Perioperative Management of Chronic Medications

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Case

A 72-year-old female with multiple medical problems is scheduled for outpatient surgery in two weeks. How should her home medications be managed?

- Aspirin
- Carbidopa/Levodopa
- Celecoxib
- Clonidine
- Estradiol
- Ginkgo
- Lisinopril
- NPH insulin
- Prednisone 10 mg a day for years
- Sulfasalazine
Objectives

- Guiding principles

- Rationale behind continuing or discontinuing:
  - Antiplatelet drugs
  - Cardiovascular drugs
  - CNS-active drugs
  - Diabetic drugs
  - Hormones
  - Non-steroidal anti-inflammatory drugs (NSAIDs)
  - Corticosteroids
  - Disease-modifying antirheumatic drugs (DMARDs)
  - Biological response modifiers (BRMs)
  - Herbal medicines
Guiding Principles

- Avoid progression or decompensation of disease
- Avoid withdrawal
- Avoid interactions with anesthesia
- Avoid perioperative complications
Drugs to Continue

- Very long half-life or biologic effect
- Significant withdrawal symptoms
- No significant interactions with anesthesia
- No significant risk of perioperative complications
Antiplatelet Drugs to Continue

☑ Aspirin
  • Continue if history of CAD, POBA, or PCI\textsuperscript{1}
  • Irreversibly inhibits platelet aggregation
  • Stop 7 days before surgery, if indicated\textsuperscript{2}

☑ Clopidogrel
  • Continue with aspirin if surgery within 30 days of bare-metal or 365 days of drug-eluting stent\textsuperscript{1}
  • Irreversibly inhibits platelet aggregation
  • Stop 7 days before surgery, if indicated\textsuperscript{2}
  • Consider a loading dose if stopped\textsuperscript{2}

\textsuperscript{1} Circulation. 2007;116:1971-1996.
\textsuperscript{2} Micromedex.
CV Drugs to Continue

☑ Beta-blockers
  • Continue if already taking for ACCF/AHA class I indication (Class I)\(^1\)
  • Start and titrate to HR < 65 in high-risk patients (CAD, ischemia on cardiac stress testing, more than 1 clinical risk factor, surgical risk) (Class IIa)\(^1\)
  • Usefulness is uncertain in patients with one or fewer risk factors (Class IIb)\(^1\)
  • Do not administer if there is a contraindication (Class III)\(^1\)
  • Do not start high-dose beta-blockers without dose titration (Class III)\(^1\)
    • POISE: metoprolol 100 mg pre-, 100 mg post-

\(^1\) *J Am Coll Cardiol.* 2009;54:2102-2128.
CV Drugs to Continue

☑️ Statins

- ACC/AHA 2007 perioperative guidelines:
  - Continue if already taking (Class I)$^1$
  - Reasonable if vascular surgery (Class IIa)$^1$
  - Consider if more than 1 clinical risk factor and intermediate-risk surgery (Class IIb)$^1$

- In vascular surgery patients, statin withdrawal was associated with a 4.6-fold increase in post-operative troponin release > 0.1 ng/ml and a 7.5-fold increase in post-operative MI and cardiovascular death$^2$

$^2$ Am J Cardiol. 2007;100:316-320.
CV Drugs to Continue

☑ Amiodarone
  • Elimination t\(_{1/2}\) up to 142 days\(^1\)

☑ Digoxin
  • Elimination t\(_{1/2}\) up to 48 hours\(^1\)

☑ Calcium-channel blockers
  • Caution if LVEF < 40%\(^2\)

\(^1\) Micromedex.
CV Drugs to Continue

✓ Clonidine
  • Risk of severe rebound hypertension\(^1\)
  • Convert to patch and taper off oral dose 48-72 hours in advance if anticipated extended NPO status\(^1\)

➢ ACC/AHA: Consider in patients with CAD or more than 1 clinical risk factor for perioperative control of hypertension (Class IIb)\(^2\)

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\(^1\) Med Clin N Am. 2001;85:1117-1128.
CNS Drugs to Continue

✓ Antiepileptics, antipsychotics, benzodiazepines, bupropion, gabapentin, lithium, mirtazapine, SSRIs, SNRIs, TCAs, valproic acid.
  • Risk of withdrawal and disease decompensation

✓ Carbidopa/Levodopa
  • Withdrawal with rapid worsening of Parkinsonian symptoms

✓ Monoamine oxidase inhibitors (MAOI)
  • Use MAOI-safe anesthesia without dextromethorphan, epinephrine, mepiridine, or norepinephrine

Diabetic Drugs to Continue

☑ Insulin
  • Continue glargine without dose adjustment\(^1\)
  • Continue usual basal rate with insulin pump\(^1\)
  • No short-acting insulin or insulin mixes within 4 hours of surgery\(^1\)
  • Give half the intermediate insulin (e.g. NPH) dose the day of surgery with D5 drip perioperatively\(^1\)

☑ Incretins (exenatide, sitagliptin)
  • Do not cause hypoglycemia in the absence of insulin\(^1\)

☑ Thiazolidinediones (pioglitazone, rosiglitazone)
  • Very long duration of biological action

Hormones to Continue

☑ Antithyroid medications (methimazole, PTU)

☑ Levothyroxine
  • Elimination $t_{1/2}$ up to 7 days$^1$

$^1$ Micromedex.
Continuing Corticosteroids

- Prednisone 5 mg/day for 5 days within 30 days of surgery can result in adrenal insufficiency\(^1\)

