Reversal of Coagulopathy-Associated Intracerebral Hemorrhage (ICH) Algorithm

**Goal:** Correction of INR ≥ 1.4
Monitor INR as indicated with treatment and every 6 hours for 24 hours

- Patient on unfractionated heparin (UFH) or low molecular weight heparin (LMWH)
  - Discontinue UFH or LMWH. See *Unfractionated Heparin (UFH) and Low Molecular Weight Heparin (LMWH) Reversal* guideline.

- Patient on warfarin (Coumadin®)
  - Discontinue warfarin therapy. See *Warfarin: Management of Elevated INR and Reversal* guideline

- Patient on dabigatran (Pradaxa®)
  - See *Dabigatran (Pradaxa) Reversal Treatment for Bleeding* guideline

- Patient on rivaroxaban (Xarelto®) or apixaban (Eliquis®)
  - See *Factor Xa Inhibitors Reversal Treatment for Bleeding* guideline

**Protamine:**
- **Administer by injection very slowly over the course of 10 minutes.**
- **Dose for enoxaparin:** 1 mg protamine will neutralize 1 mg of last enoxaparin dose.
- **NOTE:** If > 8 hours since last enoxaparin dose, decrease protamine to 0.5 mg per mg of last enoxaparin dose.

**Dose for heparin SQ or IV push:**
- **Time since heparin dose**
  - Protamine dose
  - Few minutes: 1 – 1.5 mg / 100 units heparin
  - 30-60 minutes: 0.5 – 0.75 mg / 100 units heparin
  - Greater than 2 hours: 0.25 – 0.375 mg / 100 units heparin

**Dose for heparin IV infusion:**
- After stopping infusion, give 25-50 mg protamine as total dose. May consider 100% of heparin dose in last hour + 50% of dose in the preceding hour + 25% of dose in the hour before that. Give 1 mg protamine / 100 units heparin calculated. If time has lapsed since cessation of infusion, may need further dose reduction.
- **Do not administer > 50 mg protamine in any 10 minute period.**

**Give Phytonadione (Vitamin K) 10 mg by slow IV INFUSION over 30 minutes. (Do NOT give subcutaneously or intramuscular due to erratic absorption.)**

**Give Prothrombin Complex Concentrate (PCC) [Profilnine®]**
- See *Contraindications and Precautions.* **RISK (thromboembolism) vs. BENEFIT must be considered.**

<table>
<thead>
<tr>
<th>Baseline INR</th>
<th>&lt; 2</th>
<th>≥ 2 and &lt; 4</th>
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<tbody>
<tr>
<td>Profilnine® Dose</td>
<td>25 units/kg</td>
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<td>35 units/kg</td>
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<tr>
<td>OR</td>
<td>FFP 10-15 mL/kg</td>
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**GIVE PCC**

- Recheck INR 15-30 minutes after PCC administration
- If repeat INR ≥ 1.4 consider re-dosing PCC with reduced dose.
- The maximum cumulative dose in a 24 hour period in the literature is 50 units/kg.

**INR remains ≥ 1.4**

- Consider giving FFP 10-15 mL/kg rounded to the nearest unit size. (Volume for each unit is 250-275 mL)
- Check INR immediately following FFP with recheck in 6-24 hours
- If INR remains elevated at recheck, consider more FFP

**OR**

- Consider giving Recombinant factor VII 1 mg IVP over 2-5 minutes.
- Recheck INR after 15-30 minutes
- If INR remains elevated, repeat dose

**Risk of Thromboembolism from PCC**

- **PCC (Prothrombin Complex Concentrate) is a factor IX concentrate that also contains factors II, VII, and X.** Dose is based on factor IX units. It is ordered from and supplied by pharmacy.

- **PCC should only be administered to patients when the beneficial effects of use outweigh the serious risk of potential hypercoagulation.** The use of factor products has been associated with thromboembolic complications including thrombosis and disseminated intravascular coagulation. Clinical surveillance for early signs of consumptive coagulopathy should be initiated with appropriate biological testing when administering PCC.

**References:**