Geriatric Surgical Improvement Program at Duke

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Factors affecting outcomes after surgery in older adults

• Co-morbidities
• Emergency surgery
• Complications
• Ability to rescue
• Withdrawal of effort to rescue
Retrospective studies

• To evaluate differences in outcomes between young and older patients
• To study the effect of co-morbidities
• Patient population studied:
  – Elderly patients undergoing pancreatic resection
  – Elderly patients undergoing liver resection
Pancreatic Resection in the Elderly

• OBJECTIVE: Compare outcomes and the use of multimodality therapy in young and elderly people with pancreatic cancer undergoing surgical resection.

• PARTICIPANTS: 203 individuals underwent pancreaticoduodenectomy for pancreatic adenocarcinoma. They were divided into three groups based on age (<65, n = 97; 65–74, n = 74; 75+N = 32).

• MEASUREMENTS: Perioperative outcomes, the use of multimodality therapy, and overall survival of the different age groups were compared.
Pancreatic Resection in the Elderly

- Similar rates of perioperative mortality and morbidity were observed in all age groups, but elderly adults were more likely to be discharged to a rehabilitation or skilled nursing facility.

- Predictors of poorer overall survival included coronary artery disease, positive resection margin, and less-differentiated tumor histology.

Liver Resection in the Elderly

• OBJECTIVE: The objective of this study was to assess the influence of age on postoperative outcomes after major hepatectomy among a contemporary cohort from 2 high volume centers.

• STUDY DESIGN: Demographics, diagnoses, surgical treatments, and postoperative outcomes of patients who underwent major hepatic resection were reviewed.

• RESULTS: There were 856 patients who underwent major hepatectomy (resection of 3 or more segments) from 2002 to 2009.
Liver Resection in the Elderly

RESULTS:

- Postoperative mortality and morbidity occurred in 53 (6.2%) and 403 (47.1%) patients, respectively.

- Increasing age was independently associated with postoperative mortality ($p = 0.0345$).

- Increasing age was associated with postoperative sepsis ($p = 0.0224$, odds ratio for each year 1.025 [range 1.003 to 1.048]) after major hepatic resection.

- Each 1-year and 10-year increase in age resulted in an odds ratio of mortality after major hepatic resection of 1.036 (95% CI [1.003-1.071]) and 1.426 (95% CI [1.026-1.982]), respectively.
## Major Hepatic Resection (n=856) Multivariable Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>p</th>
<th>OR [95% CI]</th>
</tr>
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<tbody>
<tr>
<td>Male gender</td>
<td>0.0195</td>
<td>2.455 [1.155-5.216]</td>
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<tr>
<td>Diagnosis</td>
<td>0.0063</td>
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<tr>
<td>HCC and cholangiocarcinoma</td>
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<tr>
<td>Simultaneous Procedures</td>
<td>0.0282</td>
<td>2.359 [1.096-5.078]</td>
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<tr>
<td>ASA Score</td>
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<tr>
<td>Age</td>
<td>0.0345</td>
<td>1-year OR 1.036 [1.003-1.071]</td>
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<tr>
<td></td>
<td></td>
<td>10-year OR 1.426 [1.026-1.982]</td>
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Conclusions

• Advancing age associated with increased mortality after major liver resection
  – Independent of ASA score
  – Despite improved safety of liver surgery

• Criteria for selection of elderly for major liver resection inadequate

• Comprehensive Geriatric Assessment and Pre-operative Assessment in Elderly Cancer Patients (PACE)

Exploring Predictors of Complication in Older Surgical Patients: A Deficit Accumulation Index and the Braden Scale

- **AIM:** To determine whether readily collected perioperative information might identify older surgical patients at higher risk for complication.

- **DESIGN:** Retrospective cohort study

- **SETTING:** Medical chart review at a single academic institution

- **PARTICIPANTS:** 102 patients aged 65 years and older who underwent abdominal surgery between January 2007 and December 2009.

- **MEASUREMENTS:** Primary predictor variables were the first postoperative Braden Scale score (within 24 hours of surgery) and a Deficit Accumulation Index (DAI) constructed based on 39 available preoperative variables. The primary outcome was presence or absence of complication within 30 days of surgery date.
Co-morbidities and Outcomes

• Of 102 patients, 64 experienced at least one complication with wound infection being the most common complication.

