POSTOPERATIVE DELIRIUM: ACUTE CHANGES WITH LONG-TERM COMPLICATIONS

Dr K. Maasri

Sept 3, 2012
Delirium

Introduction

Changes in

Cognition

Attention

Alteration in consciousness

Disorganized thinking

Acute

Potentially life-threatening

Postoperative organ dysfunction

Incidence 11% - 40%

General/Regional aneshtesia

Anesth Analg. 2011 May;112(5):1202-11
Delirium

Pathophysiology

- Inflammatory pathways
- Ischemic lesions
- Hypercoagulability
- Cholinergic dysfunction
- Impaired connectivity of different brain areas
Delirium

Impact

Patients with postoperative delirium

- High in-hospital mortality (4% - 17%)
- High 1-month mortality
- High 6-months mortality
- High 1-year mortality
- High long-term mortality
- Intraoperative complications
- Longer ICU stay

↑ COST

Anesth Analg. 2011 May;112(5):1202-11
Defining and diagnosing delirium

Algorithm of the Confusion Assessment Method (CAM)

Feature 1: Acute onset & fluctuating course
- Assessment:
  - Preoperative baseline cognitive function
  - Postoperative daily or more frequent cognitive assessment

Feature 2: Inattention
- Assessment:
  - Days of the week / months of the year backward
  - Digit span
  - Serial 7’s

Feature 3: Disorganized thinking
- Assessment:
  - Illusions, Delusions, possible Hallucinations
  - Question patient about illogical ideas

Feature 4: Altered level of consciousness
- Assessment:
  - Richmond Agitation and Sedation Scale
  - Monitor level of consciousness

Anesth Analg. 2011 May;112(5):1202-11
Defining and diagnosing delirium

Algorithm of the Confusion Assessment Method (CAM)

Sensitivity: 79% - 92%

Dutch Study

47%

Binary rating of CAM versus Rating scale (ICDSC from 0-8)

Recognition of subsyndromal delirium

Mortality

No Delirium | Subsyndromal Delirium | Delirium

Dose-response relationship of severity and length of delirium to outcome

Delirium

Incidence of postoperative delirium

- General or Regional aneshtesia

- Hip fracture: 65%
- AAA: 54%
- CABG: 52%
- Peripheral vascular: 51%
- Abdominal: 48%
- Elective orthopedic: 15%
- Urologic: 7%
- Cataract: 4%

Anesth Analg. 2011 May;112(5):1202-11
Preoperative assessment for delirium risk

### Noncardiac surgery

<table>
<thead>
<tr>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥70 years</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Impaired cognitive function</td>
</tr>
<tr>
<td>Impaired physical function</td>
</tr>
<tr>
<td>Abnormal laboratory values</td>
</tr>
<tr>
<td>Alcohol abuse</td>
</tr>
<tr>
<td>Thoracic surgery</td>
</tr>
<tr>
<td>Open-aortic surgery</td>
</tr>
</tbody>
</table>

- **Na⁺** <130 or >150
- **K⁺** <3.0 or >6.0
- **Glucose** <60 or >300

*Anesth Analg. 2011 May;112(5):1202-11*
Preoperative assessment for delirium risk

Cardiac surgery
- Impaired cognitive function
- Low albumin
- Preoperative depressive symptoms
- Prior stroke / TIA

<3.5 g/dl

Age
- Anemia
- Diabetes Mellitus
- Infections
- Preoperative β-Blockers
- Alcohol abuse
- Benzodiazepine abuse
- Nicotine abuse

Anesth Analg. 2011 May;112(5):1202-11
Preoperative assessment for delirium risk

- Preexisting cognitive impairment

- Most common independent risk factor for delirium
  - Preoperative cognitive screening
    - Risk assessment
    - Baseline documentation

- Orientation items
- Observation of conversation

- Not enough

- Use of standardized screening test

Anesth Analg. 2011 May;112(5):1202-11
Preoperative assessment for delirium risk

Preoperative functional status

Independent risk factor for delirium after noncardiac surgery

Assessment of activity of daily living

6 basic care skills
- Feeding
- Bathing
- Grooming
- Using toilet
- Transferring
- Walking

7 Complex activities
- Using telephone
- Grocery shopping
- Using transportation
- Cooking
- Housekeeping
- Taking medications
- Handling finances

