

THROMBOCYTOPENIA

DEFINITION

- Platelet count $<150 \times 10^9/L$
- mild (platelet count $100-150 \times 10^9/L$) and moderate ($50-100 \times 10^9/L$) thrombocytopenia occur frequently in preterm infants who are ill, and in those born to women with pregnancy-induced hypertension (PIH)
- severe thrombocytopenia ($<50 \times 10^9/L$) is uncommon, particularly in **apparently** healthy term infants and should raise possibility of neonatal allo-immune thrombocytopenia (NAIT; see below)

CAUSES

	WELL		ILL
	Term	Preterm	
Common	<ul style="list-style-type: none"> • NAIT • IUGR • Maternal diabetes • Maternal ITP • Trisomies (13, 18, 21) 	<ul style="list-style-type: none"> • IUGR • Congenital infections 	<ul style="list-style-type: none"> • Infection • NEC • Disseminated intravascular coagulation • Perinatal asphyxia • Congenital infections • Thrombosis (renal, aortic) • Congenital leukaemia
Rare	<ul style="list-style-type: none"> • Thrombocytopenia absent radii (TAR) syndrome • Congenital amegakaryocytic thrombocytopenia (CAMT) 		

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

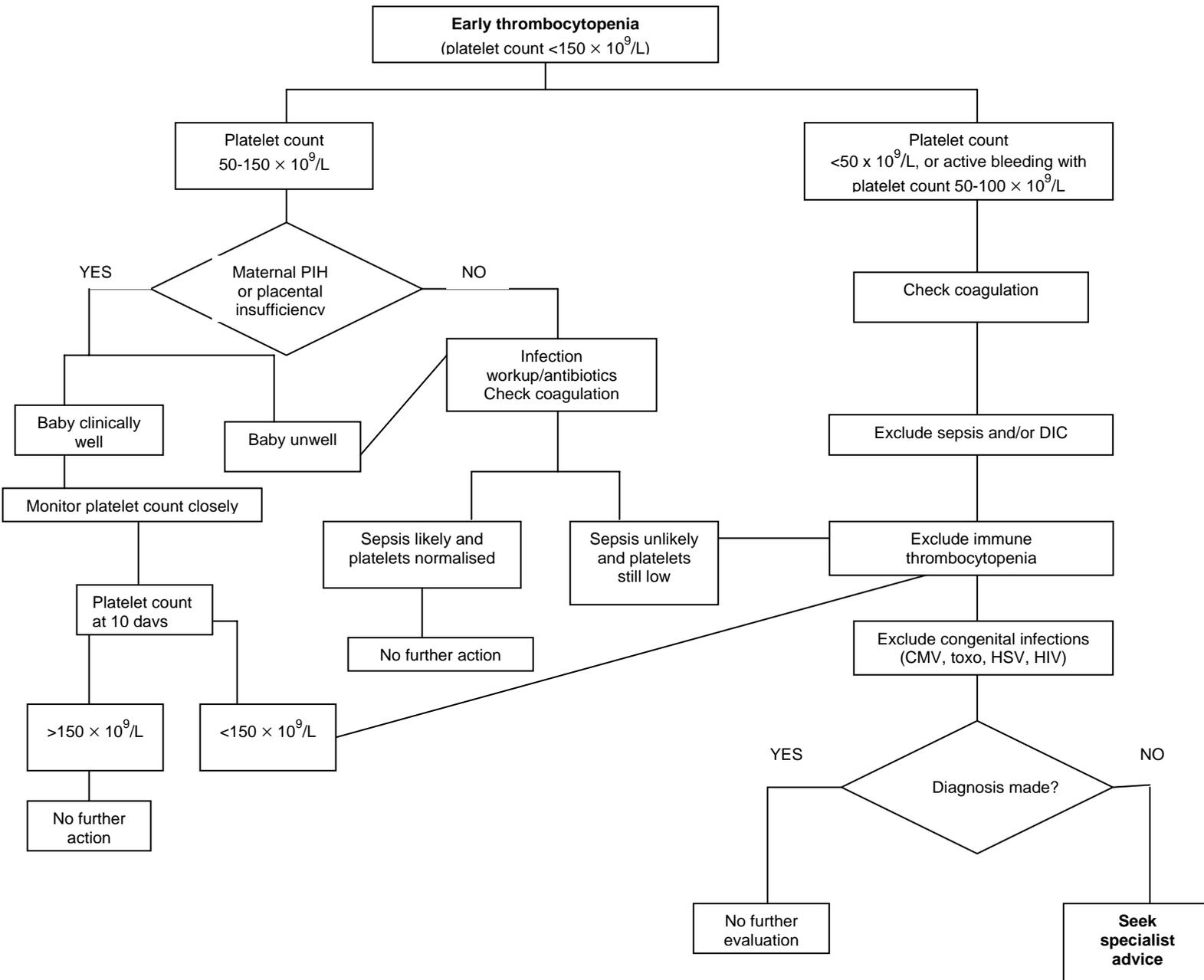
INVESTIGATIONS

- Evaluation of early-onset (<72 hr after birth) thrombocytopenia (see flowchart)
- in preterm infants with early-onset mild-to-moderate thrombocytopenia in whom there is good evidence of placental insufficiency, further investigations are not warranted unless platelet count does not recover within 10-14 days
- in preterm infants without placental insufficiency, investigate first for sepsis
- in term infants, investigate for sepsis and NAIT (see below)

Evaluation of late onset thrombocytopenia

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

Flowchart



MANAGEMENT

General

Avoid

- Heel prick, use venepuncture
- Invasive procedures
- Intramuscular injections
- Lumbar puncture

- If any of above are unavoidable:
 - discuss with consultant on call
 - consider use of platelet transfusion before undertaking unavoidable invasive procedures
 - give particular attention to haemostasis

Platelet transfusion

- This is the only available immediate and specific therapy for thrombocytopenia but carries a risk of transfusion-related infections and transfusion reactions
- The following guidance is based on expert opinions and consensus statements

Platelet count ($\times 10^9/L$)	Non-bleeding neonate	Bleeding	NAIT (proven/suspected)
<30	<ul style="list-style-type: none"> • Consider transfusion in all cases 	<ul style="list-style-type: none"> • Transfuse 	<ul style="list-style-type: none"> • Transfuse [with human platelet antigen (HPA) compatible platelets]
