



Optimizing Outcomes in Urological Surgery: Preoperative Care for Patient Undergoing Urologic Surgery or Procedure

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Introduction

- Failure in pre-operative assessment result in increased intra-operative/post-operative morbidity
- From temporary post-operative dementia in geriatric patients to more insidious complications including death
- Financial problem for both the patient and hospital system
- 8% of elective urologic surgeries cancelled within 24 hours
- Incomplete medical work up was a significant source for many of the cancellations

Pre-Operative History/Physical

- Pre-operative history and physical (H+P) must be completed within 30 days prior to surgery
- Update is required within 24 hours after the patient physically arrives

Centers for Medicare & Medicaid Services (CMS) guidelines, 2019

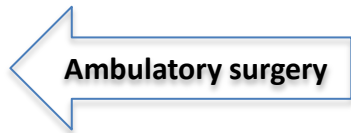
Components of the H+P

- Chief Complaint, History of Present Illness, Allergies, Medications

Physical Exam:

- Patients who need dorsal lithotomy should have lower extremity range of motion.
- Flank, and prone positioning can also be similarly modeled pre-operatively to potentially identify limitations.
- Urostomy or continent stoma benefit from a pre-operative marking of potential stoma sites that are free from skin folds or dermatologic scarring

(ASA) Physical Classification



ASA-PS class	Description
Class I	A normal healthy patient
Class II	A patient with mild systemic disease
Class III	A patient with severe systemic disease
Class IV	A patient with severe systemic disease that is a constant threat to life
Class V	A moribund patient who is not expected to survive without operation
Class VI	A declared brain-dead patient whose organs are being removed for donation

Informed Consent

- A legal and ethical process to protect the patient by promoting decision and voluntary authorization
- Based on three tenets: preconditions, information, and consent

Preconditions: competence and voluntariness of the patient

Information: disclosure of information, recommendation of a care plan and the patient's understanding of the proposed procedure

Consent: patient's decision and authorization

Key components

- 1) if able to indicate his or her treatment choice
- 2) whether understand the relevant information communicated by the clinician
- 3) if acknowledges his or her medication condition
- 4) whether engage in a rational discussion about treatment options

Pre-Operative Education

Key components to discuss

- 1) Type of sedation or anesthesia,
- 2) Incision size and location, surgical approach, drain, device, catheter or stoma care and management,
- 3) Complications and their prevention, pulmonary optimization
- 4) Toileting, ambulation, venous thromboembolism prophylaxis, pain management, bowel function, side effects, recovery timeline

Tailored education

- Stoma marking and ostomy education before cystectomy and ileal conduit urinary diversion creation,
- CIC and irrigation training before cystectomy with neobladder,
- Antiviral medication regimen education before renal transplant
- Urinary catheter care and management before prostatectomy

Specific Elements of Care

- Some patients may only consent for certain procedures to be performed while sedated, such as urinary catheterization or ureteral stent removal
- Types of care: catheterization, intravesical instillation, or intravenous catheter placement

Regarding patient's inadequate comprehension of informed consent process

- 1) Well-designed tools, such as written material, and interactive or audiovisual media, may increase patients' understanding of the information
- 2) Teach back or repeat back is a tool that allows patients to repeat in their own words what they understood about content.

Goals and Expectations

- Pre-operative evaluation and discussion of patient's preferences and wishes
- Majority of elderly pre-operative patients have specific wishes about types of medical treatment
- Shared decision making is encouraged pre-operatively
- Shared decision making is associated with increased patient knowledge and satisfaction, and more realistic expectations, as well as higher patient engagement

Grimaldo DA et al., 2001
AUA White Paper, 2015

Advance Care Planning

- Advance care planning during the informed consent process
- Pre-operative discussion and agreement on one's wishes, goals of care, and treatments
- Healthcare proxy who actively participates in the informed consent process and clearly understands the patient's goals and wishes
- Discussion of the patient's wishes if complications arise or if intra-operative findings prompt an alternative treatment approach

Physical Function, Frailty and Risk Calculators

Pre-operative assessment of “surgical fitness”

