
Which sleep medications do you prescribe your postop patients?

A. Antihistamines – diphenhydramine (Benadryl)
B. Benzodiazepines – alprazolam (Xanax), diazepam (Valium), lorazepam (Ativan)
C. Non-benzodiazepine sedatives – zolpidem (Ambien), eszopiclone (Lunesta), zaleplon (Sonata)
D. None of the above
Selected Issues for Geriatric Surgical Patients

- Cognitive Impairment
- Postoperative Delirium
- Functional Status
- Frailty
- Malnutrition Risk
- Medications and Polypharmacy
- Patient Counseling
Postoperative Delirium is Common in Elderly Patients

- 9% of patients undergoing major, elective, noncardiac operations
- 44% of patients undergoing major surgery requiring postoperative ICU stay

Marcantonio ER, 1994
Robinson TN, 2009
Postoperative Delirium Leads to Bad Outcomes

- Higher mortality
- Higher rates of institutionalization
- Greater costs and use of hospital resource
- Longer length of hospital stay
- Poorer functional recovery

Ansaloni L, 2010
Marcantonio ER, 1994
Robinson TN, 2009
Demeure JM, 2006
Dasgupta M, 2006
Postoperative Delirium

Strategy:

1. Identify patients at risk for developing postoperative delirium.

2. Determine which risk factors are amenable to intervention.
Risk Factors for Postoperative Delirium

Cognitive and Behavioral Disorders
- Cognitive impairment and dementia
- Poorly-controlled pain
- Depression
- Alcohol use
- Sleep deprivation

Disease/Illness Related
- Severe illness / comorbidities
- Renal insufficiency
- Anemia
- Hypoxia

Metabolic
- Poor nutrition
- Dehydration
- Electrolyte abnormalities

Functional Impairments
- Poor functional status
- Immobilization
- Hearing or vision impairment

Other
- Older age ≥ 70 years
- Polypharmacy and use of psychotropic medications (opioids, benzodiazepines, anticholinergics and antihistamines)
- Risk of urinary retention or constipation, presence of urinary catheter
Preventing Postoperative Delirium

Prevention is the best strategy

Many different causes
Varying levels of evidence

↓

Multicomponent strategies
Preventing Postoperative Delirium

- Daily and frequent reorienting during hospitalization
- Sleep hygiene (prevent sleep deprivation)
- Early postoperative mobilization
- Cautious use of opioids, benzodiazepines, and antihistamines (e.g. diphenhydramine/Benadryl)
- Avoiding unnecessary/inappropriate medications
- Adequate pain management
- Ready access visual and hearing aids
- Early urinary catheter removal
- Bowel regimen
Audience Question
Which preoperative characteristic of elderly patients most strongly predicts mortality?

A. Older age
B. Multiple comorbidities
C. Poor nutritional status
D. Cognitive impairments
E. Functional dependence
Redefining Geriatric Preoperative Assessment Using Frailty, Disability and Co-Morbidity

Thomas N. Robinson, MD,*† Ben Eiseman, MD,*† Jeffrey I. Wallace, MD,‡ Skotti D. Church, BS,* Kim K. McFann, PhD,§ Shirley M. Pfister, RN, MS, NP,¶ Terra J. Sharp, NP-C,¶ and Marc Moss, MD‡

Objectives: (1) Determine the relationship of geriatric assessment markers to 6-month postoperative mortality in elderly patients. (2) Create a clinical model based on frailty that confers increased susceptibility to poor outcomes. Clinical markers of frailty are widely recognized by geriatricians as predictors of poor

