THROMBOCYTOPENIA

DEFINITION

- Platelet count <150 × 10^9/L
- mild (platelet count 100–150 × 10^9/L) and moderate (50–100 × 10^9/L) thrombocytopenia occur frequently in preterm babies who are ill, and in those born to women with pregnancy-induced hypertension (PIH)
- severe thrombocytopenia (<50 × 10^9/L) is uncommon, particularly in apparently healthy term babies and raises the possibility of neonatal allo-immune thrombocytopenia (NAIT, see below)
- ensure results are not spurious, if in doubt repeat venous sample

CAUSES

	WELL	ILL
Common	• Placental insufficiency • IUGR • Maternal diabetes • Immune mediated • NAIT • Autoimmune (maternal ITP, SLE) • Trisomies (13, 18, 21) • Congenital infections	• Infection • Necrotising enterocolitis (NEC) • Disseminated intravascular coagulation (DIC) • Hypoxic ischaemic encephalopathy • Congenital infections • Thrombosis (renal, aortic) • Congenital leukaemia or neuroblastoma
Rare	• Inherited disorders • Thrombocytopenia absent radius (TAR) syndrome • Congenital amegakaryocytic thrombocytopenia (CAMT) • Cavernous haemangioma (Kasabach-Merritt syndrome) • Congenital thrombotic thrombocytopenia purpura (TTP)	• Metabolic disorders (propionic and methylmalonic acidaemia)

Severe thrombocytopenia in an otherwise healthy term newborn baby is NAIT until proved otherwise