Anesth Analg. 2011 May;112(5):1202-11
Preoperative assessment for delirium risk

Abnormal Laboratory values

- Indication of underlying severe disease or organ system dysfunction
- Glucose, Sodium, Potassium, Albumin

- Hypoalbuminemia
  - Malnutrition
  - Drug binding
  - Fluid management
  - Perioperative mortality

- BUN/Cr ≥ 18
  - Dehydration

Anesth Analg. 2011 May;112(5):1202-11
Preoperative assessment for delirium risk

Depression

Relationship to be determined

Preoperative depression

Postoperative depression + Incomplete functional recovery

Anesth Analg. 2011 May;112(5):1202-11
Preoperative assessment for delirium risk

Comorbidities

- Alcohol abuse
- Prior stroke
- TIA

ACUTE WITHDRAWAL

LONG STANDING HISTORY OF ABUSE WITH ABSENCE OF ACTIVE DRINKING

Cerebral damage

Postoperative delirium

History taking before surgery

Cerebral imaging

Anesth Analg. 2011 May;112(5):1202-11
Preoperative assessment for delirium risk

Practical preoperative screening considerations

Age → 5 senses

Sensory input

Cognitive impairment

Perioperative environment

Misinterpretation of communication, Alarms, environment

Improvement of sensory input → Cognitive stimulation

Vision / Hearing devices

Prevention of delirium

Anesth Analg. 2011 May;112(5):1202-11
## Risk estimation of delirium

**Model predicting likelihood of delirium in patients with elective surgery**

### The Marcantonio Model

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Point(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age $\geq$ 70 years</td>
<td>1</td>
</tr>
<tr>
<td>Hx of Alcohol abuse</td>
<td>1</td>
</tr>
<tr>
<td>Baseline cognitive impairment</td>
<td>1</td>
</tr>
<tr>
<td>Severe physical impairment</td>
<td>1</td>
</tr>
<tr>
<td>Abnormal Electolytes or Glucose</td>
<td>1</td>
</tr>
<tr>
<td>Noncardiac thoracic surgery</td>
<td>1</td>
</tr>
<tr>
<td>Abdominal aortic aneurysm surgery</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Score</th>
<th>Risk of postoperative delirium</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2%</td>
</tr>
<tr>
<td>1</td>
<td>11%</td>
</tr>
<tr>
<td>2</td>
<td>50%</td>
</tr>
</tbody>
</table>

Risk estimation of delirium

Independent predictors of incident delirium in medical patients

**Predictors**
- Severe illness (Fever, Infections)
- Baseline dementia
- Dehydration (High BUN/Cr)
- Sensory impairment (Visual)

Application on hip surgery elderly patients

Risk factor(s)

Risk of postoperative delirium

4%
11%
37%

**Prevention of delirium**

<table>
<thead>
<tr>
<th>Module</th>
<th>Postoperative intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive stimulation</td>
<td>Orientation (Clock, Calendar, Orientation board)</td>
</tr>
<tr>
<td></td>
<td>Avoidance of cognitively active medications</td>
</tr>
<tr>
<td>Improving sensory input</td>
<td>Glasses</td>
</tr>
<tr>
<td></td>
<td>Hearing aids, Amplifiers</td>
</tr>
<tr>
<td>Mobilization</td>
<td>Early mobilization and rehabilitation</td>
</tr>
<tr>
<td>Avoidance of psychoactive medications</td>
<td>Elimination of unnecessary medications</td>
</tr>
<tr>
<td></td>
<td>Pain management protocol</td>
</tr>
<tr>
<td>Fluid and nutrition</td>
<td>Fluid management</td>
</tr>
<tr>
<td></td>
<td>Electrolyte monitoring and repletion</td>
</tr>
<tr>
<td></td>
<td>Adequate nutrition protocol</td>
</tr>
<tr>
<td>Avoidance of hospital complications</td>
<td>Bowel protocol</td>
</tr>
<tr>
<td></td>
<td>Early removal of urinary catheters</td>
</tr>
<tr>
<td></td>
<td>Adequate CNS O₂ (Supplemental IO₂ and transfusion for low hematocrit)</td>
</tr>
<tr>
<td></td>
<td>Postoperative complication monitoring protocol</td>
</tr>
</tbody>
</table>

*Anesth Analg. 2011 May;112(5):1202-11*
Prevention of delirium

Pharmacological

- Antipsychotics
- Acetylcholinesterase inhibitors
- Melatonin
Prevention of delirium

