POST-OPERATIVE COMPLICATIONS IN THE ELDERLY

Elizabeth J. Glazier, MD/MPH
Geriatrics Attending, BAMC
February 2009
OUTLINE

- Epidemiology
- Specific complications, diagnosis and treatment:
  - Delirium
  - Pain
- Prevention
EPIDEMIOLOGY

- Life expectancy is increasing:
  - In 2008, average life expectancy = 78.14 years
  - In 2050, estimated life expectancy = 83.85 years
- Over 55% of surgeries performed in 2006 were done on adults > 65
- Minimally invasive surgeries

SURGICAL RATES IN THE ELDERLY IN 1996

Rates of Surgeries/1,000 Population

- Age < 15
- Age 15-44
- Age 45-64
- Age > 65

AGE VS. CO-MORBIDITY

- Increasing 30-day complication rate s/p radical prostatectomy with increasing age.
- After controlling for co-morbidities, there is a two-fold increase in absolute risk death/decade.
- Clinically, age is less of a predictor of mortality than co-morbidities.

Retrospective analysis of all urological surgeries done on 80+ year olds from 1975-2004 in Japan. Risks for post-op complications:
- Open surgery
- Male
- Delirium was the most common complication

## POST-OPERATIVE MORBIDITY

- Delirium
- Hypoxemia
- Pain
- Hypotension
- Anemia
- Long term cognitive dysfunction
- Nutritional deficiencies
- MI, VT, Cardiogenic shock
- Ileus
- Respiratory complications
- C.Diff colitis
- Urinary retention
- Pressure ulcers
- Falls
- Electrolyte imbalances
  - Hyponatremia
  - Hypoglycemia
- Constipation
- Thromboembolism
SIGNIFICANCE OF POST-OP COMPLICATIONS

1. Increased risk of mortality
2. Increased in-hospital morbidity
3. Increased length of hospital stay ($$$)
4. Increased discharge to facilities (SNF)
5. Decreased quality of life
6. Decreased surgical success
7. Decreased functional capacity
DELIRIUM
DELIRIUM: DEFINITION

1. A disturbance of consciousness
2. A change in cognition from baseline
3. Development of the disturbance during a brief period, fluctuating during the course of a day
4. Evidence from the history, PE, or labs, that the disturbance is caused by:
   • A general medical condition
   • A substance intoxication or side effect
   • A substance withdrawal
   • Multiple factors

DELIRIUM: EPIDEMIOLOGY

- 33% of elderly patients presenting to the ER
- Affects up to 50% of patients during their hospital stay, 70-87% of patients in ICUs
- Affects up to 50% of patients post-hip fracture surgery
- Recognition and documentation:
  - RNs<50%
  - MDs<20%
Incidence of Delirium (%)

Age in Years

In-hospital mortality rates: 22-76%
1-year mortality: Up to 40%
Poor functional recovery
Often cannot go back to prior level of independence and functioning
Often requires institutionalization
Increased length of hospital stay

<table>
<thead>
<tr>
<th></th>
<th>Delirium Present (n = 64)</th>
<th>Delirium Absent (n = 80)</th>
<th>P values (&lt; 0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of ICU Stay (days)</td>
<td>9.7 +/- 8.0</td>
<td>4.6 +/- 2.1</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Length of Hospital Stay (days)</td>
<td>16.3 +/- 10.9</td>
<td>7.6 +/- 3.9</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Cost of Hospitalization ($ in 1000s)</td>
<td>50.1 +/- 33.6</td>
<td>31.6 +/- 14.1</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Post-Discharge Institutionalization</td>
<td>33%</td>
<td>1</td>
<td>P &lt; 0.001</td>
</tr>
<tr>
<td>Hospital Mortality</td>
<td>5%</td>
<td>0%</td>
<td>P = 0.086</td>
</tr>
<tr>
<td>30 Day Mortality</td>
<td>9%</td>
<td>1%</td>
<td>P = 0.045</td>
</tr>
<tr>
<td>6 Month Mortality</td>
<td>20%</td>
<td>3%</td>
<td>P = 0.001</td>
</tr>
</tbody>
</table>