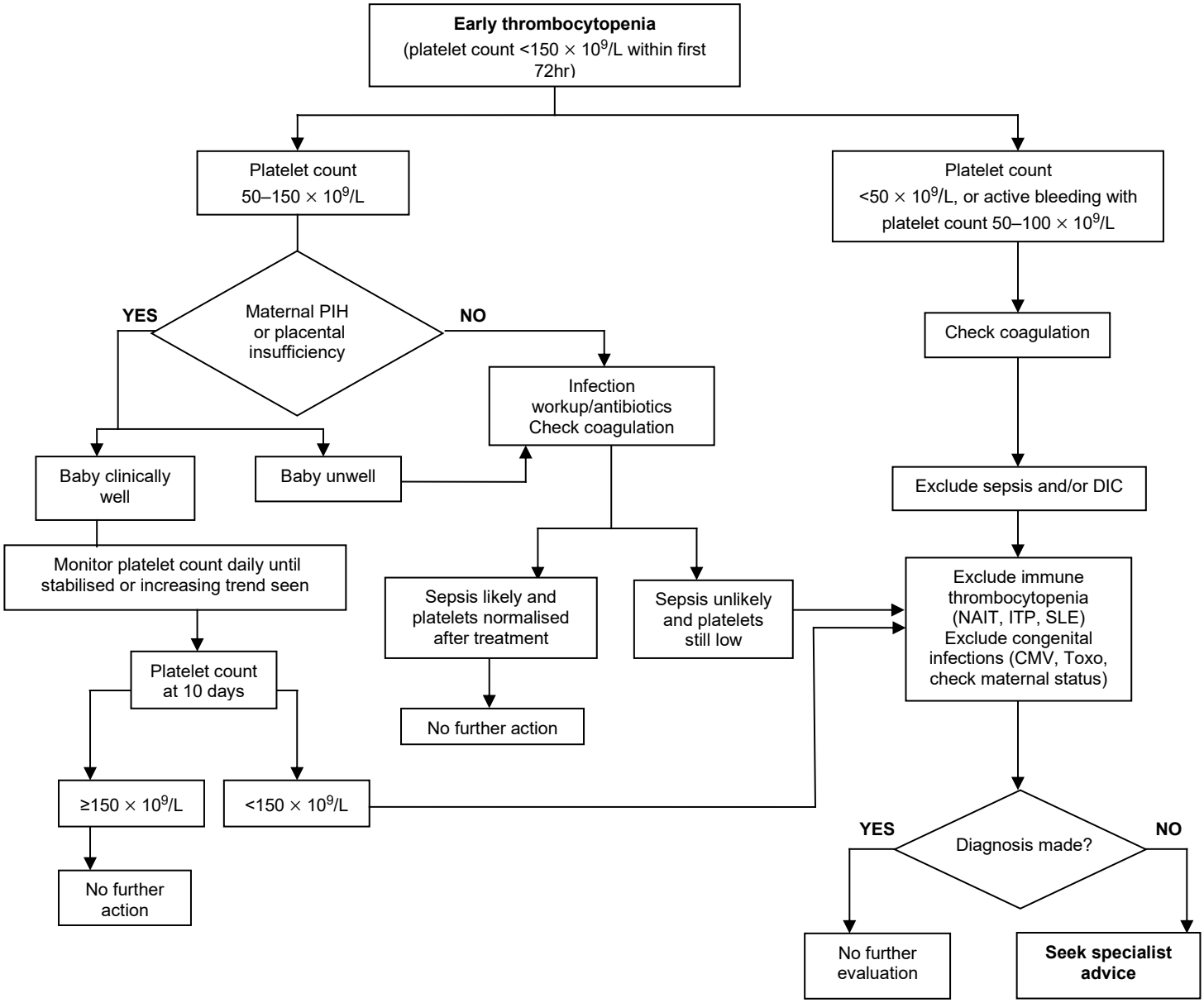
ASSESSMENT

- **Evaluation of early-onset (<72 hr after birth) thrombocytopenia (see Flowchart)**
- preterm babies with early-onset mild-to-moderate thrombocytopenia in whom there is good evidence of placental insufficiency: further investigations not warranted unless platelet count does not recover within 10–14 days
- preterm babies without placental insufficiency: investigate first for sepsis
- term babies: investigate for sepsis and NAIT
- If severe thrombocytopenia, perform clotting screen
- Look for presence of active bleeding or visible petechiae
- If features suggestive of congenital infection (e.g. abnormal LFT, rashes, maternal history etc.) or if persistent or unexplained thrombocytopenia, perform congenital infection i.e. CMV and toxoplasma serology, check maternal status for syphilis, rubella and HIV, herpes simplex and enteroviral screen
- Ensure urine sample sent for CMV. Check with local microbiology department to ensure correct sample bottles sent
- Obstetric history, particularly maternal platelet count, drugs, pre-eclampsia. Family history of bleeding disorders
- Careful examination, include other associated features (e.g. trisomies and inherited syndromes)

Evaluation of late onset thrombocytopenia

- Thrombocytopenia presenting in baby after first 3 days of life, presume underlying sepsis or NEC until proved otherwise
- these babies are at significant risk of haemorrhage, though the benefit of platelet transfusion is not clear-cut

Summary of investigations (also refer to text above)



MANAGEMENT

General

Avoid

- Heel prick and IM injections, use venepuncture and IV injections
- Invasive procedure (central line, LP, chest drain etc.). If any of above are unavoidable:
- discuss with on-call consultant
- give platelet transfusion if platelet count <50 × 10^9/L before the procedure (if semi-elective e.g. LP, central lines) **or** during/soon after procedure (if emergency e.g. chest drain)
- give particular attention to haemostasis

Platelet transfusion
- Only available for immediate and specific therapy for thrombocytopenia but carries risk of transfusion-related infections and transfusion reactions, and only after discussion with consultant

Indications for platelet transfusion (term and preterm babies)
- Main objective is to prevent consequences of severe thrombocytopenia, significant risk of acute intracerebral haemorrhage and neuromorbidity

Platelet count <25 × 10^9/L
- In otherwise well baby, including NAIT

Platelet count <50 × 10^9/L
- In baby with:
- clinical instability
- concurrent coagulopathy
- birth weight <1000 g and aged <1 week
- previous major bleeding e.g. intraventricular haemorrhage (IVH)
- current minor bleeding (e.g. petechiae, venepuncture oozing)
- planned surgery, exchange transfusion or invasive procedure (central line insertion, LP, chest drain, ECMO etc.)
- platelet count falling and likely to fall below 30
- NAIT if previously affected sibling with intracranial bleed
- PDA treated with indomethacin or ibuprofen

Platelet count <100 × 10^9/L
- If major bleeding or major surgery (e.g. neurosurgery), give platelet transfusion