Pharmacological

Antipsychotics

- Dopamine antagonist
  - Haloperidol

- Prophylaxis

- No incidence reduction of delirium after hip fracture
  - ↓ Severity
  - ↓ Duration

- ICU patients
  - High potency antipsychotics
  - Atypical antipsychotics
  - Placebo

- HALOPERIDOL

- Hyperactive symptoms
  - Easily missed

- Hypoactive symptoms

BUT

- Avoidance of antipsychotics
  - No difference in days alive without delirium

References:

Anesth Analg. 2011 May;112(5):1202-11
Prevention of delirium

Pharmacological

Acetylcholinesterase inhibitors

Rivastigmine

- Exelon
- Prevention

Randomized controlled trial

ELECTIVE ORTHOPEDIC SURGERY

Mixed results

No effect on delirium incidence

No effect on cognitive performance

No role of acetylcholinesterase inhibitors in delirium prevention

Anesth Analg. 2011 May;112(5):1202-11
Prevention of delirium

**Pharmacological**

- Melatonin

Disturbance of sleep-wake cycle \(\rightarrow\) Promotion of delirium

**Study in Saudi Arabia**

- **203 elderly patients**
  - Hip surgery
  - Spinal anesthesia
  - Placebo
  - Melatonin
    - 5mg BID
    - 49 (32.7%)
    - 53 (9.4%)
  - Midazolam
  - Clonodine
    - 7.5mg at sleep
    - 7.5mg before surgery
    - 50 (44%)
    - 51 (37.3%)

\(\downarrow\) Incidence of delirium with low dose melatonin

# Precipitating factors for delirium

<table>
<thead>
<tr>
<th>Intraoperative</th>
<th>Postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of operation</strong></td>
<td>Early complications of operation</td>
</tr>
<tr>
<td>Hip fracture</td>
<td>Low hematocrit</td>
</tr>
<tr>
<td>Cardiac surgery</td>
<td>Cardiogenic Shock</td>
</tr>
<tr>
<td>Vascular surgery</td>
<td>Hypoxemia</td>
</tr>
<tr>
<td><strong>Complexity of operation</strong></td>
<td>Prolonged intubation</td>
</tr>
<tr>
<td>Operation time</td>
<td>Sedation management</td>
</tr>
<tr>
<td>Shock/Hypotension</td>
<td>Pain</td>
</tr>
<tr>
<td>Arrythmia</td>
<td>Later complications of surgery</td>
</tr>
<tr>
<td>Decreased cardiac output</td>
<td>Low albumin</td>
</tr>
<tr>
<td>Emergency surgery</td>
<td>Abnormal electrolytes</td>
</tr>
<tr>
<td><strong>Operative factors</strong></td>
<td>Iatrogenic complications</td>
</tr>
<tr>
<td>Intraoperative temperature</td>
<td>Pain</td>
</tr>
<tr>
<td>Benzodiazepine administration</td>
<td>Infection</td>
</tr>
<tr>
<td>Propofol administration</td>
<td>Liver failure</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>Renal failure</td>
</tr>
<tr>
<td><strong>Anesthesia factors</strong></td>
<td>Sleep-wake disturbances</td>
</tr>
<tr>
<td>Type of anesthesia</td>
<td>Alcohol withdrawal</td>
</tr>
<tr>
<td>Duration of anesthesia</td>
<td></td>
</tr>
<tr>
<td>Cognitively active medications</td>
<td></td>
</tr>
</tbody>
</table>

*Anesth Analg. 2011 May;112(5):1202-11*
Precipitating factors for delirium

Intraoperative medications

- Inhaled anesthesia
  - Alteration of brain electrical activity
  - Amyloid deposition
  - Apoptosis

- Benzodiazepines
  - Cognition affected
  - Delirium precipitation

- Induction agents

- Regional
  - DEEP SEDATION
  - No reduction in delirium

- Pain medications
  - MEPERIDINE
  - Odds of delirium

Anesth Analg. 2011 May;112(5):1202-11
Precipitating factors for delirium

Intraoperative medications

Benzodiazepines

Cochrane Review

No adequately controlled trials supporting use of benzodiazepines in treatment of non-alcohol withdrawal related delirium