- Functional status and frailty: associated with increased risk of post-operative morbidity and mortality

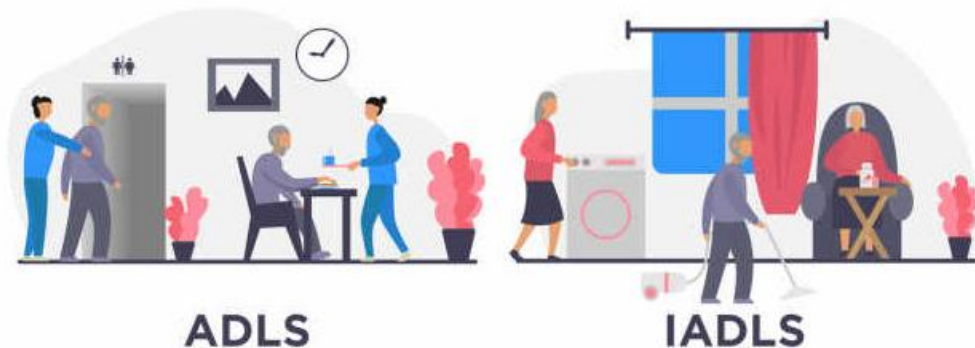
Functional Status

- Pre-operative assessment of physical function is essential, particularly in adults ages ≥ 65
- Poor physical function is associated with increased risk of post-operative surgical complications, increased need for intensive rehabilitation services
- Specifically in older adults, impaired physical function is also associated with increased risk of delirium and surgical site infections with Methicillin-resistant *Staphylococcus aureus* (MRSA)

Physical Function, Frailty and Risk Calculators

Pre-operative functional status

- Activities of daily living (**ADLs**) : grooming, feeding, toileting, bathing, dressing, transferring from bed to chair and ambulating across the room
- Instrumental activities of daily living (**IADLs**) : telephone, accessing transportation away from home, purchasing groceries, preparing meals, housework, laundry, managing medications and managing finances.



Physical Function, Frailty and Risk Calculators

- Impairment in **ADLs** and **IADLs** - strong predictors of sustained post-operative functional impairment and important risk factors for post-operative geriatric syndromes (delirium, functional decline, falls and pressure ulcers)
- 176 patients undergoing PCNL demonstrated that pre-operative impairment of ADLs independently predicted post-operative complications
- In nursing home residents undergoing TURP demonstrated increased risk of TURP failure measured by the presence of a Foley catheter one year after surgery

Frailty

- Decreased physiologic reserve and resistance to stress → poor health outcomes → falls, morbidity, disability, hospitalizations, and death

Criteria	Definition
1. Shrinking (weight loss)	≥10 pounds in the last year
2. Exhaustion	Self-reported exhaustion and endurance measured by 10-item Center for Epidemiological Studies – Depression scale.
3. Weakness	Decreased grip strength measured by a dynamometer adjusted for gender and body mass index.
4. Slow walking speed	Measured by averaging 3 trials of walking 15 feet at a normal pace
5. Low physical activity	Low weekly energy expenditure

Scoring: not frail 0-1, pre-frail 2-3, frail 4-5

Frailty

- Independently predict post-operative complications, length of stay in several urologic surgeries from partial nephrectomy to TURP
- For radical cystectomy, FI > 3+ had a greater likelihood of experiencing a major complication (odds ratio 3.22, 95% CI 2.01–5.17)
- Similar findings in RALP and pelvic organ prolapse



Cognitive Impairment and Delirium

Cognitive Impairment

- Exceedingly high in older population, accounting for 14-22% of individuals ages ≥ 71
- Cognitive impairment and dementia \rightarrow post-operative delirium \rightarrow poor surgical outcomes

Baseline cognitive impairment

- Post-operative complications (41 percent vs 24 percent, $p=0.011$)
- Higher incidence of delirium (78 percent vs 37 percent; $p<0.001$)
- Longer hospital stays (15 +/- 14 vs 9 +/- 9 days; $p=0.001$)
- Higher six-month mortality (13 percent vs 5 percent; $p=0.040$)
- Cognitive impairment + physical frailty \rightarrow worse outcomes than either (3.92 times higher risk of death)

