

IVR GUIDELINES FOR PERIPROCEDURAL BLEEDING RISK

HIGH BLEEDING RISK PROCEDURES ^a

- Ablations
- Arterial/venous interventions (≥7F sheath)
- Cerebral angiograms
- Catheter directed thrombolysis (venous and arterial)
- Biliary intervention - cholecystotomy drain, PTCD
- Deep abscess drainage (lung parenchyma, abdominal, pelvic, retroperitoneal)
- Deep nonorgan biopsy (spine, intraabdominal, retroperitoneal, mesenteric pelvic)
- Solid organ biopsies (liver, kidney, spleen)
- Gastrostomy / gastrojejunostomy insertion
- Complex IVC filter removal
- Portal Vein interventions
- Vertebroplasty / spine procedures / lumbar punctures ^e
- TIPS
- Urinary Tract Interventions - nephrostomy, ureteric stent, suprapubic drains

SCREENING BLOODWORK

PT/INR recommended – threshold INR < 1.8 (chronic liver disease < 2.5) ^c

Platelet count recommended - threshold > 50 (chronic liver disease > 30)

MEDICATION RECOMMENDATIONS

Anticoagulants	Withholding before procedure	Reinitiation ^f	Notes
UFH (Heparin)	IV Heparin: 4 hours SC Heparin: 6 hours	4 hours	Check aPTT or anti Xa level if needed.
LMWH: enoxaparin (Lovenox) dalteparin (Fragmin) tinzaparin (Innohep)	Prophylactic Lovenox: 1 dose Therapeutic Lovenox: 24 hours Dalteparin: 1 dose	12 hours	Check anti Xa level if needed or if impaired renal function.
Warfarin (Coumadin)	5 days until target INR < 1.8	24 hours	Consider bridging for high thrombosis risk (e.g. mitral valve). If STAT or emergent recommend reversal agent.
Apixaban (Eliquis)	4 doses (eGFR > 50) ~ 2 days 6 doses (eGFR < 50) ~ 3 days	24 hours	If procedure STAT or emergent, can consider checking anti-Xa activity or apixaban level
Dabigatran (Pradaxa)	4 doses (eGFR > 50) ~ 2 days 6 doses (eGFR < 50) ~ 3 days	24 hours	If procedure STAT or emergent, use reversal agent (idarucizumab); consider checking thrombin time or Pradaxa level if renal impairment
Rivaroxaban (Xarelto) Edoxaban (Lixiana)	2 doses (eGFR > 50) ~ 2 days 3 doses (eGFR < 50) ~ 3 days	24 hours	If procedure STAT or emergent, use reversal agent (andexanet alfa); consider checking anti-Xa activity or Xarelto level if renal impairment
Fondaparinux (Arixtra)	12 hours (eGFR > 50) 3 days (eGFR < 50)	4 hours	

Antiplatelets			
Clopidogrel (Plavix) Ticagrelor (Brilinta)	5 days	24 hours	Reinitiation of Plavix can occur 6 hours after procedure if using 75mg dose. 24 hours if using loading dose (300-600mg)
Aspirin Aspirin/Dipyridamole (Aggrenox)	5 days	24 hours	Can withhold other NSAIDS, but antiplatelet effect is minimal and these should not postpone an urgent elective procedure.

- a) Management of anticoagulant agents before a procedure depends on the patient's overall clinical status, thromboembolic and bleeding risk, and the procedure associated bleeding risk. Best clinical judgment required for each patient. The recommendations are general guidelines and can vary substantially depending on the patient's risk factors. Specific attention should be given to the patient's liver and renal function. Clinical condition-specific recommendations (eg, atrial fibrillation, VTE, stroke, mechanical heart valves, coronary stents) require specific risk stratification.
- b) For IVC filter removal, consider the anticipated technical complexity of the procedure and dwell time.
- c) If platelets less than 20,000 (30,000 high risk), consider transfusion. If fibrinogen <100, administer 1 dose (weight <80kg) or 2 doses (weight >80kg) of cryoprecipitate. For High Risk procedures, give 10 mg slow IV infusion of Vit K for INR > 2.5.
- d) Please confer with cardiology for the management of antiplatelet agents used for acute coronary procedures. Recommend holding these agents before any procedure: Eptifibatide (Integrilin) 4 hours, Tirofiban (Aggrastat) 4 hours.
- e) Lumbar puncture and myelogram included in "high risk" due to severe morbidity associated with epidural bleed. Clinical judgment recommended based on bleeding/thrombotic risk factors.
- f) Determination of when to resume treatment with a prophylactic or therapeutic dose of an anticoagulant or antiplatelet agent following an invasive procedure should be based on the presumed risk of post-procedural bleeding (determined by interventionalist) weighed alongside the patient's risk for a thromboembolic event. Resumption of therapeutic doses of antiplatelet/anticoagulant may require a delay.

*The recommendations are based on guidelines in J Vasc Interv Radiol 2019; 30:1168-1184