Further research required

Precipitating factors for delirium

**Intraoperative medications**

- Propofol

**Action on GABA<sub>A</sub> receptor**

- Question mark

**Delirogenic**

**Postoperative dysfunction**

- Propofol: 67.5%
- Desflurane: 49.4%

**P = 0.018**

180 patients

Coronary artery bypass surgery

Low incidence of postoperative dysfunction with propofol

Precipitating factors for delirium

Intraoperative medications

Opioids

752 patients

Matched pairs for surgery duration and anesthesia type

Postoperative dysfunction

<table>
<thead>
<tr>
<th>Medication</th>
<th>Percentage</th>
<th>First day Postoperatively</th>
<th>P &lt; 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fentanyl</td>
<td>9.9</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td>Remifentanil</td>
<td>12.2</td>
<td>5.8</td>
<td>P &lt; 0.05</td>
</tr>
</tbody>
</table>

Remifentanil with lower incidence of postoperative delirium in early postoperative period

Precipitating factors for delirium

**Intraoperative medications**

**Acetylcholinesterase inhibitors**

- **Rivastigmine**
  - Treatment
  - Randomized controlled trial
  - **↑ Mortality in the treatment arm**
  - Study stopped

**Avoidance of acetylcholinesterase inhibitors**

**Parameter** | **Rivastigmine** (n = 64) | **Control** (n = 50) | **P value**
--- | --- | --- | ---
Mortality | 12 | 4 | 0.07
Delirium length (days) | 5 | 3 | 0.06

Study in Holland

Prevention of delirium

Intraoperative medications

Ketamine

0.5 mg/kg ketamine

+ Cardiac surgery

29 patients

+ NaCl 0.9%

29

DELIRIUM

3% versus 31%

P < 0.01

CRP levels

mg/dL

Preoperatively Postoperatively

0
1
2
3
4
5
6
7
8
9
10
11
12

0.6
0.7
10.4
8.3

Placebo
Ketamine

P < 0.05

Ketamine with attenuation of postoperative delirium with antiinflammatory effect

Prevention of delirium

Intraoperative medications

Clonidine

Clonidine
Bolus = 0.5\(\mu\)g/kg
Infusion: 1-2 \(\mu\)g/kg/h

30 patients

Aortic Aneurysm Repair

NaCl 0.9%

15 patients

DELIRIUM

↓ Delirium score
↓ Weaning time
↓ ICU stay
↑ Neurological recovery

15

6

BUT

5

Reduction of severity of postoperative delirium with clonidine

Study in Italy

Precipitating factors for delirium

Postoperative medications: Sedation and Analgesia

Intubated patients

- Propofol and/or Midazolam
- Dexmedetomidine
  - Delirium risk

Opioids

- Uncontrollable pain
  - Delirium precipitation
  - Use of standardized age related protocols

- Acetaminophen
  - Opioid requirements
  - Limited cognitive properties

Patient Controlled Analgesia

CAUTION

Anesth Analg. 2011 May;112(5):1202-11
Prevention of delirium

Postoperative medications

- Dexmedetomidine
  - Randomized trial of postoperative sedation
  - Cardiac surgery
  - Versus MIDAZOLAM AND PROPOFOL
  - Incidence of postoperative delirium
  - Benefit for intermediate and high risk patients for delirium

- Dexmedetomidine Group: 3%
- Midazolam Group: 50%
- Propofol Group: 50%

Psychosomatics 2009 May-Jun;50(3):206-17
Precipitating factors for delirium

Depth of Sedation

Study in USA

114 elderly patients

Hip surgery

Spinal anesthesia

57 Light sedation

BIS ≥ 80

11 DELIRIUM

19% versus 40%

P = 0.02

57 Deep sedation

BIS ~ 50

23

Prevention of postoperative delirium with limitation of depth of anesthesia

Precipitating factors for delirium

Postoperative environment

ICU setting

- Busy
- Noisy
- Light filled
- Patient’s assessment
- Patient’s stimulation

Sleep deprivation
Overstimulation

→ Delirium

Balance of patients monitoring with sleep requirements

Consideration of early transfer of stable patients to less intense wards

*Anesth Analg.* 2011 May;112(5):1202-11
Precipitating factors for delirium

Iatrogenic events

- Hospital and/or Surgical complications
  - UTI (catheterization)
  - DVT
  - Pressure ulcers
  - Dehydration
  - Malnutrition
  - Mobility (Restraints, IVs, Face masks)