**TABLE 3. Results of Univariate Logistic Regression With Cutoffs Predicting Six-Month Mortality**

<table>
<thead>
<tr>
<th></th>
<th>OR (95% CI)</th>
<th>Univariate P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini-Cog &lt;4</td>
<td>4.153 (1.246–13.846)</td>
<td>0.0205</td>
</tr>
<tr>
<td>Albumin ≤3.3</td>
<td>8.625 (2.538–29.308)</td>
<td>0.0006</td>
</tr>
<tr>
<td>Falls ≥1</td>
<td>5.072 (1.661–22.401)</td>
<td>0.0044</td>
</tr>
<tr>
<td>Hematocrit &lt;35</td>
<td>10.671 (3.260–34.930)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>ADLs &lt; 6</td>
<td>13.908 (2.992–65.487)</td>
<td>0.0008</td>
</tr>
<tr>
<td>Charlson ≥3</td>
<td>3.890 (1.040–14.555)</td>
<td>0.0436</td>
</tr>
</tbody>
</table>

Robinson TN, 2009
Selected Issues for Geriatric Surgical Patients

- Cognitive Impairment
- Postoperative Delirium
- **Functional Status**
- Frailty
- Malnutrition Risk
- Medications and Polypharmacy
- Patient Counseling
Poor Functional Status, Poorer Outcomes

- Poor functional status is one of the strongest predictors of postoperative mortality
- Increased risk of postoperative delirium and post-discharge institutionalization

Robinson TN, 2009
Hamel MB 2005
Brouquet A, 2010
Robinson TN, 2011
Lawrence VA, 2004
Functional Status

Assessment:

Evaluate and document the following:

1. History of falls in the past year.
2. Preoperative functional status.
3. Gait and mobility limitations.
4. Deficits in vision, hearing or swallowing.
Short Simple Screening Test for Functional Assessment

**ASK THE PATIENT THE FOLLOWING QUESTIONS:**

1) “Can you get out of bed or chair yourself?”

2) “Can you dress and bathe yourself?”

3) “Can you make your own meals?”

4) “Can you do your own shopping?”

If NO to any of these questions, more in-depth evaluation should be performed, including full screening of activities of daily living and instrumental activities of daily living.

Deficits should be documented and may prompt perioperative interventions (i.e. referral to Occupational Therapy and/or Physical Therapy) and proactive discharge planning.
Timed Up and Go Test (TUGT): Screening for Gait and Mobility Impairment

Patients should sit in a standard armchair with a line 10 feet in length in front of the chair. They should use standard footwear and walking aids and should not receive any assistance.

HAVE THE PATIENT PERFORM THE FOLLOWING COMMANDS:

1) Rise from the chair (if possible, without using the armrests)
2) Walk to the line on the floor (10 feet)
3) Turn
4) Return to the chair
5) Sit down again
Timed Up and Go Test (TUGT): Interpretation

• If the patient has difficulty rising from the chair or requires > 15 seconds to complete TUGT, they are at high risk for falls.

• For patients with gait or mobility deficits, consider referral to physical therapy for more detailed gait assessment.
Selected Issues for Geriatric Surgical Patients

- Cognitive Impairment
- Postoperative Delirium
- Functional Status
- Frailty
- Malnutrition Risk
- Medications and Polypharmacy
- Patient Counseling
Frailty Syndrome

- Definition: Decreased physiologic reserve and resistance to stressors

- *Distinct from comorbidity and disability*

References:
Fried LP, 2001
Fried LP, 2004
Frailty Patients Are More Vulnerable to Poor Outcomes

• Falls and worsening mobility
• Functional Impairment
• Hospitalizations
• Death
Frailty Syndrome

Strategy:

1. Identify “frail” patients.

2. Improve communication with patient regarding:
   • Treatment options
   • Possible outcomes and course
   • Increased perioperative risk
Frailty as a Predictor of Surgical Outcomes in Older Patients

Martin A Makary, MD, MPH, FACS, Dorry L Segev, MD, PhD, FACS, Peter J Pronovost, MD, PhD, Dora Syin, MD, Karen Bandeen-Roche, PhD, Purvi Patel, MD, MPH, Ryan Takenaga, MD, Lara Devgan, MD, MPH, Christine G Holzmueller, BLA, Jing Tian, MS, Linda P Fried, MD, MPH

BACKGROUND: Preoperative risk assessment is important yet inexact in older patients because physiologic reserves are difficult to measure. Frailty is thought to estimate physiologic reserves, although its use has not been evaluated in surgical patients. We designed a study to determine if frailty predicts surgical complications and enhances current perioperative risk models.

