# Petechiae and Purpura (Bruising)

## Definition / Supporting Information

Petechiae are small (1–3 mm), while purpura are larger (eg, 1 cm), red, non-blanching macular lesions caused by intradermal capillary bleeding. Ecchymoses (bruises) cover a larger area and are a consequence of intradermal capillary and venular bleeding, typically associated with trauma.

**Keywords / also known as:** ecchymoses, non-blanching rash, skin spots, subcutaneous haemorrhage

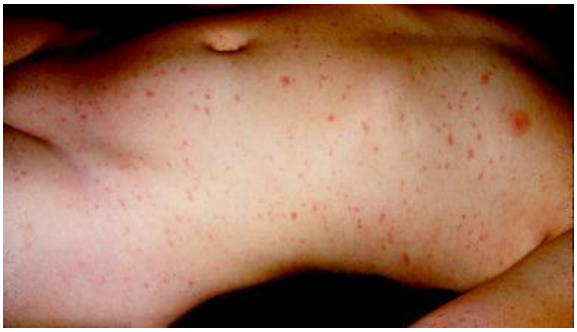

**Figure 1: Petechial and purpuric rashes - Example 1**

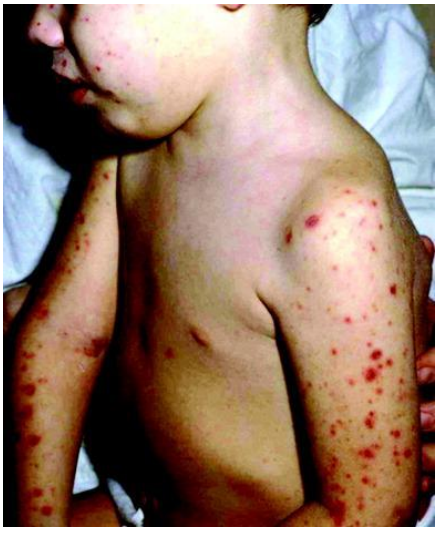

**Figure 2: Petechial and purpuric rashes - Example 2**

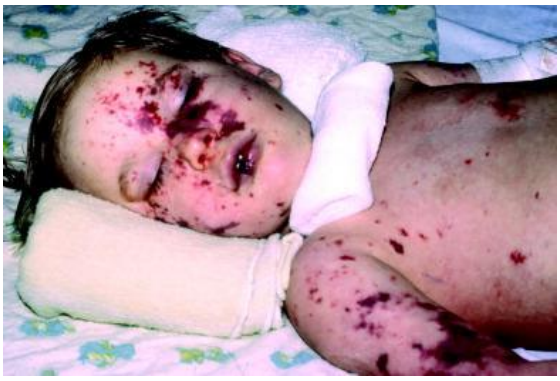

**Figure 3: Petechial and purpuric rashes - Example 3**

## Essential History

**Ask about:**

- Recent trauma
- Bleeding history and family history of bleeding
- History of vomiting or coughing forcefully
- Medication use (eg, warfarin sodium or aspirin)
- Recent infection
- Features of systemic disease
  - Fever / rash
- Red / painful or swollen joints (see Joint Pain)

## 'Red Flag' Symptoms and Signs

**Ask about:**

- Fevers
- Night sweats
- Weight loss
- Malaise
- Bone / joint pain
- Anorexia (see Appetite Loss)

**Look for:**

- General signs of illness
  - If the child appears unwell, sepsis must be strongly considered.
- Lymphadenopathy or other masses
- Pallor
- Evidence of trauma

- Unusual distribution of petechiae that might suggest non-accidental injury (eg, linear patterns)

## Differential Diagnosis / Conditions

Conditions associated with petechiae, purpura and bruising are categorised below (the lists of conditions are not exhaustive).

**Disorders of haemostasis**

- For isolated petechiae, consider a primary platelet disorder:
  - Low platelet number
  - Platelet dysfunction
- Purpura may result from a platelet disorder or other coagulation defect.
- Low platelet counts
  - > 80 x$10^9$/L
    - Child will be haemostatically normal as long as platelet function is not altered
  - 50–80 x $10^9$/L
    - Increased bleeding with trauma is likely, but spontaneous bleeding would be unusual
  - 20–50 x $10^9$/L
    - A mild bleeding diathesis is expected
  - < 20 x $10^9$/L
    - Spontaneous mucosal bleeding can occur
  - < 10 x $10^9$/L
    - Spontaneous severe bleeding is a danger