→ Delirium

Anesth Analg. 2011 May;112(5):1202-11
Reducing Delirium Incidence

Control group

132

Hip surgery

131

Intervention group

263 patients

Age > 65 years
Cognitively intact

Supplemental O₂: 3L-4L/min till Day 2 postop

IV fluids and extra nutrition: Fructose/Glucose started on admission

Increasing monitoring of vitals: BP > 90 mmHg.
Transfusion if Hgb < 100h/L, Normal T°

Adequate pain relief: Opioids + Paracetamol

Delirium screen daily

Avoiding delays

Avoiding polypharmacia

Sedatives + anticholinergics

Perioperative/Anesthetic management:

Premedication: Paracetamol

Anesthesia:
Spinal with Bupivacaine (+0.5L saline-acetate before)
General: Propofol + Opioid +/- Volatile agent
SBP>90mmHg
Transfusion if Hgb < 100g/l

Sedation: Propofol

Analgesia: Paracetamol +/- Opioid

Study in Sweden

• Supplemental O₂: 3L-4L/min if Sat < 95
• IV fluids: LR
• Monitoring of vitals:
BP > 90 mmHg.
Transfusion if Hgb < 100h/L
• Adequate pain relief:
Paracetamol + Opioids
• Avoiding sedatives and anticholinergics
• Perioperative/Anesthetic management:

34% versus 22%
P = 0.031

Role for Cerebral Oxymetry in delirium prediction?

Study in Germany

- 231 patients
- Cardiac surgery

Day -1: CAM, MMSE, ScO₂ on room air, ScO₂ on oxygen

Day +1: 26.8% DELIRIUM

Day +2: NO DELIRIUM

Day +3: 169 patients

## Role for Cerebral Oxymetry in delirium prediction?

### Study in Germany

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Delirium n = 62</th>
<th>Control n = 169</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ScO₂&lt;sub&gt;room&lt;/sub&gt;</td>
<td>58.1 ± 7.7</td>
<td>63.1 ± 7.2</td>
<td>≤ 0.001</td>
</tr>
<tr>
<td>SaO₂&lt;sub&gt;room&lt;/sub&gt;</td>
<td>96.5 ± 1.9</td>
<td>96.1 ± 2.0</td>
<td>0.175</td>
</tr>
<tr>
<td>ScO₂&lt;sub&gt;ox&lt;/sub&gt;</td>
<td>62.8 ± 7.8</td>
<td>67.6 ± 6.9</td>
<td>≤ 0.001</td>
</tr>
<tr>
<td>SaO₂&lt;sub&gt;ox&lt;/sub&gt;</td>
<td>99.5 ± 0.7</td>
<td>99.4 ± 0.9</td>
<td>0.539</td>
</tr>
</tbody>
</table>

### Intraoperative ScO₂

<table>
<thead>
<tr>
<th></th>
<th>Delirium n = 62</th>
<th>Control n = 169</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest ScO₂</td>
<td>48.6 ± 9.3</td>
<td>55.1 ± 8.6</td>
<td>≤ 0.001</td>
</tr>
<tr>
<td>Highest ScO₂</td>
<td>77.4 ± 6.9</td>
<td>81.4 ± 6.4</td>
<td>≤ 0.001</td>
</tr>
</tbody>
</table>

Influence of preoperative /Intraoperative cerebral oxygen on postoperative delirium in cardiac patients

Role for Cerebral Oxymetry in delirium prediction?

Study in Japan

25 patients

Abdominal surgery

20

NO DELIRIUM

5

DELIRIUM

25%

Changes in cerebral saturation during surgery

Changes in cerebral saturation during surgery

Cerebral saturation

Baseline

1 hour

2 hours

3 hours

End of surgery

P < 0.05

No Delirium

Delirium

Low preoperative delirium as predictor for postoperative delirium in non cardiac patients

Evaluation and treatment of delirium

Identifying and treating the etiology

Multifactorial
- History
- Thorough Physical Exam
  - Neurological exam
- Lab Tests
  - CBC, Chem9, UA
- Medications’ review

