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AGS Geriatrics Healthcare Professionals
Leading Change. Improving Care for Older Adults.

PERIOPERATIVE CARE

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OBJECTIVES

Be able to describe:

- How age-related physiologic changes influence perioperative care
- Perioperative risk factors for cardiovascular, pulmonary, renal, and neurologic complications
- Elements of perioperative management of selected medical problems
- How to avoid iatrogenic complications

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Dr Qadir has no disclosures.
Patient cases used are fictional.

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TOPICS COVERED

- Overview of Operative Therapy for Older People
- Surgical Decision-Making
- Preoperative Assessment and Management
- Perioperative and Postoperative Management of Selected Medical Problems

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SURGERY IS A COMMON TREATMENT FOR OLDER PATIENTS

- More than 40% of all inpatient surgeries are in patients ≥65 years old (>5 million a year)
- Advances in care have lowered surgical risks and shifted the risk-benefit ratio to favor surgery in increasingly older patients with more complex conditions
- While surgery per se is safer, older adults experience a disproportionate majority of postoperative morbidity and mortality

SURGICAL DECISION-MAKING

- Geriatricians should assist in the process of deciding on surgery
- Patient's goals of care should be elicited
- Surgical consultation should be pursued only if consistent with patient-oriented goals
- Goal of geriatric preoperative assessment is not to "clear" for surgery, but perform comprehensive evaluation of medical comorbidities and geriatric vulnerabilities

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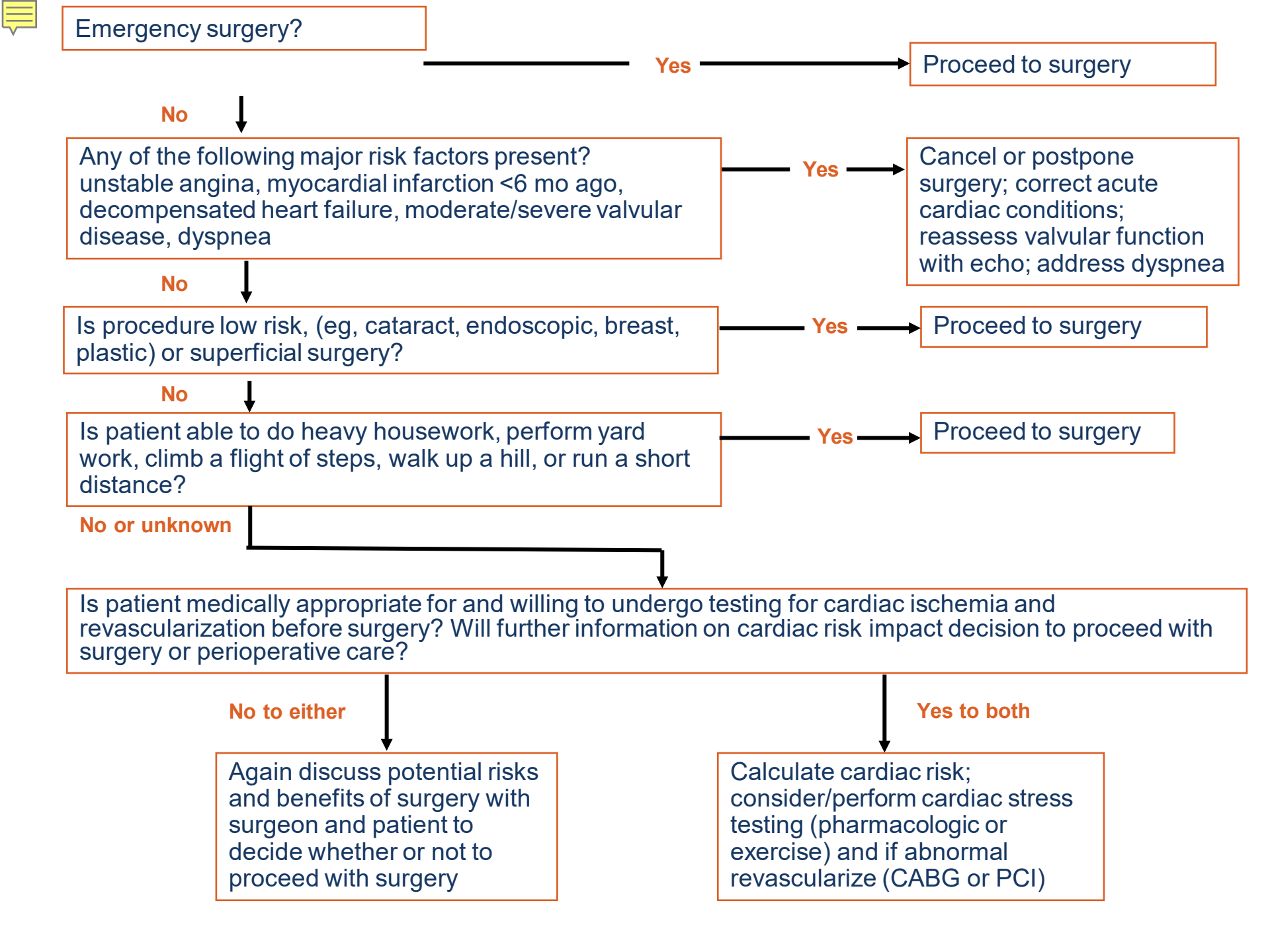
PREOPERATIVE ASSESSMENT: CARDIOVASCULAR SYSTEM