30-49	<ul style="list-style-type: none"> • Do not transfuse if clinically stable • Consider transfusion if: <ul style="list-style-type: none"> • <1 kg and <1 week old • clinically unstable (e.g. fluctuating blood pressure or perfusion) • previous major bleeding (e.g. grade 3-4 IVH or pulmonary haemorrhage) • current minor bleeding (e.g. petechiae, puncture site oozing or bloodstained ET secretions) • concurrent coagulopathy • requires surgery or exchange transfusion 	<ul style="list-style-type: none"> • Transfuse 	<ul style="list-style-type: none"> • Transfuse if any bleeding (with HPA compatible platelets)
50-99	<ul style="list-style-type: none"> • Do not transfuse 	<ul style="list-style-type: none"> • Transfuse 	<ul style="list-style-type: none"> • Transfuse if any major bleeding (with HPA-compatible platelets)
>99	<ul style="list-style-type: none"> • Do not transfuse 	<ul style="list-style-type: none"> • Do not transfuse 	<ul style="list-style-type: none"> • Do not transfuse

Type of platelets

- NAIT: HPA compatible platelets wherever possible
- All others: blood group-compatible cytomegalovirus (CMV) negative
- Irradiation of platelets is not routinely required but should be considered for infants with definite or suspected immunodeficiency or those who have undergone intrauterine transfusions

Volume of platelets

- 10 mL/kg (should raise platelet count by $>50 \times 10^9/L$). Babies with suspected NAIT will require higher dose 20 mL/kg

ADMINISTRATION OF PLATELETS

Never administer platelets through an arterial line or UVC

- 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 1 hr after transfusion

NEONATAL ALLO-IMMUNE THROMBOCYTOPENIA (NAIT)

- This is analogous to Rhesus haemolytic disease and is 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 a 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 infant indicate NAIT until proved otherwise
- NAIT can also present with:
 - fetal intracranial haemorrhage or unexplained hydrocephalus
 - postnatal intracranial haemorrhage in term infant

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 notes)
- Obtain blood from mother, baby and father for platelet typing and antibodies. Liaise with **haematology department** about appropriate samples
- Arrange cranial ultrasound scan

Treatment

- In 30% of cases, maternal antibody may not be found and can be detected later
 - treat babies with suspected NAIT empirically with antigen-negative platelets
- Transfuse baby with suspected NAIT with accredited HPA-1 antigen-negative platelets if:
 - bleeding or
 - platelet count $<30 \times 10^9/L$
- National Blood Transfusion 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 for two consecutive days
- Aim to keep platelet count $>30 \times 10^9/L$ for first week of life, or as long as active bleeding continues
- Report newly diagnosed babies with NAIT to fetal medicine consultants for counselling for future pregnancies

NEONATAL AUTO-IMMUNE 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 $<30 \times 10^9/L$, whether bleeding or not, treat with IVIg (dose as in NAIT)
- 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