THE COSTS OF DELIRIUM

- Increases hospital costs by $2,500/patient
- $6.9 billion (US dollars in 2004) of Medicare hospital expenditures are attributable to delirium
- Accounts for more than 49% of all hospital days
- Increased post-hospital costs:
  - Higher rates of institutionalization
  - Increased need for rehabilitative services, home health care, and informal caregiving

RISK PREDICTOR FOR DELIRIUM

Baseline Risk Factors

1. Vision impairment
2. Severe illness (Apache score > 16)
3. Cognitive impairment (MMSE < 24)
4. High BUN/Crt ( > 18)

<table>
<thead>
<tr>
<th>Delirium Risk Group</th>
<th># RFs</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0</td>
<td>9%</td>
</tr>
<tr>
<td>Intermediate</td>
<td>1-2</td>
<td>23%</td>
</tr>
<tr>
<td>High</td>
<td>3-4</td>
<td>83%</td>
</tr>
</tbody>
</table>

THE CLINICAL PREDICTION RULE

- Age > 70
- ETOH abuse
- Dementia
- Poor functional status
- Abnormal pre-op electrolytes

PRECEIntATING FACTORS FOR DELIRIUM

- Post-op
- Acute cardio-pulmonary event
- Bed rest
- Drug/ETOH withdrawal
- Age
- Fecal impaction
- Indwelling devices
- H/O dementia
- Fluid/Electrolyte disturbances
- Medications
- Infections
- Severe anemia
- Restraints
- Urinary retention
- Uncontrolled pain
- Functional dependency
- H/O CVA
MEDICATIONS THAT CAN CAUSE DELIRIUM

- Anticholinergics
- Benadryl (Tylenol PM)
- Sedative hypnotics
- Opioids
- Lithium
- Muscle relaxants
- NSAIDs
- Antibiotics
- H2 Blockers (Zantac)
- Anticonvulsants
- Aricept
- Digoxin
- Beta blockers
- Diuretics
- Sinimet
- Benzodiazepines
- Anti-emetics (Phenergan)
Acute Onset Fluctuating Course + Inattention

AND

Disorganized Thinking

OR

Altered Level of Consciousness

EVALUATION OF DELIRIUM

- Confusion Assessment Method (CAM)
- Complete history and physical (ask RN, family members)
- Laboratory tests (based on H/P): U/A, LFTs, BMP, ABG, CXR, ECG, blood cultures
- Brain imaging **unhelpful**, except post-head trauma or new focal neurologic finding
PREVENTION OF DELIRIUM

- Early mobilization
- Minimize use of sedatives and anti-psychotics
- Prevent sleep deprivation (non-pharmacologic)
- Early intervention for hypoxia and volume depletion
- Ensure appropriate aides: Eyeglasses, dentures, hearing aides, walkers
- Prevention of constipation
- Appropriate pain management
HOSPITAL ELDER LIFE PROGRAM

MANAGEMENT OF DELIRIUM

- Interdisciplinary team:
  - RN, MD, family, OT/PT, SW
- Reorientation: Calendars, bed by the window, clocks, familiar home objects
- Allow for uninterrupted nighttime sleep
- Removal of lines, catheters, restraints
- Discontinue offending medications
- Family or a sitter in the room at all times
PHARMACOLOGIC MANAGEMENT OF DELIRIUM

- Reserve for patients with severe agitation.
- Reserve for patients who pose a safety hazard to themselves or to the staff.
- Start at low doses and titrate slowly.
- Maintain effective dose for 2-3 days.
<table>
<thead>
<tr>
<th>Class and Drug</th>
<th>Dose</th>
<th>Adverse Effects</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antipsychotic: Haldol</td>
<td>0.5-1.0 mg PO BID or 0.5-1.0 mg IM x 1</td>
<td>EPS (especially &gt; 3 mg/day)</td>
<td>Avoid IV due to short duration of action.</td>
</tr>
<tr>
<td>Atypical Antipsychotic: Risperidone</td>
<td>0.5 mg BID</td>
<td>EPS</td>
<td>Associated with increased mortality among older patients with dementia.</td>
</tr>
<tr>
<td></td>
<td>2.5-5.0 mg QD</td>
<td>Prolonged QT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25-50 mg QD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olanzapine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quetiapine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antidepressant: Trazodone</td>
<td>25-150 mg QHS</td>
<td>Oversedation</td>
<td>Tested only in uncontrolled studies</td>
</tr>
</tbody>
</table>