- The risk of postoperative cardiac events is directly related to age
- To calculate cardiac risk:
  - ASA classification
    www.asahq.org/clinical/physicalstatus.htm
  - ACC/AHA guideline
    http://www.onlinejacc.org/content/64/22/e77
    See algorithm on next slide
  - Overall surgical risk: ACS NSQIP Surgical Risk Calculator
    http://www.riskcalculator.facs.org/RiskCalculator/


Emergency surgery?
Yes
Proceed to surgery
No
Any of the following major risk factors present? unstable angina, myocardial infarction <6 mo ago, decompensated heart failure, moderate/severe valvular disease, dyspnea
Yes
Cancel or postpone surgery; correct acute cardiac conditions; reassess valvular function with echo; address dyspnea
No
Is procedure low risk, (eg, cataract, endoscopic, breast, plastic) or superficial surgery?
Yes
Proceed to surgery
No
Is patient able to do heavy housework, perform yard work, climb a flight of steps, walk up a hill, or run a short distance?
Yes
Proceed to surgery
No or unknown
Is patient medically appropriate for and willing to undergo testing for cardiac ischemia and revascularization before surgery? Will further information on cardiac risk impact decision to proceed with surgery or perioperative care?
No to either
Again discuss potential risks and benefits of surgery with surgeon and patient to decide whether or not to proceed with surgery
Yes to both
Calculate cardiac risk; consider/perform cardiac stress testing (pharmacologic or exercise) and if abnormal revascularize (CABG or PCI)

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PREOPERATIVE CARE: CARDIOVASCULAR SYSTEM (1 of 2)

- History and physical should be performed
- Supplemental cardiac testing only useful in the following specific circumstances
  - Pre-op ECG useful as baseline in patients with heart disease undergoing non-low-risk surgery
  - In patients with dyspnea of uncertain cause, consider measurement of LV function
  - In patients with moderate or worse valvular stenosis/regurgitation, check pre-op echo if none in past year

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PREOPERATIVE CARE: CARDIOVASCULAR SYSTEM (2 of 2)

- Major indications for revascularization in the perioperative period
  - Significant unprotected left main vessel disease
  - 3-vessel disease
  - 2-vessel disease with proximal LAD disease
  - Survivors of sudden cardiac death with presumed ischemic ventricular tachycardia
- Pre-op revascularization is typically not associated with reduced MACE unless very high risk (as listed above)

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CESSATION OF ANTICOAGULATION BEFORE SURGERY IN OLDER ADULTS

- Weigh protective benefit versus bleeding risk in patients already on anticoagulation
- Do not withhold for cutaneous surgery, dental extractions, minor oral procedures, or cataract surgery
- For other procedures, cessation of warfarin, with or without low-molecular-weight heparin bridge therapy, is based on patient's risk of thromboembolism
- Similarly, apixaban, rivaroxaban, and dabigatran should be stopped 2–3 days before surgery depending on the bleeding risk associated with the procedure.