Post-operative Delirium

- Increased mortality and post-operative complications (including falls), longer hospital lengths of stay, longer ICU lengths, and higher rates of discharge to skilled nursing facilities
- Increased costs of care
- Occurring in up to 9% of older patients undergoing major, elective non-cardiac operations and 44% of post-operative patients ICU stay
- Patients (> ages 65 yrs) undergoing urologic surgery found the incidence of delirium to be 26%
- Older age, medications, surgical stress, biochemical imbalances, hemodynamic problems and electrolyte disorders

Post-operative Delirium

- After radical cystectomy and TURP - 29 %(lasting one to five days)
- Pre-operative cognitive impairment - predictors of post-operative delirium (17-fold increased risk of developing this syndrome)

Cognitive and behavioral disorders
Cognitive impairment and dementia
Untreated or inadequately controlled pain
Depression
Alcohol use
Sleep deprivation
Disease- or illness-related
Severe illness or comorbidities
Renal insufficiency
Anemia
Metabolic
Poor nutrition
Dehydration
Electrolyte abnormalities
Functional impairments
Poor functional status
Immobilization
Hearing or vision impairment
Other
Older age \geq 70 years
Polypharmacy and use of psychotropic medications (benzodiazepines, anticholinergics, and antihistamines)
Risk of urinary retention or constipation, presence of urinary catheter

Pre-operative Evaluation of Pulmonary Risk

- Post-operative pulmonary complications occur in up to 6% of major abdominal surgery
- Up to 25% of patients dying as a result of post-operative respiratory failure

Patient and procedure-related risk factors

- Patient characteristics: (age >60 years, chronic lung disease, cigarette use, CHF, functional dependence (for activities of daily living), ASA classification, obesity, asthma, OSA, impaired sensorium, alcohol use)
- Procedure specific risk factors: procedures lasting >4 hours, abdominal surgery, and emergent surgery

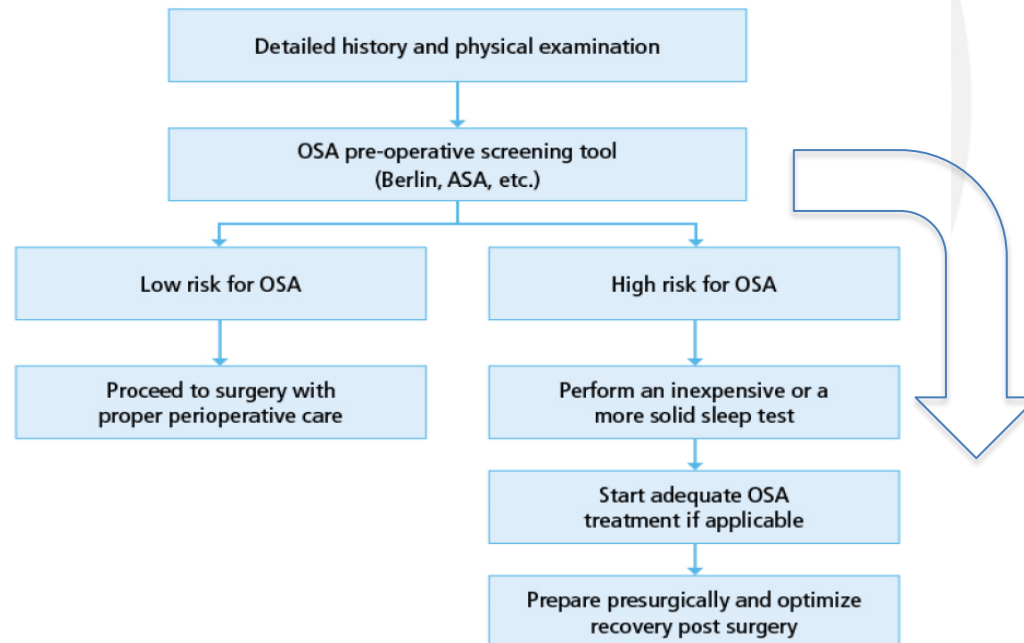
Obstructive Sleep Apnea

- OSA: 10-17% of men > 3-9% of women
- Sleep disordered breathing - a risk for potentially significant intra-operative morbidity
- Risk factors of OSA - Obesity, abnormal upper airway anatomy and cardiovascular disease
- Main intraoperative risk - upper airway collapse, hypoxemia and difficult airway control
- OSA - increase in postoperative complications (Odds Ratio of 2.43)

