Guidelines

Preoperative Clinicians (e.g., Primary Care Clinician, Perioperative Clinician, etc.)

Perioperative Glycemic Control

- **At the time a referral for major elective surgery is considered, evaluate glycemic control** for patients with or at risk for diabetes (e.g., age 45+, BM 30 kg/m2 +, familial history of diabetes, past medical history of gestational diabetes) (AAFP)
- Perform testing as early as possible in presurgical process (i.e. with enough time to be able to make changes to optimize patient health).
- Screen for health-related social needs, including food insecurity
    - Consider using tools (such as the Protocol for Responding to and Assessing Patients' Assets, Risks and Experiences(PRAPARE)) and document results in the medical record.
    - Refer to staff or community organization that can help to address identified needs (e.g., team social worker, local resource hub, etc.)
- **For patients with diabetes**:
    - Perform a preoperative risk assessment for people at high risk for ischemic heart disease, those with autonomic neuropathy or renal failure, per most updated American Diabetes Association guidelines.
    - Discuss and determine goals (e.g., reduction of HbA1c, increase in hemoglobin/hematocrit levels) of medical optimization of glycemic control and anemia before surgery in collaboration with the patient and their support system as appropriate.
    - Set an HbA1c goal for surgery
        - **Whenever possible, target should be HbA1c <8%.**
        - HbA1c is highly individualized, and goals of optimization should be made between patients and providers considering co-occurring conditions and risks for hypoglycemic events. **See Appendix C for common clinical conditions that affect HbA1c.**
    - Consider referring to a certified diabetes education specialist and/or registered dietician/nutritionist for support with optimization.
    - Consider referral to a Diabetes Prevention Program as applicable.
    - Plan medication management as appropriate, including but not limited to:[v]
        - Insulin transition plans for insulin-dependent patients with diabetes, including those on automated insulin delivery systems (AID)
            - Basal insulin plus pre-meal short- or rapid-acting coverage supports improved glycemic outcomes and lower perioperative complications.
            - Reduction of 25% basal insulin dose given evening before surgery can lower risk of hypoglycemia.

        - Consider holding oral diabetes medications
            - Newer oral meds all have prolonged fasting recommendations (currently clears only for 24hrs) and some may require holding for 72+ hrs: GLP-1 RAs and/or GLP-1/GIP Ras, DPP-4 inhibitors, SGLT2 inhibitors
        - Holding versus continuing other meds will depend on renal function and other patient factors: Oral anti-hypergletformin, sulfonylureas, meglitinides, thiazolidinediones, etc. Consider holding SGLT2 inhibitors 3-4 days before surgery[vi]
        - If a patient is unable to demonstrate good glycemic control (e.g., HbA1c < 8%), or plan for good glycemic control,
            - Consider the benefits and risks of recommending delaying the procedure until reaching the patient's individualized threshold for glycemic control. May also be influenced by availability of intensive perioperative glycemic control resources (e.g. inpatient admission).
            - Consider waiting to schedule the elective procedure until patient reaches their individualized threshold for glycemic control optimization
    - **Communicate glycemic control status and optimization plan to surgery team** in referral and/or handoff. Plans should include, but are not limited to:
        - Medication initiation or adjustment points for patients with elevated HbA1c.
        - Nutritional support as needed, including referral to registered dietician/nutritionist
        - Close follow up plan to re-check blood glucose before procedure and threshold by which to consider delaying procedure
        - Plan for and schedule close outpatient follow-up for patients with anticipated intraoperative hyperglycemia (e.g., schedule an appointment within 1-week post-operative for patients with ~~un~~controlled diabetes)

Preoperative Anemia Optimization

As early as possible in the presurgical process in anyone being considered for intermediate, moderate, or high risk surgery, screen for anemia with complete blood count .

