

Treatment of Patients Over-Anticoagulated with Warfarin

1) Establish the cause of elevated INR.

- The causes of elevated INR should always be investigated.
- In many cases, merely correcting the cause (e.g. dose, compliance, change in diet, liver disorder or other illnesses) will bring the INR back into the patient's target range.

2) Determine bleeding risk among patients with elevated INR. Risk factors include:

- First year of warfarin therapy
- Age > 65 years
- Hypertension
- Alcoholism
- Liver disease
- Previous history of gastrointestinal bleeding
- Stroke

3) Management of the patient with an elevated INR

- Determine if they are bleeding or not
 - Patients who are bleeding need an aggressive reversal of their Warfarin
 - Patients just with an elevated INR and without any evidence of bleeding can be managed more conservatively with the goal of allowing the INR to return to therapeutic range over the next few days.
- Most patients require the use of vitamin K
 - **For most situations** (Non-bleeding), the oral route will result be adequate, with an onset of within 12 hours.
 - **INR < 5:** Omit 1 dose • Increase the frequency of INR monitoring (2 to 3 times a week)• Resume therapy at 10-20% lower dose
 - **INR 5 – 9:** Omit 1 to 2 doses• Increase the frequency of INR monitoring (daily)• Resume therapy at 10-20% lower dose when INR reaches patient's target range• If the patient is at high risk of serious bleeding, consider administering vitamin K1 1 mg orally x 1.
 - **INR > 9:** Discontinue warfarin temporarily• Consider administering vitamin K1* 2.5 mg orally x 1 • Increase the frequency of INR monitoring (daily) and give additional vitamin K1. If INR is not substantially reduced by 24-48 hrs• Resume therapy at 20% lower dose when INR reaches patient's target range and monitor INR closely until stable. Consider more frequent routine INR monitoring.
 - **Subcutaneous vitamin K should be avoided, due to erratic absorption and delay in INR reversal,**
 - Intravenous vitamin K;
 - Should be infused slowly over 60 minutes. Intravenous vitamin K should be reserved for only **life-threatening bleeding** or when the need for rapid reversal.
 - Intravenous vitamin K is associated with a slight risk of anaphylaxis.
- Management of elevated INR with serious or life threatening bleeding (If patient's clinical status is compromised due to bleeding)
 - Admit to an acute care facility for assessment and management.
 - Discontinue warfarin temporarily
 - Attempt local control of bleeding
 - Give frozen plasma (FFP 15 ml/kg) or other blood products and call on-call hematologist (Always give the vitamin K with the plasma because the effect of plasma is only transient and the patient may have a rebound rise in the INR if vitamin K is not given)
 - Administer vitamin K, by slow intravenous infusion (rate < 1 mg/min)
 - * INR 2-4.5 Give 1-1.25 mg IV ± 15 ml/kg of plasma
 - * INR 4.5-10 Give 2.5-5 mg IV ± 15 ml/kg of plasma
 - * INR >10 Give 5-10 mg IV ± 15 ml/kg of plasma
 - Monitor INR every 6 hour and treat with repeat dosing of vitamin K1 and/or frozen plasma as necessary.