Perioperative Care in the Elderly

Background

1. Introduction/general info
    - Over half of elderly population will require surgery at least once during their lifetime
    - Surgery in elderly riskier than in younger pts
    - Age decreases functional reserve of organ systems and alters ability to cope with stress of surgery

Pre-Operative Period

1. Patient assessment
    - Detailed H&P as with any Pre-Op evaluation
        - Questions addressing risk factors unique to elderly
2. Risk analysis
    - Risk stratification based on pre-op H&P and testing
    - Different risks associated with surgery in elderly
    - Cognitive impairment
        - Elderly are more likely to suffer from dementia pre-op or exhibit symptoms of delirium in peri-op period
        - Assessment scale to calculate risk of post-op delirium has been developed
        - Risk factors and point values include:
            - Age >= 70 years old (1 point)
            - History of delirium (1 point)
            - Pre-existing cognitive impairment (1 point)
            - Self report of alcohol affected health (2 points)
            - Preoperative use of narcotics (1 point)
            - Admission to neurosurgery service (1 point)
        - Score >= 2:
            - Sens: 73%
            - Spec: 74%
        - Score >= 3:
            - Sens: 93%
            - Spec: 33%
    - Frailty
        - Physiological weakening and stress of surgery
        - Minor surgery can result in organ failure
    - Functional dependency
        - Surgery can alter functionality
            - Those previously able to perform ADLs may have difficulty performing them post-op
        - Assess patient's typical day
        - Appearance and grooming
        - Specifically focus on:
            - Dressing
            - Bathing and cleaning
            - Ease of transfer from chair to upright position
        - Musculoskeletal and neurological exam

- Poor nutrition
  - Disease process may affect pt's appetite
  - Wound healing and rehabilitation adversely affected by poor nutrition
- Other major risks associated with surgery:
  - Congestive heart failure
  - Cardiac ischemia
  - Aspiration
  - Pneumonia
  - Urosepsis

3. Current functional status
   - Pt's typical day
   - Activities performed
   - Frailty
   - Does anyone live with the patient?
   - Who is actively involved in patient's daily life?
4. Current pathology and its roles
   - See
     - PreOperative evaluation
     - PreOp Cardiac Risk ACP
     - PreOp Risk AHA ACC
5. Preoperative testing
   - Studies suggest that majority of preop tests completed are not necessary
     - Although these studies may demonstrate a higher yield in elderly, they remain to be considered unnecessary
   - Great deal of testing depends upon severity of current disease processes and stress of proposed surgery
     - See PreOperative evaluation
   - Social issues
     - Primary care physician involve consolidating information for patients, advance directives and code status
6. Perioperative beta-blocker therapy
   - Pts with moderate-high cardiac risk (Revised Cardiac Risk Index [RCRI] score of 2 or higher) have reduced risk of in-hospital death following perioperative beta-blocker therapy
   - No proven benefit to perioperative beta-blocker therapy without prior cardiac risk stratification
   - Most effective when initiated at least 30 days before surgery and continued throughout hospital stay

Intraoperative Period

1. Pathology, drugs and pharmacokinetics
   - Cardiac pathology associated with aging and anesthesia
     - Conduction system fibrosis:
       - May lead physiologically to first degree block and possible sick sinus syndrome; potent opioids in anesthesia may result in severe bradycardia
     - Conduction system fibrosis:
       - May lead physiologically to 1st degree heart block and sick sinus syndrome

        - Potent opioids in anesthesia may cause severe bradycardia
    - Arteriosclerosis:
        - May lead physiologically to systolic hypertension, stiffening of the left ventricle and impaired diastolic relaxation; this causes increased risk for diastolic dysfunction
    - Decrease in beta receptor activity:
        - May lead physiologically to inability to alter heart rate and impairs the baroreceptors, which may result in labile blood pressures
    - Stiff veins:
        - May lead physiologically to an impaired filling of the right atrium and failure to maintain adequate pressure altering cardiac functioning
    - Increase of basal sympathetic tone:
        - Anesthesia may cause hypotension due to blunting of the sympathetic tone
- Pulmonary pathology associated with aging and anesthesia
    - Resistance to chest expansion:
        - Increased residual volume and increased work of breathing places at increased risk for respiratory failure
    - Decreased muscle mass:
        - Inability to maintain minute ventilation places at increased risk for respiratory failure
    - Decreased lung parenchymal stiffness:
        - Impaired V/Q mismatch leads to increased risk for atelectasis, pneumonia, and hypoxia
    - Impaired airway protection reflex:
        - More frequent aspiration leads to a greater risk of pneumonia and ARDS
    - Blunted CNS responses:
        - Greater sensitivity to anesthetic agents