STUDY DESIGN: We prospectively measured frailty in 594 patients (age 65 years or older) presenting to a university hospital for elective surgery between July 2005 and July 2006. Frailty was classified using a validated scale (0 to 5) that included weakness, weight loss, exhaustion, low physical activity, and slowed walking speed. Patients

AGS
# Frailty – Operational Definition

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Definition</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shrinkage</strong></td>
<td>Unintentional weight loss</td>
<td>≥ 10 pounds in past year</td>
</tr>
<tr>
<td><strong>Weakness</strong></td>
<td>Decreased grip strength</td>
<td>Lowest 20% at baseline, adjusted for gender and body mass index.</td>
</tr>
<tr>
<td><strong>Exhaustion</strong></td>
<td>Poor energy and endurance</td>
<td>Self-reported on questionnaire</td>
</tr>
<tr>
<td><strong>Low physical activity</strong></td>
<td>Weekly energy expenditure</td>
<td>Lowest 20(^{th}) percentile by gender (Minnesota Leisure Physical Activity Questionnaire)</td>
</tr>
<tr>
<td><strong>Slowness</strong></td>
<td>Walking speed</td>
<td>Lowest 20(^{th}) percentile by gender and height</td>
</tr>
</tbody>
</table>

The patient receives 1 point for each criterion met.

- 0-1 = Not Frail
- 2-3 = Intermediate Frail (Prefrail)
- 4-5 = Frail

Fried LP, 2001
Makary MA, 2010
Selected Issues for Geriatric Surgical Patients

• Cognitive Impairment
• Postoperative Delirium
• Functional Status
• Frailty
• Malnutrition Risk
• Medications and Polypharmacy
• Patient Counseling
Hospitalized and Institutionalized Elderly Patients at High Risk for Malnutrition

- Average Age = 82.3 +/- 7.5
- International Study (US, Europe, South Africa)

Kaiser MJ, 2010
Poor Nutritional Status, Poor Outcomes

• Infectious complications (SSI, pneumonia, UTI, etc.)

• Wound complications (dehiscence and anastomotic leaks)

• Longer hospital stay

Schiesser M, 2009
Identifying Patients with Severe Nutritional Risk

1. Body mass index (BMI) < 18.5 kg/m$^2$

2. Serum Albumin < 3.0 g/dL*

3. Unintentional weight loss > 10–15% within 6 months

* With no evidence of hepatic or renal dysfunction)
Severe Nutritional Risk

Recommendations:

• If feasible, patient should undergo a full nutritional assessment by a dietician to design a perioperative nutritional plan.

• Consider preoperative nutritional support.
Preoperative Nutritional Support:
European Society for Clinical Nutrition and Metabolism

ESSEN GUIDELINES

ESSEN Guidelines on Enteral Nutrition: Surgery including Organ Transplantation

A. Weimann\textsuperscript{a,*}, M. Braga\textsuperscript{b}, L. Harsanyi\textsuperscript{c}, A. Laviano\textsuperscript{d}, O. Ljungqvist\textsuperscript{e}, P. Soeters\textsuperscript{f}, DGEM: K.W. Jauch, M. Kemen, J.M. Hiesmayr, T. Horbach, E.R. Kuse, K.H. Vestweber