PAIN MANAGEMENT
DIFFICULTIES IN PAIN MANAGEMENT

- Assessing an elderly patient:
  - Speech difficulties, i.e. dementia, dysarthria
  - Less likely to complain
- Medication side effects
- Poor pain control leads to\(^1\):
  - Increased LOS
  - Decreased functional status even two months after discharge

Physiological effects of undertreating pain:

- Increased catabolic demand
- Impaired healing
- Impaired respiratory effort
- Impaired mobility:
  - Increased risk of DVT
  - Constipation
  - Poor rehabilitation
- Increased sympathetic autonomic stimulation:
  - HTN
  - Tachycardia
  - Tachypnea
- Decreased immune responsiveness
- Increased Na and H2O retention
PSYCHOLOGICAL EFFECTS OF UNDERTREATING PAIN

- Depression
- Insomnia
- Delirium
- Anxiety
- Anger
- Hopelessness
- Suffering
1. Use multiple modalities for analgesia.
2. Start at low doses, titrate up slowly to effect.
3. Whenever possible, add a scheduled NSAID.
4. Use scheduled and PRN medications.
5. Prevent predictable post-op pain by anticipating pain needs.
DECREASING PAIN

- Pre-operative education about pain management decreases postoperative pain.
- Multimodality: Opioids, non-opioids and non-pharmacologic pain treatments
- Use of a consistent pain scale prevents over medication.
- True opioid addiction in the elderly is rare, under treatment of pain is more common.
PRE-OPERATIVE PAIN MANAGEMENT EDUCATION

- Can significantly reduce post-operative pain
- Content should include:
  - Understanding the cause of the pain
  - How to use pain assessment scales
  - Options for pain management
  - Debunking myths surrounding addiction

WONG-BAKER FACES PAIN SCALE

0=VERY HAPPY, NO HURT
1= HURTS JUST A LITTLE BIT
2=HURTS A LITTLE MORE
3=HURTS EVEN MORE
4=HURTS A WHOLE LOT
5=HURTS AS MUCH AS YOU CAN IMAGINE
(Don’t have to be crying to feel this much pain)
## CHECKLIST OF NONVERBAL PAIN INDICATORS (CNPI)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>With Movement</th>
<th>At Rest</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vocal Expressions:</strong> Moans,</td>
<td>0 = none</td>
<td>0 = none</td>
</tr>
<tr>
<td>grunts, cries, gasps</td>
<td>1 = evident</td>
<td>1 = evident</td>
</tr>
<tr>
<td><strong>Facial Expression:</strong> Winces,</td>
<td>0 = none</td>
<td>0 = none</td>
</tr>
<tr>
<td>grimace, tight lips, clenched</td>
<td>1 = evident</td>
<td>1 = evident</td>
</tr>
<tr>
<td>teeth, furrowed brow</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bracing:</strong> Clutching or</td>
<td>0 = none</td>
<td>0 = none</td>
</tr>
<tr>
<td>holding onto side rails, bed</td>
<td>1 = evident</td>
<td>1 = evident</td>
</tr>
<tr>
<td>tray, table, painful area</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Restlessness:</strong> Shifting</td>
<td>0 = none</td>
<td>0 = none</td>
</tr>
<tr>
<td>position, hand movements,</td>
<td>1 = evident</td>
<td>1 = evident</td>
</tr>
<tr>
<td>unable to keep still</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rubbing:</strong> Touching,</td>
<td>0 = none</td>
<td>0 = none</td>
</tr>
<tr>
<td>holding, rubbing or</td>
<td>1 = evident</td>
<td>1 = evident</td>
</tr>
<tr>
<td>massaging affected area</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td>0-5</td>
<td>0-5</td>
</tr>
</tbody>
</table>
NON-PHARMACOLOGIC PAIN MANAGEMENT STRATEGIES

- Massage
- Superficial application of hot or cold
- Relaxation techniques
- Repositioning
- Social interactions with family and staff
- TENS unit
NON-OPIOID PAIN MANAGEMENT STRATEGIES

- Scheduled Tylenol (up to 4 gm/day)
- IV Ketorolac (no more than 60 mg/day).
- Ibuprofen 800 TID (avoid in GFR <60)
- Use of PPIs with long term use of NSAIDS
ADVANTAGES