Type of platelets
- NAIT: HPA compatible platelets wherever possible
- All others: blood group-compatible CMV negative
- Irradiation of platelets is not routinely required but consider for babies with definite or suspected immunodeficiency, or those who have undergone intrauterine transfusions

Volume of platelets
- 10–20 mL/kg (10 mL/kg usually raise platelet count by >50 × 10^9/L). Babies with suspected NAIT will require higher dose of 20 mL/kg

ADMINISTRATION OF PLATELETS

Never administer platelets through an arterial line or UAC

- Use platelets as soon as they arrive on ward (ensure IV access before requesting platelets from blood bank)
- Keep platelets at room temperature
- To minimise loss, draw contents of pack into 50 mL syringe through a special platelet or fresh blood transfusion set with a 170–200 micrometre filter and infuse using a narrow bore extension set linked to IV line, primed with sodium chloride 0.9%
- Transfuse platelets over 30–60 min, mixing syringe from time to time to avoid platelets settling down
- There is no need for routine use of diuretic after platelet transfusion
- Check platelet count within 12 hr after transfusion

NAIT
- Analogous to rhesus haemolytic disease and caused by transplacental passage of maternal alloantibodies directed against fetal platelet antigens, inherited from father but absent in mother

- Majority caused by antibodies against platelet antigens, HPA-1a (80%) and HPA-5b (10–15%)
- NAIT can affect first pregnancy and has 10% risk of severe intracranial haemorrhage; 20% of survivors exhibit significant neurodevelopmental sequelae

Recognition
- For HPA-1a antigen-negative women, complete a neonatal alert form
- Petechiae, purpura, excessive bleeding and severe thrombocytopenia in an otherwise healthy term newborn baby indicate NAIT until proved otherwise
- NAIT can also present with:
- fetal intracranial haemorrhage or unexplained hydrocephalus
- postnatal intracranial haemorrhage in term baby

If NAIT suspected, involve consultant neonatologist immediately

Assessment
- Check baby's platelet count daily until >100 $\times$ 10^9/L
- Check mother's platelet count (may already be in maternal healthcare record)
- Obtain blood from mother, baby and father for platelet typing and antibodies. Liaise with haematology department about appropriate samples
- Arrange cranial ultrasound scan (see **Cranial ultrasound scans** guideline)

Treatment
- In 30% of cases, maternal antibody may not be found and can be detected later
- Transfuse baby with suspected NAIT with accredited HPA-1a antigen-negative platelets if:
- bleeding **or**
- platelet count <25 $\times$ 10^9/L
- National Blood Service has a pool of suitable donors, and platelets are available at short notice from blood bank
- if accredited HPA-1a negative platelets not available, administer random donor platelets

Inform blood bank and consultant haematologist as soon as NAIT suspected. Do not delay transfusion for investigations

- If thrombocytopenia severe (<50 $\times$ 10^9/L), or haemorrhage persists despite transfusion of antigen-negative platelets, administer intravenous human immunoglobulin (IVIG) 1 g/kg/day once daily (for 1–3 days (may require additional doses 2–4 weeks later)
- Aim to keep platelet count >25 $\times$ 10^9/L for first week of life, or as long as active bleeding continues
- Report newly diagnosed babies with NAIT to fetal medicine consultant for counselling for future pregnancies

NEONATAL AUTOIMMUNE THROMBOCYTOPENIA

Clinical features
- Caused by transplacental passage of autoantibodies in women with ITP or SLE, and affecting about 10% of babies born to such women
- Severity generally related to severity of maternal disease
- Risk of intracranial haemorrhage in baby <1%

Management
- Report all women with thrombocytopenia and those splenectomised through Neonatal Alert System, and instigate plan of management
- Send cord blood for platelet count
- Check baby's platelet count 24 hr later, irrespective of cord blood result
- If baby thrombocytopenic, check platelet count daily for first 3–4 days or until >100 $\times$ 10^9/L

- If platelet count <25 $\times$ 10^9/L, whether bleeding or not, treat with IVIG (dose as in NAIT) +/- steroids
- Discharge baby when platelet count >100 $\times$ 10^9/L
- For babies requiring IVIG, recheck platelet count 2 weeks later. A few may require another course of IVIG at this time because of persistence of maternal antibodies