NB All bleeding in a patient on warfarin should be taken seriously. Bleeding may occur when the INR is therapeutic. If the INR is sub-therapeutic e.g. <1.5, bleeding may be due to factors other than warfarin and reversal may not be appropriate. Always check FBC and coagulation screen to identify other causes. If in doubt discuss with haematologist.

### NORTHERN REGION HAEMATOLOGISTS GROUP GUIDE TO WARFARIN REVERSAL

#### BLEEDING

- **Life / Limb /Sight Threatening**
  - CONTACT HAEMATOLOGIST
  - Intracranial (CT or MRI)
  - Retroperitoneal (CT or MRI)
  - Intra-ocular (NOT conjunctival)
  - Spontaneous muscle bleed with compartment syndrome
  - Pericardial
  - Active bleeding from any orifice plus either BP ≤ 90 mmHg systolic, oliguria or 2 g fall in haemoglobin

  - Vitamin K 5 mg IV
  - Prothrombin complex concentrate IV (Beriplex) 30 units/kg

  - Check INR Immediately

  - Adequate correction

  - Repeat INR & APTT in 4-6 hours

  - Inadequate correction

  - Consider other factors contributing to prolonged coagulation tests eg DIC, Congenital coagulation factor deficiency, Liver disease. **A further dose of 20 units/kg Beriplex may be indicated- seek haematological advice**

- **Significant bleeding without haemodynamic compromise**

  - Vitamin K 2 mg IV

  - Check INR at 4-6 hours or sooner if clinical deterioration

  - Oral vitamin K is safe and adequate treatment for the majority of patients. There may be some clinical circumstances when 1-2 mg IV vitamin K should be considered e.g. gross over-anticoagulation or unsteady patients

- **Minor**

  - Vitamin K 2mg PO

  - Check INR at 24 hours or sooner if clinical deterioration

### Algorithm 1 of 3

1. Oral vitamin K - there are marked differences between formulations of vitamin K. The most effective preparation is IV Konakion (Roche) given orally. The vial contains 10 mg/ml - dilute appropriate dose in small amount of juice/water after drawing up in 1 ml insulin syringe. Alternatively the Konakion MM paediatric formulation may be used

2. Vitamin K IV may rarely cause anaphylaxis. Give by slow IV bolus

3. Prothrombin complex concentrate (PCC) may induce a prothrombotic state. Use with caution in patients with DIC or decompensated liver disease

4. In serious but non-life-threatening bleeding (e.g. GI bleeding or epistaxis without haemodynamic compromise) prompt reversal with IV vitamin K is indicated

The use of FFP for warfarin reversal is no longer recommended
Check INR at 24 hours or sooner if clinical deterioration

**NO BLEEDING**

**INR >8**

Vitamin K 1-2mg PO

- Oral vitamin K is safe and adequate treatment for the majority of patients. There may be some clinical circumstances when 1-2 mg IV vitamin K should be considered e.g. gross over-anticoagulation or unsteady patients.

- Check INR at 24 hours or sooner if clinical deterioration

INR 5 – 7.9

Omit or reduce dose or Vitamin K 1-2 mg PO if considered “High Risk” of bleeding

INR 5 – 7.9

**HIGH RISK** of bleeding:

- Age > 70
- Hypertension
- Diabetes
- Renal failure
- Previous MI, CVA or GI bleed
- Anti-platelet therapy

Additional guidelines:

1. Oral vitamin K - there are marked differences between formulations of vitamin K. The most effective preparation is IV Konakion (Roche) given orally. The vial contains 10 mg/ml - dilute appropriate dose in small amount of juice/water after drawing up in 1 ml insulin syringe. Alternatively the Konakion MM paediatric formulation may be used.

2. Vitamin K IV may rarely cause anaphylaxis. Give by slow IV bolus

3. Most patients do not require INR reversal at INR 5-7.9 but correction should be considered in "high risk" patients whose risk of bleeding is higher. High risk: Age > 70; Hypertension; Diabetes; Renal failure; Previous MI, CVA or GI bleed; Anti-platelet therapy

The use of FFP for warfarin reversal is no longer recommended.
NEED FOR SURGERY

Assess urgency of surgery and degree of reversal required

EMERGENCY SURGERY (IMMEDIATE):
Vitamin K 5mg IV² and Prothrombin complex concentrate IV (Beriplex)³ 30 units/kg⁴

URGENT (WITHIN 24 HOURS):
If surgery can be delayed for 6-12 hours, give Vitamin K 2mg IV². If it can be delayed for 24 hours, give Vitamin K 1-2mg po¹

¹Oral vitamin K - there are marked differences between formulations of vitamin K. The most effective preparation is IV Konakion (Roche) given orally. The vial contains 10 mg/ml - dilute appropriate dose in small amount of juice/water after drawing up in 1 ml insulin syringe. Alternatively the Konakion MM paediatric formulation may be used.

²Vitamin K IV may rarely cause anaphylaxis. Give by slow IV bolus

³Prothrombin complex concentrate (PCC) may induce a prothrombotic state. Use with caution in patients with DIC or decompensated liver disease

⁴A lower dose of PCC may be adequate if full reversal is not required.

The use of FFP for warfarin reversal is no longer recommended