• In models adjusted for age, race, sex, and open vs. laparoscopic surgery, lower Braden Scale scores were predictive of 30-day postoperative complication (OR 1.30 [CI 95%, 1.06, 1.60]), longer length of stay (β = 1.44 (0.25) days; p_value = ≤ 0.0001) and discharge to institution rather than home (OR 1.23 [CI 95%, 1.02, 1.48]).

• The cut-off value for the Braden Score with the highest predictive value for complication was ≤ 18 (OR 3.63 [CI 95%, 1.43, 9.19]; c_statistic of 0.744).
Co-morbidities and Outcomes

CONCLUSION:

• This is the first study to identify the perioperative score on the Braden Scale, a widely used risk-stratifier for pressure ulcers, as an independent predictor of other adverse outcomes in geriatric surgical patients.
• Further studies are needed to confirm this finding as well as investigate other utilizations for this tool, which correlates well to phenotypic model of frailty.

RR Cohen et al, Accepted for publication, JAGS.
GENERAL SURGERY ANY WOUND OCCURRENCE TREND COMPARED TO ACS-NSQIP BENCHMARK


Numerator = cases with wound occurrence
Denominator = Total Gen. Surgery cases abstracted per period
Benchmark = ACS NSQIP ACADEMIC TEACHING HOSPITALS WITH 500 + BEDS
Areas for Improvement

• Morbidity Rates
• Urinary Tract Infections
• Surgical Site Infections
• Length of Stay
Elderly Peri-operative Care (EPOC)

- Geriatric consult for high risk patients prior to surgery
- Identification of Trigger factors
- Pre-op Consult
- Continuing post-op care
Trigger Factors - Identifying the older adult at high risk.

- Diagnosis of Dementia or report of cognitive dysfunction that affects some aspect of function or low cognitive screening test score.
- Poor nutritional status: recent weight loss, Low Body Mass Index (BMI)
- Multiple chronic diseases: more than 5 prescription medications, warfarin, oxygen, substance abuse, or APACHE II score >16 (Probably not appropriate for outpatients), depression, other psychiatric illness.
- Age over 85
- Visual impairment worse than 20/70 binocular with correction.
- Index of dehydration BUN/Cr ratio > =18.
Pre-op Evaluation

- Weight, height, orthostatic BP, pulse ox
- Cognitive screening test, depression screen
- Accurate medication list
- Vision testing
- Labs: CMP, CBC, ??
- Advance Directives
- Involved family members
- Functional Assessment: ADLs/IADLs
Pre-op Evaluation

- Initial evaluation done in surgery clinic to identify high risk patients.
- Geriatrics service notified for same day evaluation upon return to clinic. Recommendations made following evaluation.
- Geriatrics consultation team involved upon hospitalization.
- Consider need for geriatric post hospital care.
Pre-Op Evaluation (Contd.)

- Risk of malnutrition (e.g. MNA < 23.5)
- Impaired cognition (e.g. abnormal 3-Item recall)
- Depression (e.g. GDS >2)
- Impaired functional status (e.g. dependence in 1 or more ADLs or IADLs)
- Abnormal ambulation, unsteady gait, or fall risk (e.g. abnormal “Get Up and Go,”)
- High risk for delirium
- Presence of fecal or urinary incontinence
Medication Use

• Anticoagulation medications
• Diabetes medications
• Cardiovascular medications
• Hormonal medications
• Herbal medications
• Over-the-counter medications
Patient’s Decision Making Capacity

- General impression of patient’s decision-making capacity.
- Cognitive function testing via the Mini Mental Status Examination
- Use of a specific capacity assessment tool, such as the Aid to Capacity Evaluation
- Any of the above
- All of the above
Patient - Provider Discussions

• Ability to understand
  - the medical problem.
  - the proposed treatment.
  - alternatives (if any) to the proposed treatment.
  - the option of refusing treatment or of it being withheld or withdrawn.