2. Stress of surgery
    - Surgery and anesthesia create an increased inflammatory response and suppression of cell-mediated immunity
    - Stress response is related to length and invasiveness of surgical procedure, degree of preoperative anxiety, and subjective assessment of postoperative pain

Post-Operative Period

1. Cardiac complications
    - Most common post-op problems:
        - Hypertension
        - Rhythm disturbances
        - Heart failure
    - Post-op hypertension
        - Search for non-cardiac cause (pain, urinary retention)
        - Assess volume status for fluid overload, review fluid management to assess need to start fluids or stop, review previous antihypertensive meds (if any) and confirm that medicines were taken preoperatively

        - To treat uncontrolled essential hypertension, parenteral formulations available include beta-blockers, CCBs, and ACE inhibitors
        - Choice of antihypertensive Tx largely depends on pts' condition
        - If NPO, oral antibiotics should not be used
        - If treated with antihypertensive in preop period, parenteral form of that may be effective
        - If volume overloaded, parenteral furosemide may treat both conditions
        - If tachycardic, parenteral beta blocker may treat both conditions
        - If concomitant heart failure, parenteral ACE inhibitors may improve both conditions
        - If hypertension moderately severe / severe, consider IV nitroprusside
        - As the patient is able to tolerate oral intake, non-parenteral agents can again be used
    - Arrhythmias
        - May result from or lead to ischemia and failure
        - Supraventricular tachycardia - very common in elderly postoperatively (associated with hx of prior SVT, asthma, heart failure, or PACs on preoperative EKG)
        - Attempt restoration of sinus or rate control with infusion of adenosine, CCBs, or a beta blocker
        - Atrial fibrillation - cardioversion, rate control with medications (often beta blockers or CCBs), and anticoagulation are all important aspects of managing postoperative atrial fibrillation; must rule out other cause such as MI
    - Heart failure
        - Can result from fluid overload during procedure, new ischemia, or arrhythmia
        - Rule out new ischemia or arrhythmia and subsequently treat with diuretics, beta blockers, and ACE inhibitors as was most likely the regimen prior to surgery
2. Pulmonary complications
    - Pneumonia
        - Although certain disease states predispose patients to acquiring postoperative pneumonia, the aging process and its effects on physiology in addition to anesthesia predispose patients to pneumonia, particularly aspiration pneumonia
        - Preoperative PFTs should be available on patients that require such for surgery clearance
        - Perioperative respiratory care includes encouragement of coughing, deep breathing exercises, incentive spirometry (which also may aid with atelectasis), and early mobility
    - Pulmonary embolism
        - To reduce the risks of DVT and PE, most hospitals routinely prescribe DVT prophylaxis with either heparin or LMW heparin particularly in elderly patients
        - Postoperative pulmonary emboli can present with shortness of breath, chest pain, hypotension, tachycardia, tachypnea. The gold standard for diagnosis is V/Q scan, although CT may also be used

        - Signs of DVT include unilateral swelling, pain, erythema, calf tenderness, positive Homan's sign. If DVT is suspected, lower extremity doppler should be ordered