Obstructive Sleep Apnea

To reduce intraoperative and postoperative complications

- Consistent use of CPAP pre-operatively and post-operatively is the most effective
- Preoperatively identifying suspicion of OSA due to the potentially significant morbidity associated with unrecognized and untreated OSA



Pre-operative Pulmonary Testing

PFT, CHEST Radiographs

Albumin

- Severe nutritional deficiency - risk for post op complication
- **Serum albumin (<30 g/L)** is an independent risk factor for the development of post-operative pulmonary complications as well as early post-operative morbidity and mortality in urologic oncology patients.
- Pre-operative nutritional supplementation prior to elective urologic surgery.

Pre-operative Evaluation of Cardiac Risk

- The risks of cardiovascular event - both patient and procedure specific factors
- All urologic surgery should have an assessment of their cardiovascular risk prior to surgery
- Erectile dysfunction often precedes cardiovascular disease, and may be a marker of cardiovascular disease
- (ACC/AHA) guideline on perioperative cardiovascular evaluation stratifying patients into low-risk and high-risk procedures

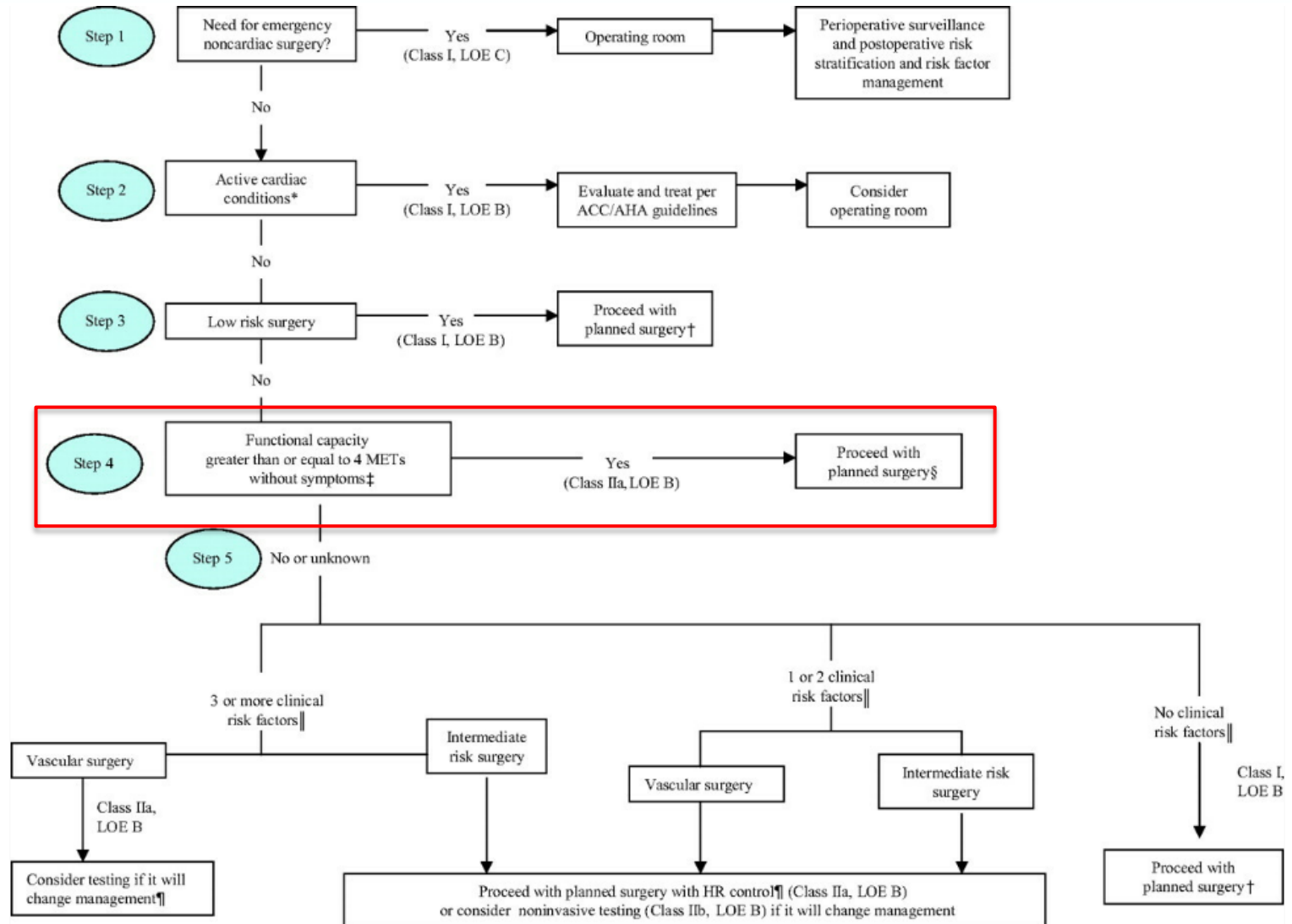
Determine Health Status

Metabolic Equivalents of Functional Capacity

Excellent (>7 METs)	Moderate (4 to 7 METs)	Poor (<4 METs)
Squash Jogging (10-minute mile) Scrubbing floors Singles tennis	Cycling Climbing a flight of stairs Golf (without cart) Walking 4 mph Yardwork (e.g., raking leaves, weeding, pushing a power mower)	Vacuuming Activities of daily living (e.g., eating, dressing, bathing) Walking 2 mph Writing

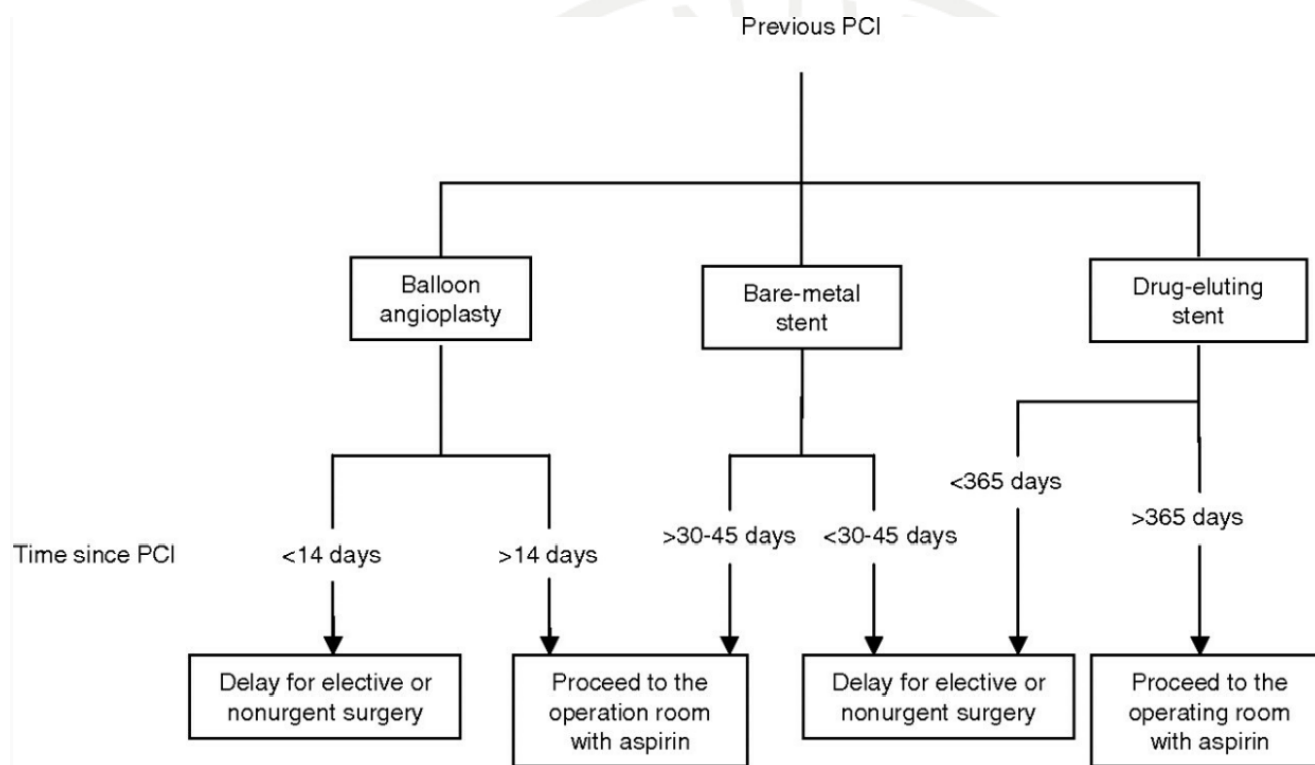
METs = metabolic equivalents.