- For patients with anemia (Hb <13g/dL), identify underlying cause of anemia. Assessment should include the following
    - Reflexively test iron studies.
    - Comprehensive medical and medication history and physical exam
    - Order other lab tests as indicated to diagnose underlying cause. Consider the algorithm in Appendix H and other evidence-based resources for evaluation of anemia in healthy individuals in outpatient setting. Minimize blood draw amount (e.g., Peds tubes) when able

- If iron deficiency anemia is suspected, consider further evaluation to determine underlying cause
    - Blood loss (e.g., gastrointestinal, cancer, gynecological)
    - Autoimmune or chronic disease (e.g. kidney, rheumatoid, etc)
    - Decreased absorption due to gastrointestinal illness (celiac disease, gastrectomy, gastric bypass, resection, H. pylori, inflammatory bowel disease), medications (antacids, proton pump inhibitors, ESAs) or food (calcium, tannins, phytates)
    - Pregnancy
    - Iron-poor diet
- Discuss and determine goals of treatment for anemia with the patient, including likely time course needed for treatments (4-6 weeks or more), including cause of anemia and individual patient factors and circumstances.
- Treat anemia to optimize prior to surgery (goal = HgB > 12 g/dL)
    - For those with identified cause of anemia, treat the underlying cause
    - For patients with isolated iron deficiency anemia, supplement with iron formulation unless contraindicated. Consult pharmacy as able to support selecting iron supplementation methods that meet hemoglobin/iron goals, cost and timeline limitations.
        - If 8+ weeks until surgery, can consider oral iron therapy
        - IV supplementation is recommended in patients with <8 weeks until surgery, oral iron is not effective or tolerated, or with severe anemia (Hb <10g/dL)
        - Consider addition of erythropoietin stimulating agents
            - In patients with anemia of inflammation (e.g., kidney disease, autoimmune disease)
            - Those who cannot accept transfusions
            - Those with severe anemia with urgent surgery needing more rapid response
- Communicate anemia optimization plan with the surgical team, including relevant lab values, underlying cause as identified, and treatment goals and plan.
- Reassess anemia status 2-4 weeks after treatment initiation (target = HgB > 12 g/dL) and minimum of 2 weeks prior to surgery (if already scheduled)
    - Complete repeat lab testing to assess response to treatment (CBC, iron studies, etc.)
        - If response is adequate, proceed to surgery
        - If response is inadequate (Hb <12 g/dL)
            - Consider changing formulation (oral → iv) or adding ESA if response is inadequate

- For urgent surgery, discussing risks and benefits of further evaluation and timing of determining underlying cause of anemia during the preoperative period.
- For elective surgery with moderate or high risk of blood loss, recommend delaying surgery to further optimize anemia status.

- Refer as needed to continue treatment for anemia after procedure complete.
- Special considerations for patients that cannot receive blood products:
  - Take a full medical history including history of anemia, abnormal bleeding, coexisting conditions, medical/surgical history, and current medications that could impact hemostasis
  - Consider discontinuation of medications that could induce coagulopathies (e.g., analgesics like NSAIDS, antibiotics like beta-lactams)[vii], anticoagulants and review other medications or supplements that impact coagulations/platelet function
  - Take steps to optimize preoperative red blood cell production, such as administering supplementary iron (even with normal iron stores) or using r-HuEPO to increase slightly low hematocrit before anticipated major blood loss or for patients with ischemic heart disease
  - Consider higher hemoglobin level goals for preoperative management (e.g., Hb 13-14g/dL)
  - Determine with patient what blood products are acceptable/unacceptable. Clearly identify them in the medical record.
  - For patients that cannot accept blood products
    - Follow Evidence-informed guidelines for anemia optimization in patients that cannot accept blood products, such as: **Clinical Strategies for Avoiding and Controlling Hemorrhage and Anemia without Blood Transfusion in Surgical Patients** or more updated. Resources can be found here.

Level 1

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    - Consider waiting to schedule the elective procedure until patient reaches their individualized threshold for glycemic control optimization

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Multidisciplinary Collaboration

Payment Reform

Level 2

Preoperative Anemia Optimization

Patient with DM

- Consider referring to a certified diabetes education specialist and/or registered dietician/nutritionist for support with optimization.
- Consider referral to a Diabetes Prevention Program as applicable

Perioperative Glycemic Control

Multidisciplinary Collaboration

Payment Reform

Level 3

Preoperative Anemia Optimization

Perioperative Glycemic Control

Multidisciplinary Collaboration

Payment Reform