- Less post-op delirium and sedation
- Lowest incidence of pulmonary complications
- Highest patient satisfaction

DISADVANTAGES

- Understand use of PCA
- Avoid basal dosing in the elderly
- Manual use the equipment

PATIENT CONTROLLED ANESTHESIA (PCA)
PREVENTING OPIOID INDUCED ADVERSE EFFECTS

- Early mobilization
- Ensure appropriate fluid status
- Prophylactic stool softeners and laxatives
- Use of Ondansetron avoids the anti-cholinergic side effects of other anti-emetics
## OPIOID CHOICE

<table>
<thead>
<tr>
<th>OPIOID</th>
<th>DOSING</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>1-4 mg IV q2-4 hrs</td>
<td>Best choice</td>
</tr>
<tr>
<td></td>
<td>MS Contin 15 mg BID</td>
<td>Beware in pts with renal/hepatic dysfunction</td>
</tr>
<tr>
<td>Tylenol #3</td>
<td>1-2 tabs q4-6 hr</td>
<td>Most CONSTIPATING</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>5 mg q4-6 hr</td>
<td>Use scheduled dose if pain is anticipated to continue</td>
</tr>
<tr>
<td>Oxycontin</td>
<td>10 mg Q12hr</td>
<td></td>
</tr>
<tr>
<td>Vicodin</td>
<td>1-2 tabs q4-6 hr</td>
<td>Elixir has less Acetominophen</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>25 mcg patch q3d</td>
<td>Long acting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Takes about 3 days to achieve steady state</td>
</tr>
</tbody>
</table>
POWER OF PREVENTION

PREVENTION
Functional assessment best predicts level of care needed and location of discharge\(^1\).

Cognitive assessment

- Mini-COG, SLUMS, MMSE

Mobility assessment

- Get up and Go

Social assessment of home environment helps to determine needs upon discharge.

**ADLS VS. IADLS**

- **Activities of Daily Living:**
  - D = dressing
  - E = eating
  - A = ambulating
  - T = transferring, toileting
  - H = hygiene

- **Instrumental Activities of Daily Living:**
  - Medication administration
  - Finances
  - Housekeeping
  - Telephone use
  - Grocery shopping
  - Transportation
  - Cooking
MINI-COG

1. Name 3 items and ask the patient to recall them.
2. Give the patient a blank piece of paper and ask them to draw a clock, placing all the numbers in the right sequence and putting the hands in the proper position to read 11:10.
3. Ask the patient to recall the 3 items.
MINI-COG SCORING ALGORITHM

- **Mini-Cog**
  - **Recall = 0**
    - Impaired
      - Clock Abnormal
        - Impaired
  - **Recall = 1-2**
    - Impaired
  - **Recall = 3**
    - Not Impaired
      - Clock Normal
        - Not Impaired
### Comprehensive Geriatric Assessment

<table>
<thead>
<tr>
<th></th>
<th>No Pre-Op Assessment (N = 54) % n</th>
<th>Pre-Op Assessment (N = 54) % n</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delirium</td>
<td>18.5 (10)</td>
<td>5.6 (3)</td>
<td>0.036</td>
</tr>
<tr>
<td>Uncontrolled Pain</td>
<td>29.6 (16)</td>
<td>1.9 (1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Constipation</td>
<td>29.6 (16)</td>
<td>16.7 (9)</td>
<td>0.085</td>
</tr>
<tr>
<td>Dependent Transfers on day 3 post-op</td>
<td>14.8 (8)</td>
<td>0</td>
<td>0.003</td>
</tr>
<tr>
<td>Mean LOS +/- SD</td>
<td>15.8 +/- 13.2</td>
<td>11.5 +/- 5.2</td>
<td>0.058</td>
</tr>
</tbody>
</table>

Harari D. et al. *Age and Aging* 2007; 36: 190-196
PREVENTION OF POST-OPERATIVE COMPLICATIONS

- Planning for hospital discharge prior to admission
- Improved detection and treatment of comorbidities
- Multi-disciplinary team approach
- Early mobilization
- Home assessment, DME needs, safety
- Adequate pain control
GOALS IN POST-OPERATIVE CARE

- Avoidance of delirium
- Avoidance of complications
- Adequate pain control
- Prevent functional decline
- Discharge to prior level of independence
QUESTIONS?