Cardiac Evaluation Algorithm for Non-Cardiac Surgery



Previous Percutaneous Coronary Intervention

Timing of Elective Surgery in Patients with Previous PCI



- Dual antiplatelet (AP) therapy should not be discontinued for elective urologic surgery in patients who had a BMS within 30 days or DES within one year

Management of Anticoagulation/Antiplatelet

AUA recommendation

- For clopidogrel or aspirin for secondary stroke prevention, especially for recent events, it is recommended to **continue aspirin**
- Dual antiplatelet (AP) therapy **should not be discontinued** for elective urologic surgery in **BMS within 30 days** or **DES within one year**
- For **low-dose aspirin alone**, can be **continued** in the perioperative period without increased risk of major bleeding
- In patient with atrial fibrillation, warfarin can **be stopped five days** before high risk surgical procedures and should be restarted 12 to 24 hours after surgery if the bleeding risk is acceptable

Management of Anticoagulation/Antiplatelet

- AC (anticoagulant) and AP (anti-platelet) agents should be discontinued prior to SWL
- In low-risk group, therapy was simply discontinued 8 days before SWL; in higher risk group should be referred to cardiologist
- Ureteroscopy with laser lithotripsy can be performed with continuing oral AC/AP therapy
- Oral AC/AP medications should be stopped prior to PNL (discontinuation of AC 10 days preoperatively and resumed 5 days post-operatively)
- In selected patients, laser prostate surgery can be safely accomplished for the patient with INR significant risk of thrombosis without the discontinuation of oral AC/AP
- AC/AP in TURP cause increased risk of bleeding complications during perioperative period
- TRUS Prostate biopsy can be performed safely on low dose aspirin with a risk of minor bleeding approximately 1/3 higher than controls

Pre-operative Evaluation of Stroke Risk

Pre-operative Carotid Artery Revascularization

- Patients with symptomatic, high-grade carotid artery stenosis (>70 percent stenosis) should have carotid artery stenting or endarterectomy prior to elective urologic surgery

Pre-operative Management of Atrial Fibrillation and Anticoagulation

- Patients on antiarrhythmic or rate controlling agents should continue these medications for the intraoperative period
- As discussed previously, patients on clopidogrel or aspirin for secondary stroke prevention, especially for recent events, should continue aspirin through the intraoperative period.

Diabetes

- Surgery cause a neuroendocrine stress response → increase in epinephrine and cortisol → hyperglycemia
- Some unable to regulate this hyperglycemia due to an underlying lack of insulin production
- Hyperglycemia can also cause poor wound healing and increased coagulation
- Preoperative HbA1c levels > 8% were associated with longer hospital lengths of stay
- NHS pre-operative guidelines recommend delaying elective surgery if HbA1c >7% and suggest cancelling for blood sugar measurements 400-500 mg/dL

