ANTICOAGULANTS: THE GUIDE TO REVERSAL

Definition of Bleeding:
Minor bleeding – Any clinically overt sign of hemorrhage (including imaging) that is associated with a <5 g/dl decrease in the hemoglobin concentration or < 15% decrease in the hematocrit felt by the clinician to be related to anticoagulation
Major bleeding – Intracranial hemorrhage or a ≥5 g/dl decrease in the hemoglobin concentration or a ≥15% absolute decrease in the hematocrit resulting in hemodynamic compromise or compression of a vital structure and felt by the clinician to be related to anticoagulation

ANTIPLATELET AGENTS

Aspirin
Minor – desmopressin 0.3 mcg/kg x 1
Major – platelet transfusion

Clopidogrel (Plavix®)
Minor – desmopressin 0.3 mcg/kg x 1
Major – platelet transfusion – consider two units if life or brain threatening bleeding

Prasugrel (Effient®)
Minor – desmopressin 0.3 mcg/kg x 1
Major – platelet transfusion – consider two units if life or brain threatening bleeding

Ticagrelor (Brilinta®)
Minor – desmopressin 0.3 mcg/kg x 1
Major – platelet transfusion – consider two units if life or brain threatening bleeding

Sustained Release Aspirin/Dipyridamole (Aggrenox®)
Minor – desmopressin 0.3 mcg/kg x 1
Major – platelet transfusion

Abciximab (Reopro®)
Major – platelet transfusion

Eptifibatide (Integrilin®)
Minor – desmopressin 0.3 mcg/kg x 1
Major Bleeding Reversal: platelet transfusions plus infusion of 10 units of cryoprecipitate

Tirofiban (Aggrastat®)
Minor – desmopressin 0.3 mcg/kg x 1
Major bleeding Reversal: platelet transfusions plus infusion of 10 units of cryoprecipitate
HEPARIN AND HEPARIN LIKE AGENTS

Standard Heparin

<table>
<thead>
<tr>
<th>Time since last heparin dose</th>
<th>Dose of Protamine</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30 minutes</td>
<td>1 unit/100 units of heparin</td>
</tr>
<tr>
<td>30–60 minutes</td>
<td>0.5 – 0.75 units/100 units of heparin</td>
</tr>
<tr>
<td>60–120 minutes</td>
<td>0.375 – 0.5 units/100 units of heparin</td>
</tr>
<tr>
<td>&gt; 120 minutes</td>
<td>0.25 – 0.375 units/100 units of heparin</td>
</tr>
</tbody>
</table>

Infusion rate should not exceed 5 mg/min. Maximum dose is 50 mg per dose.

Low Molecular Weight Heparin
Reversal of Bleeding: Protamine (works just as well with LMWH as heparin) – if within 4 hours of dose: 1 mg of protamine for each 1 mg of enoxaparin or 100 units of dalataparin and tinzaparin. Repeat one-half dose of protamine in 4 hours. If 4–8 hours after dose: give 0.5 mg for each 1 mg of enoxaparin or 100 units of dalataparin and tinzaparin.

Fondaparinux (Arixtra®)
Major Bleeding Reversal – Protamine ineffective – rVIIa (90 mcg/kg) may be of use

Dabigatran (Pradaxa®)
Reverse if patient shows signs of bleeding and had an elevated aPTT > 40 seconds
   1. Profilnine (Factor IX complex) 4000 units (50 units/kg for patients under 80 kg) plus 1 mg of rFVIIa

Rivaroxaban (Xarelto®)
Reverse if patient shows signs of bleeding and has an INR > 1.5
   1. Profilnine (Factor IX complex) 4000 units (50 units/kg for patients under 80 kg) plus 1 mg of rFVIIa

THROMBOLYTIC THERAPY
Reversal: Immediate infusions of equivalent of 6–8 units of platelets (or one platelet pheresis product), 2 units of plasma, and 10 units of cryoprecipitate. No value in infusing anti-fibrinolytic agents.
## WARFARIN

### Not Bleeding: Goal is INR in 2–3 range

<table>
<thead>
<tr>
<th>INR</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>3– 4.5</td>
<td>Hold dose until INR decreased</td>
</tr>
<tr>
<td>4.5–10</td>
<td>1.25 mg Vitamin K PO</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>2.5 – 5 mg Vitamin K PO</td>
</tr>
</tbody>
</table>

Should see INR back in therapeutic range in 24–48 hours

### Bleeding: Goal is INR under 2

<table>
<thead>
<tr>
<th>INR</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–4.5</td>
<td>2.5 mg Vitamin K ± FFP (15 ml/kg)</td>
</tr>
<tr>
<td>4.5–10</td>
<td>5 mg Vitamin K ± FFP (15 ml/kg)</td>
</tr>
<tr>
<td>&gt;10</td>
<td>5–10 mg Vitamin K ± FFP (15 ml/kg)</td>
</tr>
</tbody>
</table>

FFP: Fresh Frozen Plasma

Life or Brain Threatening: Profilnine 4000 units + 1 mg rVIIa

### References:


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