Anesth Analg. 2011 May;112(5):1202-11
Evaluation and treatment of delirium

Cerebral imaging

CT
- Low diagnostic value

MRI
- Difficulty in performing

Restriction of imaging for those with new focal neurological findings

Anesth Analg. 2011 May;112(5):1202-11
Evaluation and treatment of delirium

Management of agitation associated with delirium

- Thorough review of medications
- Thorough Physical Exam
- Removal of offending precipitants
- Initiation of nonpharmacological treatment
- Initiation of pharmacological treatment

- Antipsychotics (Haloperidol)
  - <6 weeks otherwise \(\uparrow\) mortality
  - If not possible

- Benzodiazepines
  - Prolongation / Worsening of course of delirium
  - Respiratory depression

Pain assessment
Constipation, Urinary retention
Family members

Anesth Analg. 2011 May;112(5):1202-11
Implications of delirium beyond the perioperative period

Persistent delirium

Delirium → Disease with lasting effect

→ 1-year mortality

→ Prevention of functional recovery

Anesth Analg. 2011 May;112(5):1202-11
Implications of delirium beyond the perioperative period

**Postdelirium mental health**

- **Delirium**
  - Acceleration of cognitive decline in Alzheimer patients
  - Association with postoperative depression
  - ?
  - Association with posttraumatic stress disorder-like syndrome

**Long term mental health complications**

*Anesth Analg.* 2011 May;112(5):1202-11
Implications of delirium beyond the perioperative period

- Functional delirium
  - Delirium
    - Functional decline
    - Nursing home placement (3 months)
      - Lack of studies for delirium assessment after 6 months

Anesth Analg. 2011 May;112(5):1202-11
Case

**History**
- Osteoarthritis
- Systolic HTN
- Visual impairment

**Patient**
- 82 year old woman

**Medications**
- β-Blocker
- Thiazide diuretic
- Analgesics
- Multivitamins

**Lab results**
- BUN = 24mg/dL
- Cr = 1.0 mg/dL
- Hgb = 12.8 g/dL
- Albumin = 3.8 gm/dL
- Normal TSH
- Normal Vit B₁₂

**ORIF for hip fracture**

Case

Which is correct?

A. At high risk (>40%) for postoperative cognitive dysfunction

B. 5% - 10% risk of postoperative delirium

C. Postoperative delirium cannot be prevented

D. Reduction of risk of delirium by 25% with preoperative haloperidol (1.5mg/day for 3 days)

Case

Which is correct?

A. At high risk (>40%) for postoperative cognitive dysfunction

B. 5% - 10% risk of postoperative delirium

C. Postoperative delirium cannot be prevented

D. Reduction of risk of delirium by 25% with preoperative haloperidol (1.5mg/day for 3 days)

↓ Reduction
↓ Severity
Same Incidence

Postop Day 2

Patient

- Weak
- Slightly confused
- Not eating
- Crying in pain

Normal neurological exam
Case

Next step?

A  ↑ Physical therapy
B  Starting an antidepressant
C  Insertion of NG tube
D  ↑ Dose of analgesics
Case

Next step?

A  Physical therapy

B  Starting an antidepressant

C  Insertion of NG tube

D  Dose of analgesics

Difficult with pain

Not useful with no Hx of depression

Still premature

Intense pain \rightarrow Delirium

Case

Postop Day 3

Patient

Weak

Fatigued

Previous Hx of

Mild weight loss

Fatigue

↓ Activity

Case

Reason for symptoms?

A. Frailty
B. Early delirium
C. Occult heart failure
D. Adverse drug reaction to her $\beta$-blocker
E. Clinical depression
Case

Reason for symptoms?

A Frailty

B Early delirium No criteria meeting diagnosis of delirium

C Occult heart failure Possible (Common) BUT No Hx of heart disease

D Adverse drug reaction to her β-blocker No weight loss with a drug reaction

E Clinical depression No Hx of depression

Case

Frailty

Minimal physical activity
“"I am doing less”"

Generalized muscle weakness
“"My whole body is weak”"

Slowed performance
“"It takes me a long time to walk”"

Fatigue or poor endurance
“"I need to rest all the time”"

Unintentional weight loss
“"My clothes are too loose on me”"

Strength

Age (years)

Usual (Normal Aging)

Acute illness (surgery)

Rehabilitation

Conclusion

Delirium
- Acute change in cognitive function
- Thought disorganization
- Abnormal level of consciousness

Postoperative Delirium
- Common
- Elderly
- Substantial morbidity/cost/mortality

Early identification + Treatment
- Nonpharmacological
- Pharmacological
Thank You