**Postoperative Thromboprophylaxis**

* High-risk patients
  + Based on this risk assessment, the patient would be considered to be at high risk for VTE by the American College of Chest Physicians (ACCP) classification.
  + In the absence of increased bleeding risk, patients in this risk class should receive a combination of mechanical and pharmacologic prophylaxis
    - Often mechanical for the first 24 hours and pharmacologic starting 24 hours after surgery
  + Pharmacologic or mechanical prophylaxis alone may be appropriate in patients judged to be at moderate risk for VTE
  + Mechanical prophylaxis alone may also be indicated in patients judged to be at low risk for VTE as well as in high risk patients, who are determined to be at increased risk for bleeding

**Patients taking anti-platelet or anti-coagulants**

* Risk Stratify Patients
  + High - >10% annual thrombotic risk
    - Individuals with mechanical mitral valves
    - atrial fibrillation and CHADS2 scores of 5 or 6,
    - recent stroke or venous thromboembolism (VTE) are considered high risk
  + Moderate – 5-10% annual risk
  + Low - <5% annual risk
    - Those with atrial fibrillation and CHADS2 scores of 0-2 or
    - a remote history of VTE more than 12 months before surgery and no other thrombotic risk factors typically are classified as low risk
* Patients on Coumadin



* + In patients requiring minor dental procedures, warfarin may be continued with coadministration of an oral antifibrinolytic agent or warfarin may be stopped 2-3 days before the procedure
  + Warfarin also may be continued in patients undergoing minor dermatologic procedures with the use of adjunctive local hemostatic measures as necessary
  + Cataract surgery also may be performed without interruption of warfarin
* Patients on ASA
  + In general, patients may remain on aspirin for minor dental or dermatologic procedures and cataract surgery
  + For major noncardiac surgery, those at low risk of cardiovascular events should discontinue aspirin 7-10 days before surgery
  + Aspirin should be continued in patients judged to be at moderate or high risk.
  + Patients who require coronary artery bypass grafting (CABG) should remain on aspirin in the perioperative setting
    - If such patients are on dual antiplatelet therapy, clopidogrel or prasugrel should be held beginning 5 days before surgery
  + In patients with a coronary stent who are receiving dual antiplatelet therapy and require surgery, surgery should be deferred, if possible, during the period of highest risk for in- stent thrombosis (6 weeks after placement of bare metal stents, 6 months after placement of drug-eluting stents)
  + After this period has passed, clopidogrel or prasugrel may be suspended temporarily for surgery
  + If surgery cannot be delayed, dual antiplatelet therapy should be continued during and after surgery

**Management of perioperative hemorrhage**

* Perioperative hemorrhage may be due to inadequate local hemostasis or a systemic hemostatic defect
  + Potential hemostatic defects include an unrecognized preexisting bleeding diathesis, such as factor deficiency, von Willebrand disease, or a platelet function disorder; drugs; uremia; dilutional coagulopathy; or disseminated intravascular coagulation (DIC)
  + Not to be overlooked is the increased risk of bleeding induced by acid- base disturbances and hypothermia
* Surgery specific factors
  + Cardiopulmonary
    - Excessive blood loss in patients undergoing cardio-pulmonary bypass surgery may be due to the effects of the bypass circuit on platelet function fibrinolysis, or the use of antiplatelet agents, heparin, or other anticoagulants
  + Liver Transplantation
    - Liver transplantation carries unique risks due to the temporary loss of coagulation factor synthesis and enhanced fibrinoly- sis. During reperfusion of the transplanted liver, tissue-type plasminogen activator is released into the circulation and proteolysis of von Willebrand factor (vWF) occurs.
* Work up
  + Platelet count, PT, PTT, firbrinogen
  + Mixing study
* Management
  + In general, cryoprecipitate and platelets should be transfused to maintain a fibrinogen concentration of at least 100 mg/dl and a platelet count of at least 50 x 109/L (100 x 109/L for organ- or life-threatening bleeding), respectively
  + Hypothermia and acid-base disturbances should be corrected
  + If basic hemostatic laboratory parameters are normal or bleeding persists after correction of these parameters, inadequate local hemostasis due to vessel injury is suggested and surgical reexploration should be considered
  + Some systemic bleeding diatheses (such as mild deficiency of factors VIII, IX, or XI; von Willebrand disease; qualitative platelet defects; or a disorder of fibrinolysis) may not be identified by basic laboratory testing
  + Patients with mild factor XI deficiency, for example, may have a normal or near-normal aPTT
  + Clinicians should maintain a high index of suspicion for these disorders in a patient with persistent unexplained surgical bleeding and test for specific coagulation factor levels as indicated