**Infectious causes of petechiae and purpura**

- Platelet consumption is common in children with bacteraemia and sepsis before frank disseminated intravascular coagulation (DIC) has developed.
- In an ill-appearing child with petechiae or purpura:
  - Infectious causes must be considered
  - Appropriate antibiotics should be administered on the basis of likely pathogens.
- Meningococcal sepsis / bacterial meningitis must be considered for the febrile child with petechiae or purpura (see Bacterial meningitis and meningococcal septicaemia [NICE clinical guideline 102]).
- Purpura fulminans has been associated with:
  - Viral infections
  - *Streptococcus pneunomoniae*
  - *Meningococcus*

- Live-virus vaccinations can cause moderate thrombocytopenia
  - Varicella
  - Measles
- Cytomegalovirus
- Parvovirus
- Dengue fever and other viral haemorrhagic fevers
- Rickettsial diseases such as Rocky Mountain spotted fever
- Malaria
- HIV

**Disorders of platelet production: malignancy and bone marrow failure**

- Malignancy
  - Leukemia
    - Consider if petechiae or purpura in the setting of hepatomegaly / splenomegaly or significant lymphadenopathy.
  - Other marrow infiltrating malignancies must also be considered.
  - Bone marrow failure secondary to non-malignant processes:
    - Infectious processes (viral or bacterial with sepsis)
    - Medication use (various antibiotics and antiepileptics)
    - Profound nutritional deficits (vitamin $B_{12}$ or folate deficiency)
- Rare bone marrow failure syndromes
  - Fanconi's anaemia
  - Myelodysplastic disease
  - Wiskott–Aldrich syndrome

**Disorders of platelet function: primary platelet disorders**

- Qualitative disorders resulting from platelet dysfunction
  - Medication use (eg, aspirin)
  - Uraemia
  - Liver disease
- von Willebrand's disease
  - Most common bleeding disorder
    - Affects ~1% of the population
  - Establish the diagnosis with:
    - Coagulation screening (partial thromboplastin time prolonged)
    - Factor VIII and von Willebrand factor assays
- Rare platelet function disorders
  - Glanzmann's thrombasthenia
  - Bernard–Soulier syndrome
  - Hermansky–Pudlak syndrome

  - Chédiak–Higashi syndrome

**Disorders of platelet survival (destruction)**

- Idiopathic (or immune) thrombocytopenic purpura is a diagnosis of exclusion.
  - Produces profound isolated thrombocytopenia and petechiae or purpura
- Hypersplenism, eg, due to:
  - Liver disease
  - Infections, such as Epstein–Barr virus or malaria
  - Metabolic diseases, such as Gaucher's disease
  - Hypersplenism alone does not typically cause platelet counts < 50,000.
    - Alternative explanations should be considered for patients with moderate–severe thrombocytopenia.
- Haemolytic uraemic syndrome (HUS)
  - Anaemia, thrombocytopenia, uraemia
  - Usually follows diarrhoeal prodrome (absence of diarrhoeal prodrome suggestive of 'atypical' HUS)
- Thrombotic thrombocytopenic purpura
- Autoimmune disorders, eg:
  - Systemic Lupus erythematosus
- Giant vascular malformations may cause intravascular destruction of platelets
  - Kasabach–Merritt syndrome

Thrombocytopenia or altered haemostasis may be associated with adverse drug reactions, or rare vascular disorders and connective tissue syndromes, such as:

- Hereditary telangiectasias
- Ehlers–Danlos syndrome
- Marfan's syndrome
- Osteogenesis imperfecta

**Other (normal platelet count)**

- Henoch-Schonlein Purpura
- Non-accidental injury (see Child maltreatment: when to suspect child maltreatment in under 18s [NICE clinical guideline 89])
- Mechanical due to history of coughing or vomiting forcefully
- Rash confined to superior vena cava distribution (above nipple line)

## Investigations

To be undertaken by non-specialist practitioners (eg, General Practitioner (GP) Team), or by specialist practitioners (eg, Emergency Department / General Paediatric Team(s)):

Consider:

- Full blood count with platelets and differential count
  - If more than 1 cell line on a blood count is identified as being abnormal, bone marrow aspiration must be considered (liaise urgently with Paediatric Haematology / Oncology Team(s), via the cancer pathway).
- Clotting screen (prothrombin time and partial thromboplastin time)

To be undertaken by specialist practitioners (eg, Emergency Department / General Paediatric Team(s)):