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MANAGEMENT OF PATIENTS WITH CORONARY STENTS

- Cohort studies identify substantially increased risk of major adverse cardiac event when surgery is performed soon after a coronary stent is placed
- Optimal timing for non-cardiac elective surgery:
  - Not before 30 days after a bare metal stent
  - Not before 6 months after a drug-eluting stent

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PRE-OPERATIVE BETA-BLOCKERS

- β-Blockers should be continued in patients who are already on a β-blocker for medical indications
- Initiation should be considered in patients with ≥3 cardiovascular risk factors or evidence of myocardial ischemia who are not already on a β-blocker
  - If initiated, it should be started 2-30 days before surgery and titrated to 60-70 bpm
  - Carefully monitor for hypotension and bradycardia
  - Research is mixed on effectiveness to reduce adverse outcomes

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PREOPERATIVE ASSESSMENT: RESPIRATORY SYSTEM

Major risk factors for pulmonary complications:

- ***Patient-related:*** age, COPD, ASA class II or greater, heart failure, ADL deficit, low albumin <3.5
- ***Procedure-related:*** emergency surgery; prolonged surgery (>3 hours); AAA repair; neurosurgery; or thoracic, abdominal, head and neck, or vascular surgery
- General anesthesia is also a risk factor

2007 ACP GUIDELINE

According to the 2007 American College of Physicians Guideline for Risk Assessment and Perioperative Management of Pulmonary Complications:

- Appraise risk factors
- Routine chest x-ray not recommended except for known cardiac or pulmonary disease in patients undergoing thoracic, upper abdominal, or AAA surgery
- Spirometry is recommended for patients suspected of, but not yet diagnosed with, COPD so that COPD managements can be started as appropriate. Spirometry is also indicated for patients who are undergoing lung reduction surgery.
- Post-op lung expansion therapy recommended

PREOPERATIVE ASSESSMENT: KIDNEY FUNCTION

Accurate estimation of GFR is important

- Renal and glomerular blood flow decrease with age, and muscle mass declines, so serum creatinine may appear normal even when kidney function is not.
- The GFR can be estimated by calculating the creatinine clearance using either the Cockcroft-Gault equation or by relying on the Modification of Diet in Renal Disease study (MDRD method) that some laboratories automatically report.
- Many drugs used perioperatively may require dosage adjustment if renal function is impaired.

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PREOPERATIVE ASSESSMENT: EVALUATION OF COGNITION

- Patients with dementia have been found to have increased risk of complications after surgery, including acute kidney failure, pneumonia, and stroke
- Underlying cognitive impairment is a risk factor for development of postoperative delirium
- Postoperative delirium is one of the most common complications affecting up to 50% of older adults
- It is important to document a patient's baseline cognitive evaluation

PREOPERATIVE ASSESSMENT: EVALUATION OF COGNITION

- **Preoperative risk factors for delirium in non-cardiac surgery:**
  - Age ≥ 70 years
  - Cognitive impairment
  - Limited physical function
  - History of alcohol abuse
  - Abnormal serum sodium, potassium, or glucose
  - Intrathoracic surgery or abdominal aneurysm surgery
- **The most important intraoperative risk factor for delirium is blood loss**

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PREOPERATIVE ASSESSENT: SCREENING FOR MALNUTRITION

- Poor nutritional status increases risk of adverse outcomes.
- Perioperative nutrition screen recommended by Joint Consensus Statement on Nutrition Screening and Therapy.
  - Risk factors assessed: BMI <18.5 kg/m^2 (<20 in adults >65 years old), weight loss of >10% / 6 mo, reduced oral intake <50% in the last week and/or preoperative serum albumin <3.0 g/dL.
  - If any answers are yes, should undergo a preoperative nutrition evaluation to optimize nutrition status
  - Consider increasing protein 1.2-1.8g/kg at least 1 week prior

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FUNCTIONAL STATUS AND FRAILTY

- Patients who require help with IADLs, ADLs are at risk of poorer surgical outcomes.
- Frailty has been associated with an increased risk of being discharged to a nursing facility rather than home, and higher rates of delirium, cognitive impairment, functional decline, and death.
- Multiple frailty indices can be used.
- It is important for patients and family members to understand the risks associated with frailty or poorer functional status when considering surgery and to consider whether alternatives may be appropriate, depending on a patient's goals of care.