• Ability to appreciate
  - the consequences of accepting the treatment.
  - the consequences of refusing the proposed treatment.

• Ability to make a decision that is not substantially based on delusions or depression.
• Patient’s priorities and preferences regarding the treatment options
• Operative risks, including complications and mortality.
• Functional outcome, including period of disability,
• Advance directive or living will indicating life-sustaining preferences
• Advance directive or durable power of attorney for health care indicating the patient’s surrogate decision maker, or discussion of who would be surrogate decision maker
Outcomes

- Length of stay.
- Occurrence/severity of delirium
- Complications
- Re-admission rates
- Patient satisfaction
- Family/care giver satisfaction
Pre-op Interventions

- Emphasize need for pre-operative bathing
  Chlorohexidine (CHG) shower
  CHG 70% alcohol prep
- Selective or no bowel prep
- Clears upto 2 hrs before procedure
- Antibiotic prophylaxis
- Thromboprophylaxis
- Hearing aids, glasses, dentures
Intra-operative interventions

• Mid-thoracic epidural anesthesia/analgesia
• Maintenance of normothermia (body warmer/warm intravenous fluids)
• Intra-operative goal directed fluid therapy
• DVT prophylaxis
• Wound Care:
  – Antibiotic: ertapenem (no re-dosing) or Cipro + Flagyl
  – Alexis wound protectors
  – Change gown and gloves follow anastomosis or at fascial closure
  – Wound closure tray
  – Limit OR traffic
Post-operative interventions

– No re-dosing of antibiotics unless clearly documented reason
– Leave sterile dressings on for 48 hrs
– CHG swabs daily after dressing removal
– Strip VACs (trial)
– Enhanced recovery after surgery (ERAS) protocols
ERAS

• Mid-thoracic epidural anesthesia/analgesia
• Avoid nasogastric tubes
• Prevention of nausea and vomiting
• Early removal of catheter
• Early oral nutrition
• Non-opioid oral analgesia/NSAIDS
• Early mobilization, physical therapy.
• Stimulation of gut motility
Database

- Pre-operative Variable Set
- Intra-operative Variable Set
- Baseline Variables for Patients Who Enter the Dataset Post-op
- Discharge Variables
- Long term Follow up
Goals of Care

1. Co-ordinated visits that will include imaging studies, anesthesia, pre-operative geriatric evaluation, evaluation by cardiology/pulmonary, nephrology, endocrinology or coagulation clinic as indicated.

2. Functional status evaluation and documentation: to determine need for post-operative physical therapy

3. Post-operative evaluation and recommendations by the geriatric medicine team, and when indicated by other services

4. Monitoring post-operative recovery at home and coordinating post-operative surgery visits with other surgeons (concomitant procedures), coagulation clinic and PRMO personnel.

5. Maintaining communication with the patient’s primary care physician, home health personnel and family care provider so as to be able to document post-operative recovery and address special needs.
Postoperative Mortality Rates in Patients After Emergency General Surgery: Effect of Complications

- No Major Complication:
  - <50 Years: 0%
  - 50-64 Years: 1%
  - 65-79 Years: 2%
  - 80 Years: 6%

- Major Complication:
  - <50 Years: 6%
  - 50-64 Years: 14%
  - 65-79 Years: 23%
  - 80 Years: 37%
Incidence of Specific Postoperative Complications in Older Patients Undergoing Emergency General Surgery.

- Mechanical Ventilation >48 Hours: 12.9%
- Unplanned Reintubation: 7.2%
- Superficial SSI: 5.0%
- Urinary Tract Infection: 3.9%
- Organ/Space SSI: 3.7%
- Cardiopulmonary Arrest: 2.5%
- Wound Dehiscense: 1.8%
- Deep Incisional SSI: 1.4%
- Unplanned Reintubation: 0.8%
- Coma >24 Hours: 0.5%
- Peripheral Nerve Injury: 0.0%

N = 22,847
Independent Effect of Specific Postoperative Complications On Subsequent Mortality In Older Patients Undergoing Emergency General Surgery.
Acute Care Surgery

- Geriatric Bay in the Emergency Room
- Decreased waiting times
- Targeted care
- Discussion regarding outcomes
- Plan of care / advanced directives
Geriatrics for Specialty Residents (GSR)