Ciaraldi et al., 2002
Feely et al., 2013
Underwood et al., 2014

Steroids

- Patients should be educated not to arbitrarily stop steroids
- Since patients taking prednisone 20mg daily for at least three weeks may experience some adrenal crisis if steroid is suddenly stopped
- Steroid doses adjusted prior to surgery is needed on long-term steroid uses for >3 weeks to prevent potential gastrointestinal bleeding risk or reactive airway issues during surgery.
- In general, most patients should continue current steroid dosing up to scheduled surgery and take the medication the night before surgery

Culkin et al., 2014
Wabnitz et al., 2017

Pre-operative Fasting

Reduce the risk of intra-operative aspiration events

- Solids and non-human milk products, a light meal may be ingested up to six hours before general anesthesia
- More fasting time may be needed for intake of fried or fatty foods or meat

Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents, 2017

Bowel Preparations

- No evidence to suggest that a mechanical bowel prep before RC with ileal diversion reduces risk of bowel leak, obstruction or overall mortality
- European guidelines state that a mechanical bowel prep before RC with ileal diversion is not needed
- More data suggesting that oral antibiotic prep have efficacy in reducing surgical site infections during colonic surgery
- Most oral antibiotic bowel preps include aminoglycosides, macrolides, and/or polymyxins
- Oral and IV antibiotics were superior in reducing surgical site infections during colon surgery compared to IV antibiotics alone

Witjes et al., 2014
Bellows et al., 2017
Chi et al., 2015

Renal

- ESRD: increased risk of morbidity and mortality after surgery due to electrolyte imbalances
- Evaluation for hyperkalemia (>5.5 mmol/L), altered acid base status, prolonged bleeding times, and anemia.
- ESRD patients can potentially be at risk for cardiovascular events.
- Antibiotic prophylaxis against endocarditis for ESRD patients on dialysis

Krishnan et al., 2002
Goldblum et al., 1980

Modifiable Pre-operative Factors

Prehabilitation

- Process of improving a patient's fitness prior to surgery involving cardiovascular and strength conditioning
- Older or frail patients are less likely to have the physiologic reserve to compensate for the increased aerobic demands of major surgery.
- Inverse relationship between pre-operative aerobic capacity and poor surgical outcomes
- Poor cardiopulmonary conditioning prior to cystectomy showed 5.5 times more likely to have complications at 90days and prolonged LOS
- Aerobic capacity is trainable over a short period before surgery by exercise program
- 40% for 90-day hospital readmission rates in radical cystectomy and significantly higher rate of death within two years of surgery

Prehabilitation

- Exercise interventions prior to surgery: from walking programs to more-intense exercise protocols
- Even a limited period of exercise is cardio-protective and help avoid ischemic events
- 1 to 3 episodes of exercise per week will provide strong cardio-protection; gradual, modest cardiovascular risk factor modification
- Majority of the prehabilitation interventions in urology have focused on the cystectomy population
- 2 week, in-home, patient directed strength program: 66% patients completed and resulted in an 18% improvement in muscle power compared to the control group

Prehabilitation

In prostatectomy patients

- Pre-operative pelvic floor muscle exercises (PFME) for fast recovery of post-op urinary continence
- Pre-op + post-op PFME had superior continence outcomes compared with post-op PFME alone (59.3% vs. 37.3%, $p=0.028$) after RP
- Prehabilitation prior to major urologic surgery can reduce post-op complications, shorten, and LOS

Centemero et al., 2010
Singh et al., 2017

Behavioral Interventions Prior to Surgery

Smoking Cessation (at least 4weeks)

- For reduced post-operative complications
- For wound healing

Managing Anxiety and Expectations

- Higher anxiety levels: delayed recovery from general anesthesia
- Pre-operative anxiety: linked to post-operative wound complications, longer post-operative stay, risk for readmission
- Education and managing patient expectations
- Simplest and most direct method is discussion with the surgeon

Summary

- Complete pre-operative evaluation and assessment is important for urologic patients scheduled to undergo a surgical or procedural intervention
- Pre-operative process can involve multiple different steps, based on an individual **patient's needs**, and a “**team approach**” can be beneficial to **maximizing a patient's readiness for surgery**
- Program will help improve patient outcomes after urologic surgery



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