- Normal cortisol release from surgery 50-150 mg\(^1\)

- Continue outpatient corticosteroid dose plus add a stress dose

\(^1\) *Endocrinol Metab Clin N Am. 2003;32:367-383.*
Stress-Dose Corticosteroids

- Minor surgery (local anesthesia, duration less than one hour):
  - Hydrocortisone 25 mg IV or methylprednisolone 5 mg IV during surgery

- Moderate surgery (lower extremity vascular, joint replacement, open cholecystectomy):
  - Hydrocortisone 50-75 mg IV or methylprednisolone 10-15 mg IV during surgery, tapering to baseline dose over 1-2 days

- Major surgery (cardiothoracic, Whipple):
  - Methylprednisolone 10 mg IV every 8 hours, tapering to baseline dose over 2-3 days

Other Drugs to Continue

☑ Selective COX-2 inhibitors
  • No effect on platelet aggregation
  • Hold 2-3 days before surgery if concern for impaired renal function

☑ HIV therapy

☑ Hydroxychloroquine

☑ Inhaled beta-agonists, inhaled corticosteroids, ipratropium, theophylline, tiotropium.

☑ Myasthenia gravis therapy
Drugs to Stop

- Risk of significant interactions with anesthesia
- Risk of significant perioperative complications
CV Drugs to Stop

❖ **ACEI and ARB**
  - Risk of hypotension requiring vasopressors during induction of anesthesia 50% higher in a systematic review\(^1\)
  - Risk of post-operative acute renal failure after cardiothoracic surgery 28% higher in one recent study\(^2\) but 52% lower in another\(^3\)
  - Consider stopping 1 day before surgery

❖ **Diuretics**
  - Risk of dehydration and electrolyte imbalance due to NPO status

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Diabetic Drugs to Stop

- Metformin
  - FDA Black Box Warning to discontinue before any intravascular radiocontrast study or surgical procedure\(^1\)
  - Lactic acidosis is rare but carries a mortality of 50%\(^1\)
  - Stop 24 hours before surgery, restart 48-72 hours after\(^2\)
  - Confirm normal renal function before restarting\(^2\)

- Sulfonylureas (glimepiride, glipizide, glyburide)
  - Risk of hypoglycemia
  - Stop the night before surgery

\(^1\) Micromedex.
Hormones to Stop

- Oral contraceptives, hormone replacement therapy, raloxifene
  - In analysis of HERS trial, DVT risk was 4.9 times higher for 90 days after surgery in patients taking estrogen/progesterone hormone replacement therapy, although unclear if routine DVT prophylaxis was used
  - Non-surgical DVT risk remained 2.5 times higher for 30 days after cessation of HRT

- Consider stopping 4 weeks before surgery when prolonged immobilization is expected
- Consider longer and more intensive DVT prophylaxis

NSAIDs to Stop

- Non-selective COX inhibitors
  - Reversibly inhibit platelets only while drug is present in circulation\(^1\)
  - Stop 1-3 days before surgery

\(^1\) Micromedex.
DMARDs to Stop

✔ Methotrexate
  • Increased risk of wound infections and dehiscence
  • Decreased risk of post-operative disease flare
  • Stop 2 weeks before surgery if medical comorbidities, advanced age, or on prednisone over 10 mg/day\(^1\)

✔ Leflunomide
  • Renally cleared with elimination \(t_{1/2}\) of 2 weeks\(^1\)
  • Risk of myelosuppression
  • Stop 2 weeks before surgery, restart 3 days after

✔ Azathioprine, sulfasalazine
  • Renally cleared with risk of myelosuppression\(^1\)
  • Stop 1 day before surgery, resume 3 days after

\(^1\) Cur Opin Rheumatol. 2004;16:192-198.
BRMs to Stop

- Anti-TNF-α (adalimumab, etanercept, infliximab)
- IL1 antagonists (anakinra)
- Anti-CD20 (rituximab)
  - Increased risk of wound infections and dehiscence
  - Decreased risk of post-operative disease flare
  - Stop 1 week before surgery, resume 1-2 weeks after

Herbal Medicines to Stop

- Used by up to a third of U.S. population

- Can have significant perioperative implications:
  - Cardiovascular instability (ginseng, ma huang)
  - Hypoglycemia (ginseng)
  - Immunosuppression (echinacea use for > 8 weeks)
  - Increased risk of bleeding (garlic, ginkgo, ginseng)
  - Prolongation of anesthesia (kava, St. John's wort, valerian)

STOP 1-2 weeks before surgery

*JAMA.* 2001;286:208-216.
Case Revisited

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Summary

Balance risks vs. benefits of drugs in each patient

☑ Continue
  • Antiplatelet therapy
  • Beta-blockers
  • Statins
  • Calcium channel blockers
  • Clonidine
  • Amiodarone
  • Digoxin
  • All CNS drugs
  • Insulin, with adjustments
  • TZDs and incretins
  • Thyroid drugs
  • Corticosteroids, with stress dose
  • COX-2 inhibitors
  • HIV drugs
  • Hydroxychloroquine

☒ Stop
  • ACEI and ARBs
  • Diuretics
  • Metformin
  • Sulfonylureas
  • OCPs, HRT, SERMs
  • Non-selective COX inhibitors
  • DMARDs
  • BRMs
  • Herbal medicines