3. Kidney / electrolyte complications
    - Assess early signs of kidney damage by measuring intake and output as well as assessing plasma creatinine
    - Impaired renal flow - urine Na will be less than 40 mEq/L and urine creatinine: plasma creatinine will be greater than 10:1
    - Acute Tubular Necrosis - urine sediment may contain granular or epithelial cell casts, urine Na will be greater than 40 mEq/L and urine creatinine: plasma creatinine will be less than 10:1; manage by holding all potentially nephrotoxic drugs and maintaining euvolemic state (indications for dialysis: hypervolemia, hyperkalemia, metabolic acidosis, or encephalopathy); factors that predispose to ATN include: preoperative dehydration, intraoperative fluid imbalance, hypotension, etc
    - Obstructive nephropathy - concern in elderly males with BPH or females with enlarged uterus or fibroids, often the distended bladder can be palpated and placement of a catheter prevents hydronephrosis and further complications
4. GI complications
    - Constipation - particularly a concern when opioids are used for pain control and therefore stool softener should be ordered with the opioids; in patient with hx of constipation, consider altering diet with prunes, prune juice, or other promotility agents
    - Diarrhea - should raise concern for fecal impaction or antibiotic related Clostridium difficile colitis; manage with fluid resuscitation and treatment of underlying cause
5. Endocrine disorders
    - Patients with diabetes often have their oral hypoglycemic agents held during the NPO period. In advancing diet, start with oral agents at half their previous dose and continued control with sliding scale insulin. When normal diet is resumed, continue previous outpatient dosages
    - Patients with diabetes on insulin should be converted to sliding scale during their NPO period
6. Pain control
    - Most patients will require narcotic pain medicines
        - Cognitively intact patients may appreciate better pain control and lower narcotic use if drug administered via PCA pump
        - Patients with less severe pain may only require scheduled acetaminophen (not to exceed 4 g daily) with narcotics prescribed only on a prn basis
        - Cognitively impaired patients or those unable to communicate effectively benefit from scheduled narcotics with regular assessments of the medication effects as well as instructions when to withhold medication
        - Due to adverse side effects of narcotics, consider using cyclooxygenase 2 (COX2) inhibitors, ketorolac, clonidine, gabapentin, and mixed agonist/antagonist narcotics that may enable reduction of narcotic doses

- Adjuncts to medications include ice packs, massage, relaxation techniques

7. Alterations of sensorium
   - Delirium
     - Some studies suggest that the rate of postoperative delirium is as high as 50%
     - Multicomponent interventions have been suggested for the prevention and treatment of delirium, focusing on reducing sleep interruptions, minimizing medications and immobility, enhancing sensory input, and reducing dehydration
     - Such multimodal treatment may include: supplemental oxygen, restoring serum electrolytes to normal limits, stopping high risk medications (ie anticholinergic drugs, benzodiazepines, meperidine, H2 receptor antagonists), assuring adequate nutrition intake, getting the patient out of bed on postoperative day 1, and treating severe pain
   - Cognitive dysfunction
     - Diagnosis must include a new onset of decline in at least two areas of cognitive functioning persisting for at least two weeks after surgery
     - The pathogenesis of postoperative cognitive dysfunction is poorly understood and therefore treatment at this time remains supportive
8. Planning for transitions
   - Long before the patient is ready for discharge, you should have an idea of how the patient will get help if he/she returns home after the hospitalization
   - Physical therapy assessment as well as personal assessment of the patient's ability to walk, change positions, and perform activities of daily living will aid in deciding an appropriate discharge location
   - Transition from the hospital is also a very frustrating and complicated time for a patient
     - Time must be spent adequately explaining new or chronic diagnoses that the patient is suffering from, as well as careful review of new medications, new doses, or discontinued medications
     - Family meetings with members of the patient's household or his/her primary caregiver(s) are an integral step to any discharge whether the patient is returning home or going to a nursing or rehab facility
     - Family meetings are also critical for patients where surgery was merely palliative or noncurative. Transition from the hospital may bring conversations related to end-of-life care and transitioning to a palliative care or hospice team

Conclusions

1. With the ever growing geriatric population, it is becoming ever more important to be knowledgeable of care of elderly patients
2. It is extremely important to remember when caring for the elderly, the patient is not always better when they go home from the hospital
3. It is important to portray honest information to the patient and his/her family and to work with them in developing unifying goals for future care

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Evidence-Based Inquiry

1. Which patients undergoing noncardiac surgery benefit from perioperative beta-blockers?

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