COAGULOPATHY

- Haemostasis is immature during the neonatal period and does not attain full function until aged 6 months
- Normal ranges for prolonged prothrombin time (PT) and activated partial thromboplastin time (APTT) are difficult to define, making interpretation of results difficult
- There is considerable uncertainty about the use of fresh frozen plasma (FFP) in neonates
- Prophylactic use of FFP, including before surgery, is of unproven benefit

INVESTIGATIONS

Do not perform coagulation screening routinely.
Results are difficult to interpret, and routine testing may lead to increased transfusion of FFP without benefit

Check clotting in:
- Selected babies with evidence of bleeding or who are at high risk of disseminated intravascular coagulation (DIC) e.g. severe sepsis or NEC
- Babies receiving therapeutic hypothermia
- Metabolic disease: urea cycle disorder, galactosaemia, tyrosinaemia, organic acidaemia
- Significant liver dysfunction or conjugated jaundice
- Babies undergoing surgery or tissue biopsy who have had previous bleeding problems
- Family history of inherited bleeding disorder (after discussion with consultant haematologist)
- Thrombocytopaenia (see **Thrombocytopaenia** guideline)

Sampling
- Ensure sample from a free-flowing vein (peripheral or umbilical) or from an arterial line before heparinising
- Fill exactly to black mark on tube (usually 1.3 mL)
- If sample clots (this does not confirm normal coagulation), repeat
- If sampling from arterial line with heparin infusion, take larger volume (e.g. 2.5 mL) from dead-space (see **Arterial line sampling** guideline)

Request
- INR (measure of PT)
- APTT
- Fibrinogen
- If features of DIC (e.g. bruising, bleeding, sepsis), request fibrin degradation products and D-dimer (if available)
- If concerned/unsure about initial results, seek senior advice

Normal values

Test	Value	
	30–36 weeks' gestation	**Term**
Prothrombin time	8.5–17 sec	8.5–14.4. sec
Activated partial thromboplastin time	0–21 days: 27–75 sec 22–90 days: 26.9–62.5 sec	28–55 sec
Thrombin time	9–15 sec	9–15 sec
Fibrinogen	1.5–4.0 g/dL	1.5–4.0 g/dL

Note
- Normal values vary greatly between sources. Few sources give values for preterm babies
- Coagulopathy defined as PT or APPT >1.5 x midpoint of normal range

IMMEDIATE TREATMENT

- No evidence to support the use of FFP to try to correct abnormalities of coagulation screening alone in non-bleeding babies
- FFP may be of benefit to babies with clinically significant bleeding (including massive blood loss) or before invasive procedures with a risk of significant bleeding, if they also have an abnormal coagulation profile defined as a PT or APTT significantly above normal gestation or postnatal age-related reference range (see **Table**)
- In inherited clotting factor deficiencies, use FFP only when pathogen inactivated factor unavailable. Discuss with consultant haematologist before giving FFP
- If INR alone is raised (>2), and clotting samples were performed before first dose of vitamin K, repeat clotting screen. If sample taken after first dose of vitamin K, repeat dose (see **Vitamin K** guideline)
- vitamin K dose also indicated in case of isolated raised INR or prolonged PT
- If APTT raised and active bleeding give FFP 10–20mL/kg over 30-60 min

Do not use FFP or cryoprecipitate purely for volume replacement or polycythaemia without coagulopathy

Cryoprecipitate

- Indicated for hypofibrinogenaemia (fibrinogen level <0.8–1.0 g/L) either congenital or secondary to DIC/sepsis **WITH** bleeding
- Give 5–10 mL/kg over 30–60 min

MONITORING

- Repeat coagulation profile 2–4 hr after FFP/cryoprecipitate
- Give further treatment only if bleeding persists – do not treat abnormal clotting screen in the absence of bleeding
- If abnormal coagulation persists for >24 hr in the absence of any precipitating factors, seek advice from haematologist