Anticoagulation Reversal Guidelines

Our Lady of the Lake Regional Medical Center
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This document is based upon the current available evidence. It is intended to provide evidence based recommendations for reversal of commonly used anticoagulants. However, it is not intended to replace clinical judgment.

Warfarin

Clinical Scenario	Treatment of Elevated INR	Time to Recheck INR
No clinically significant bleeding, no urgent/emergent surgery, no dental extraction		
INR < 5	Hold warfarin dose and resume at lower dose when INR is therapeutic	24-48 hours
INR ≥ 5 but < 9	Patient at low risk for bleeding: Hold 1-2 doses of warfarin and resume at a lower dose when INR is therapeutic OR Patient at high risk for bleeding: Hold 1 dose of warfarin and give phytonadione (vitamin K) 2.5 mg po	24-48 hours
INR ≥ 9	Hold warfarin dose. Vitamin K 2.5 – 5 mg PO. Repeat as needed	24-48 hours
Clinically significant bleeding		
Any INR	Hold warfarin therapy and give **Vitamin K (10 mg by an injectable route**)**, supplement with fresh frozen plasma (FFP)or prothrombin complex concentrate (PCC), depending upon urgency; vitamin K injections may be needed q12h.	12-24 hours
Life-threatening bleed	Hold warfarin. FFP, ± (PCC), or recombinant factor VIIa (not 1st line therapy) plus vitamin K 10 mg by an injectable route	12-24 hours

* If continuing warfarin therapy is indicated after high doses of vitamin K, then heparin or low-molecular-weight heparin can be given until the effects of vitamin K have been reversed, and the patient becomes responsive to warfarin therapy.
**IV administration is associated with an increased risk of anaphylactoid reactions. Anaphylactoid reactions have occurred during the first infusion and in patients receiving IV phytonadione, which has been diluted and injected by slow IV infusion. Therefore, IV administration should be restricted to those situations where another route is not feasible and the increased risk involved is considered justified.
**NOTE:* If the IV route is used, phytonadione injection should be diluted prior to administration with preservative-free D5W, NS, or D5NS only and the infusion rate should not exceed 1 mg/minute.

Heparin (Intravenous)

Timeframe since last IV dose	Dose of Protamine
<30 minutes	1-1.5mg per 100 units of IV heparin
30 minutes to 2hr	0.5-0.75mg per 100 units of IV heparin
> 2 hours	0.25mg per 100 units of IV heparin

*Protamine sulfate by the IV route can cause hypotension and anaphylactoid reactions when given too rapidly. Therefore, doses should not exceed 5mg/min. It is intended for injection without further dilution, however, it may be diluted in D5W or NS.

Heparin (Subcutaneous)

Give 1-1.5mg of protamine per 100 units of heparin. This can be done by giving a portion of the dose (25-50mg) slowly by the IV route, followed by the remaining portion as a continuous infusion over 8-16 hours.

Enoxaparin

Timeframe since last SC/IV dose	**Dose**
≤8 hours	1mg of protamine per 1mg of enoxaparin (**MAX single dose of 50mg**)
> 8 hours,or as a second dose if bleeding continues	0.5mg of protamine per 1mg of enoxaparin

*Note that protamine does not fully reverse enoxaparin

**Protamine sulfate by the IV route can cause hypotension and anaphylactoid reactions when given too rapidly. Therefore, doses should not exceed 5mg/min. It is intended for injection without further dilution, however, it may be diluted in D5W or NS.

The following are strictly *recommendations* as there is a limited amount of data on this topic.

Rivaroxaban and Dabigatran

	Rivaroxaban	**Dabigatran**
Mild	Delay the next dose OR discontinue therapy	Delay the next dose OR discontinue therapy
Moderate to Severe	Above **PLUS** symptomatic treatment: • Mechanical Compression • Surgical Intervention • Symptomatic Treatment • Hemodynamic Support/Blood Transfusion • Oral Charcoal (if administered **<2 hours** prior)	Above **PLUS** symptomatic treatment: • Mechanical Compression • Surgical Intervention • Symptomatic Treatment • Hemodynamic Support/Blood Transfusion • Oral Charcoal (if administered **<2 hours** prior)
Life Threatening	Above **PLUS (in no particular order)**: • Profilnine SD® dosed at 50 units/kg x1 • Fresh Frozen Plasma Note: **NOT** dialyzable	Above **PLUS (in no particular order)**: • NovoSeven® 90mcg/kg IV x1 • Fresh Frozen Plasma (not likely to work) If no result, consider: • Hemodialysis- dialyzable (~60% removed)
*****Consider the thrombotic effects of blood factors*****		

Obtain periodic (every 1-2 hours) anticoagulation assays according to the offending drug (see table below) when the patient is classified as a Severe or Life Threatening bleed until bleeding subsides to ensure appropriateness and efficacy of interventions.

Drug	**Rixaroxaban**	**Dabigatran**
Assay	Prothrombin Time (PT)	Activated Partial Thromboplastin Time (aPTT)

Note that these assays are intended only to get a general sense of the level of anticoagulation and in no way are indicative of any certain clinical status in regards to the certain drug used

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