- Pre-operative Cardiac Evaluation in the Elderly: Dr. A. Roche
- Pre-Operative Pulmonary Evaluation in the Elderly: Dr. K. Wahl
- Hospital Based Palliative Care: Dr. A. Galanos
- Pearls and Perils: Polypharmacy in the Elderly: Dr. M. Heflin
- Post-operative Delirium in the Elderly: Dr. C. Colon-Emeric
- Surgical Intensive Care in the Elderly: Dr. S. Vaslef
- How to Conduct a Family Meeting: Dr. A. Galanos
- Laparoscopic Surgery in the Elderly: Dr. S. Lagoo
- Benign Colorectal Disease: Drs. E. Bush and C. Mantyh
- Vascular Disease in the Elderly: Drs. J. Neinaber and L. Mureebe
- Colorectal Malignancy in the Elderly: Dr. J. Thacker
- Trauma in the Elderly: Drs. K. Balsara and M. Shapiro
- Breast cancer in the Elderly: Dr. J. Haney
- Co-agulation Disorders in the Elderly: Dr. G. Arepally
- Pain Management in the Elderly: Dr. B. Ginsberg
- Physical Medicine and Rehabilitation in the Elderly: Dr. H. Hoenig
Dedicated Geriatric Education for Surgery Residents

- Elderly patients’ gratitude for care received was the most rewarding aspect of caring for them.
- Access to information regarding community resources (52.2% pre to 26% post)
- Disconnect between PCP/surgeon and anesthesiologist (32% pre to 26% post)
- Addressing advance directives in the intra-operative setting (56% to 42%).
The CRIT program fosters collaboration among disciplines in the management of medically complex older patients. An intensive two-day program focuses on:

- incorporating geriatrics principles into training
- developing teaching and leadership skills
- enhancing abilities to collaborate with other disciplines
- developing an achievable action project focused on a geriatrics care issue
The Team

American Geriatric Society
Danny O. Jacobs
Harvey J. Cohen
Christopher Mantyh
Julie Thacker
Heidi White
Heather Whitson
Mitchell Heflin
Rachel Rose Cohen
Michael Lidsky
Srimevas Reddy
Andrew Barbas
Jacqueline Hairfield
Jane Fellows
Cornelia Poer
Bridget Long
SURGICAL CARE OF PATIENTS IN THE EXTREMES OF LIFE*

JOHN J. MORTON, M.D.

ROCHESTER, N. Y.

1. Age, of itself, at either extreme of life is no bar to surgery.
2. The most difficult surgical procedures can be carried out with safety in the extremes of life.
3. Careful and delicate handling of the tissues is essential to success on the technical side of this surgery.
4. Early restoration to their own environment aids in accelerating recovery.
5. Mobilization of the aged patient without undue concern about the incision seems to be a factor of safety in preventing postoperative complications.
6. The will to get well is important in the rehabilitation of the aged patient.
7. Surgery in infancy and old age should be undertaken only by surgeons of experience, as the margin of safety is usually less than in the young or middle aged groups.

Multi-System Comprehensive Assessment

- Hemoglobin or Hematocrit
- White blood cell count
- Platelet count
- Coagulation Tests (PT or INR; PTT)
- Electrolytes (Na, K, Cl, CO₂, Glucose)
- Renal Function (BUN, Cr)
- Albumin
- Prealbumin
- Urinalysis
- Electrocardiogram (within 6 months)
- Chest Radiograph (within 6 months)
- Height
- Weight
Dedicated Geriatric Education for Surgery Residents

• Increased concern regarding length of stay and consumption of resources (54% pre to 64% post)

• Peri-operative evaluation (30% pre to 36% post), become more challenging (30% pre to 36% post)

• Topics considered critical in the both surveys included pre-operative cardiac evaluation, benefits and pitfalls of anticoagulation, management of post-operative depression/delirium and the intricacies of palliative care.

• Topics that increased in order of importance were management of post-operative cardiac arrhythmias, myocardial infarction, pneumonia and identification and evaluation of frailty.
All Patients (n=1673)