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ADVANCE CARE PLANNING & POSTOPERATIVE EDUCATION

- Preoperative period is an ideal time to discuss advance care planning
- Patients should be educated about and select a Health Care Proxy
- Discussions should be held to understand the patients wishes if serious complications were to develop
- Counsel the patient and family on nonpharmacologic measures to prevent delirium

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AVOIDING IATROGENIC COMPLICATIONS

- Encourage time out of bed and avoid restraints
  - ➢ Early postoperative consultation of a physical and occupational therapist may be reasonable
- Remove indwelling catheters as soon as possible, to reduce the risk of infection and the effects of restricted mobility
- Stop IV fluids, and lift restrictions on diet as soon as possible
- Review medications daily

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PREHABILITATION

- Pre-habilitation protocols in the literature that were implemented had significant heterogeneity.
- Studies have suggested that pre-habilitation may reduce length of stay, postoperative complications, and costs and improve functional outcomes after surgery through use of nutritional and physical optimization.
- Pre-habilitiation, is included in the American College of Surgeons Strong for Surgery Initiative to improve quality of care.

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ENHANCED RECOVERY AFTER SURGERY (ERAS)

- ERAS is a multidisciplinary, evidence-based approach to the immediate perioperative care of the surgical patient.
- ERAS recommends:
  - Intake of clear liquids and a carbohydrate drink up to 2 hours prior to surgery
  - Prioritizing minimally invasive surgical approaches and avoiding excessive intraoperative IV fluids
  - Early mobilization; early feeding; and multimodal, opioid-sparing pain management
- Implementation of ERAS protocols has led to reduced length of stay, complications, and cost

ANESTHETIC TECHNIQUE

- Insufficient evidence to recommend one particular anesthetic plan for all older adults
- Physiologic changes of aging may have a significant impact on how a patient responds to anesthesia
- If medication needed for postoperative nausea/vomiting,5-HT_3 receptor antagonist (eg, ondansetron) is preferred over anticholinergic medications such as promethazine and transdermal scopolamine

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PERIOPERATIVE CARE: REDUCING RISK OF DELIRIUM

When preoperative risk factors are present, clinicians should be especially vigilant about:

- Reducing sleep interruptions
- Reducing dehydration
- Encouraging mobility, avoiding restraints
- Enhancing sensory input
- Minimizing medications, especially anticholinergic
  - Evidence does NOT support use of antipsychotics for treatment of delirium
- Controlling pain, constipation
- Correct electrolyte abnormalities

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POSTOPERATIVE COGNITIVE DYSFUNCTION

- A syndrome distinct from delirium, characterized by abnormalities in learning and memory
- Most common after cardiac surgery
- Can last for days or become permanent
- Associated with increased risk of mortality
- No demonstrated link to hypotension, hypoxemia, or type of anesthesia
- Treatment is supportive

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POSTOPERATIVE CARE: KIDNEY DAMAGE (1 of 2)

- **Early signs of postoperative kidney damage:**

  oliguria, isosthenuria, increase in serum creatinine

- **Mechanisms of postoperative kidney damage:**
  - **Impaired renal blood flow:** signaled by urine sodium <40 mEq/L, ratio of urine to plasma creatinine >10:1
  - **Acute tubular necrosis:** signaled by urine sodium >40 mEq/L, ratio of urine to plasma creatinine <10:1; urine sediment may have granular or epithelial cell casts
  - **Obstructive nephropathy,** especially in men with prostatic hyperplasia: bladder typically distended, palpable

POSTOPERATIVE CARE: KIDNEY DAMAGE (2 of 2)

- **Acute tubular necrosis:**
  - Hold all potentially nephrotoxic medications and meticulously maintain a euvolemic state
- **Obstructive nephropathy:**
  - Insert a bladder catheter to reduce the risk of hydronephrosis and impaired kidney function

POSTOPERATIVE CARE: GASTROINTESTINAL CONCERNS

Constipation

- Order a scheduled laxative and a stool softener when ordering an opioid analgesic
- Consider suggesting prunes, prune juice, applesauce, bran

Diarrhea

- Check manually for fecal impaction, and consider having stool specimen checked for leukocytes or *Clostridium difficile* toxin
- Focus carefully on volume resuscitation and treating the underlying cause