- If infection is suspected:
  - Blood cultures
  - Blood gas
  - Serum glucose
  - Coagulation screen
- If the history or physical examination is suggestive of malignancy, the following should be obtained immediately:
  - Full blood count
    - If more than 1 cell line on a blood count is abnormal, bone marrow aspiration must be considered (liaise urgently with Paediatric Haematology / Oncology Team(s))
    - Isolated profound thrombocytopenia is not likely to result from a malignancy.
  - Liver function tests
  - Bone profile (calcium / phosphate / albumin / uric acid)
  - Manual differential count of the peripheral blood
    - Diagnosis of leukaemia can be made if peripheral blasts are present
    - Absence of leukaemic blasts on a peripheral blood smear does not rule out leukaemia
  - Serum electrolytes
    - Risk of tumour lysis and acute kidney injury
  - Chest Xray
    - Patients may have occult but massive mediastinal lymphadenopathy
  - Bone marrow aspiration
  - Biopsy
- If haemolysis is suspected (eg, HUS, auto-immune conditions):
  - Lactate dehydrogenase

  - Blood film (looking for fragments)
  - Haptoglobins
  - Consider complement studies and antinuclear antibodies

## Treatment Approach

To be undertaken by non-specialist practitioners (eg, GP Team), or by specialist practitioners (eg, Emergency Department / General Paediatric Team(s)):

- Treatment depends on cause of petechiae or purpura.
- If in doubt, treat as for potential meningococcal septicaemia:
  - Give parenteral antibiotics (intramuscular or intravenous benzylpenicillin sodium or ceftriaxone) at the earliest opportunity, but do not delay urgent transfer to hospital.

## When to Refer

Refer urgently to specialist practitioners (eg, Emergency Department / General Paediatric / Paediatric Haematology / Oncology Team(s)) if:

- Child appears unwell
  - Arrange emergency transfer to hospital
  - Give parenteral antibiotics (intramuscular or intravenous benzylpenicillin sodium or ceftriaxone) at the earliest opportunity, but do not delay urgent transfer to hospital
- Moderate-to-severe bleeding
- Evidence of > 1 cell line abnormality on complete blood count
- Safeguarding concerns (see Child maltreatment: when to suspect child maltreatment in under 18s [NICE clinical guideline 89], Child abuse and neglect [NICE guideline 76, section 1.3] and Child What to do if you're worried a child is being abused abuse concerns [HM Government Advice for Practitioners])
- Concern about malignancy
  - For immediate specialist assessment see Suspected cancer: recognition and referral [NICE guideline NG12 section 1.10.2]

Refer non-urgently to specialist practitioners (eg, Emergency Department / General Paediatric / Paediatric Haematology / Oncology Team(s)) if:

- Diffuse petechiae or purpura
- Focal petechiae
- Purpura not clearly associated with trauma
- Platelet count < 100 x $10^9$/L

## ‘Safety Netting’ Advice

- Advise parent / carer to seek further advice if the petechiae spread or the condition worsens

## Patient / Carer Information

***Please note: whilst these resources have been developed to a high standard they may not be specific to children.***

- Henoch Schonlein Purpura (Web page), infoKID
- Idiopathic Thrombocytopenic Purpura (Web page), Patient

## Resources

### National Clinical Guidance

Meningitis (bacterial) and meningococcal septicaemia in under 16s: recognition, diagnosis and management (Web page), NICE clinical guideline CG102, National Institute for Health and Care Excellence.

Bacterial meningitis and meningococcal septicaemia overview (Web page), NICE pathway, National Institute for Health and Care Excellence.

Child abuse and neglect (Web page), NICE guideline NHG76, National Institute for Health and Care Excellence.

Suspected cancer: recognition and referral (Web page), NICE clinical guideline NG12, National Institute for Health and Care Excellence.

What to do if you’re worried a child is being abused: Advice for practitioners (Web page), HM Government.

Child maltreatment: when to suspect child maltreatment in under 18s (Web page), NICE clinical guideline CG89, National Institute for Health and Care Excellence.

### Medical Decision Support

Recognition of Physical Abuse (Web page), RCPCH Child Protection Companion

### Suggested Resources

***Please note: these resources include links to external websites. These resources may not have national accreditation and therefore PCO UK cannot guarantee the accuracy of the content.***

Rash (Web page - log-in required), Spotting the Sick Child

Meningitis Research Foundation (Web site).

Kaplan RN, Bussel JB. Differential diagnosis and management of thrombocytopenia in childhood. Pediatr Clin North Am. 2004;51(4):1109-1140. [PubMed]

Emergency Medicine (Web page), e-Learning for Healthcare.

British Committee for Standards in Haematology Genral Haematology Task Force. Guidelines for the investigation and management of idiopathic thrombocytopenic purpura in adults, children and in pregnancy. Br J Haematol 2003;120(4):574-596. [PubMed]

## Acknowledgements

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