\textsuperscript{a}Klinik f. Allgemein- und Visceralchirurgie, Klinikum "St. Georg", Leipzig, Germany
\textsuperscript{b}Department of Surgery, San Raffaele University, Milan, Italy
\textsuperscript{c}1st Surgical Department, Semmelweis University, Budapest, Hungary
\textsuperscript{d}Department of Clinical Medicine, Università "La Sapienza" di Roma, Italy
\textsuperscript{e}Karolinska Institutet, CLINTEC, Division of Surgery, Karolinska University Hospital Huddinge & Centre of Gastrointestinal Disease, Ersta Hospital, Stockholm, Sweden
\textsuperscript{f}Department of Surgery, Academic Hospital Maastricht, The Netherlands

Received 20 January 2006; accepted 20 January 2006
Selected Issues for Geriatric Surgical Patients

• Cognitive Impairment
• Postoperative Delirium
• Functional Status
• Frailty
• Malnutrition Risk
• Medications and Polypharmacy
• Patient Counseling
Older Patients at Greater Risk for Adverse Drug Reactions

- More likely to have impaired renal function and chronic kidney disease
- More sensitive to psychoactive medications (e.g. narcotics, benzodiazepines, antihistamines)
- More likely to be on multiple medications (Polypharmacy)
Medication Management

1. Review and document the patient’s complete medication lists, including nonprescription agents and herbal products
2. Modify medication regimen to reduce adverse drug reactions
   • Discontinue inappropriate medications and substitute suboptimal medications (see Beers criteria)
   • Start perioperative medications that improve postoperative outcomes (i.e. beta blockers and statins)
   • Renal dosing of medications
Discontinue Potentially Inappropriate Medications

American Geriatrics Society Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

The American Geriatrics Society 2012 Beers Criteria Update Expert Panel

Potentially inappropriate medications (PIMs) continue to be prescribed and used as first-line treatment for the most vulnerable of older adults, despite evidence of poor outcomes from the use of PIMs in older adults. PIMs come. Estimates from past studies in ambulatory and long-term care settings found that 27% of adverse drug events (ADEs) in primary care and 42% of ADEs in long-term care
Selected Issues for Geriatric Surgical Patients

- Cognitive Impairment
- Postoperative Delirium
- Functional Status
- Frailty
- Malnutrition Risk
- Medications and Polypharmacy
- Patient Counseling
Audience Question
Do you make sure your elderly patients have an advanced directive in their medical chart?

A. Always
B. Sometimes
C. Rarely
Treatment Goals and Expectations

• In a study of deceased individuals who were age 60 years and older
  o Nearly 30% required decision making regarding medical care near the end of life, but lacked decision-making capacity.
  o Two-thirds had advance directives, and these individuals received care strongly associated with their preferences.

• The number of elderly individuals with advance directives has increased, but advanced directives are still rarely in the medical chart for older patients undergoing a major during hospitalization.

Silveira MJ, 2010
Yang AD, 2004
Treatment Goals and Expectations

• Patients’ expectations influence their treatment preferences.

• In a survey of patients 60 years and older with limited life expectancy:
  o 98.7% of patients would undergo a low-burden treatment to restore current health (versus no treatment and dying)
  o 74.4% would forgo treatment if it resulted in severe functional impairment
  o 88.8% would reject treatment if it resulted in cognitive impairment.

Fried TR, 2002
Treatment Goals and Expectations

1. Discuss with the patient the treatment goals and plans. Be sure that the provider understands the patient’s preferences and expectations.

2. Describe the expected postoperative course and possible complications.
   - If relevant, possible functional decline and need for rehabilitation or nursing home care

Make sure that these discussions are documented in the medical records.
End-of-Life Preferences

3. Make sure the patient has an advance directive \textit{and} designated health care surrogate/proxy, and that it is in the medical chart.

“Five Wishes” by Aging with Dignity

Lifecare Advance Directive
Family and Social Support

4. Determine the patient’s family and social support systems

If support systems are insufficient, consider preoperative referral to social worker
Optimal Preoperative Assessment of the Geriatric Surgical Patient

Warren B. Chow, MD, MS, MSHS OR

ACS NSQIP National Conference
July 22, 2012