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POSTOPERATIVE CARE: PAIN (1 of 3)

- The oldest-old and cognitively impaired patients are at highest risk of **undertreatment** of pain
- **Under-treatment** of pain, at least in individuals without dementia, appears to be a **more powerful predictor for development of postoperative delirium than opioid use**
- Postoperative pain is best managed with a multimodal approach

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POSTOPERATIVE CARE: PAIN (2 of 3)

- Scheduled acetaminophen can be used (not to exceed 3 g/d) along with topical options
- Opioids should be used at the lowest effective dose for the shortest time necessary to reduce the risks associated with long-term use.
- Patients discharged to home on opioid analgesia should be given a prescription for naloxone with instructions for its use.

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POSTOPERATIVE CARE: PAIN (3 of 3)

- **Avoid NSAIDs**: potential for GI bleeding, delirium, fluid retention, nephrotoxicity, cardiovascular risks
- **Avoid muscle relaxants** due to risk of delirium
- When starting a pain medication postoperatively, it is best to stick with the geriatric prescribing mantra of “start low and go slow.”
- **Useful adjuncts:** ice packs, heating pads, massage, relaxation techniques

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MANAGEMENT OF URINARY RETENTION

- Patients with preexisting voiding dysfunction and men with prostatic hyperplasia are higher risk
- Constipation can contribute to urinary retention so treating constipation can help both problems
- Limit anticholinergic medications

CHOOSING WISELY® (1 of 2)

Recommendations*:*

- Don’t perform stress cardiac imaging or advanced noninvasive imaging as a preoperative assessment in patients scheduled to undergo low-risk noncardiac surgery.
- Patients who have no cardiac history and good functional status do not require preoperative stress testing before noncardiac thoracic surgery.
- Don’t perform preoperative medical tests for eye surgery unless there are specific medical indications.
- Avoid echocardiograms for preoperative/perioperative assessment of patients with no history or symptoms of heart disease.

CHOOSING WISELY® (2 of 2)

- Don’t order coronary artery calcium scoring for preoperative evaluation for any surgery, irrespective of patient risk.
- Don’t initiate routine evaluation of carotid artery disease before cardiac surgery in the absence of symptoms or other high-risk criteria.
- Before cardiac surgery, there is no need for pulmonary function testing in the absence of respiratory symptoms.
- Don’t obtain preoperative chest radiography in the absence of clinical suspicion for intrathoracic pathology.

SUMMARY

- Surgery is an important therapeutic option for many older people
- Preoperative assessment should be individualized, comprehensive, and, often, multidisciplinary
- Attentive perioperative management minimizes complications in older patients, especially those with chronic medical problems and functional impairments

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CASE 1 (1 of 2)

For patients admitted for hip fracture, which of the following is most likely to decrease if an interprofessional inpatient geriatric team is consulted?

A. Number of delirium episodes
B. Severity of incident delirium
C. Duration of incident delirium
D. 1-Year survival after incident delirium

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CASE 1 (2 of 2)

For patients admitted for hip fracture, which of the following is most likely to decrease if an interprofessional inpatient geriatric team is consulted?

A. Number of delirium episodes

B. Severity of incident delirium

C. Duration of incident delirium

D. 1-Year survival after incident delirium

CASE 2 (1 of 3)

A 72-year-old woman comes to the clinic in preparation for a surgical resection for colon cancer, scheduled in 5 days.

History includes:

- Nonvalvular atrial fibrillation
- Hypertension
- Prior stroke 3 months ago
- Her kidney function is normal
- She remains on dabigatran

She is at moderate risk of thrombosis and at high risk of bleeding.

CASE 2 (2 of 3)

Which of the following is the most appropriate recommendation?

A. Stop dabigatran now and bridge with low-molecular weight heparin (LMWH) before the procedure.
B. Stop dabigatran 2 days before the procedure. No bridging required.
C. Stop dabigatran on the day of the procedure and bridge immediately with LMWH prior to the procedure.
D. No need to stop dabigatran.

CASE 2 (3 of 3)

Which of the following is the most appropriate recommendation?

A. Stop dabigatran now and bridge with low-molecular weight heparin (LMWH) before the procedure.

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