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The Management of the Child with a Non-Blanching Rash in the Emergency Department

Link to Algorithm

Aim

To provide guidance to clinicians on the management of children with a non-blanching rash (NBR) presenting to hospital

Definition of Terms

Clotting: Coagulation studies
CRP: C-reactive protein
CSF: Cerebrospinal fluid
DIC: Disseminated intravascular coagulation
ED: Emergency department
FBC: Full blood count
HSP: Henoch-Schonlein purpura
ICU: Intensive care unit
IM: Intramuscular
ITP: Immune thrombocytopenia
LP: Lumbar puncture
NAI: Non-accidental injury
NBR: Non-blanching rash
PCR: Polymerase chain reaction
SBI: Serious bacterial infection
SVC: Superior vena cava
U&E: Urea & electrolytes

Target Patient Population

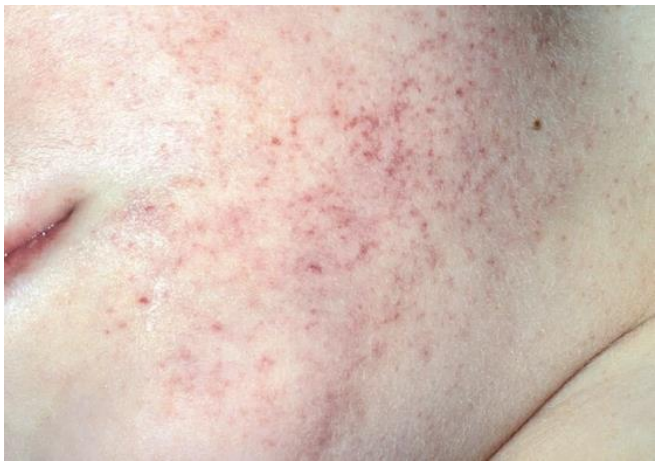
This evidence summary applies to children presenting with a non-blanching rash (NBR) to the Emergency Department (ED) and Urgent Care Centre (UCC).

Target Users

This guide is directed at health-care professionals engaged in the acute care of children in the ED and UCC.

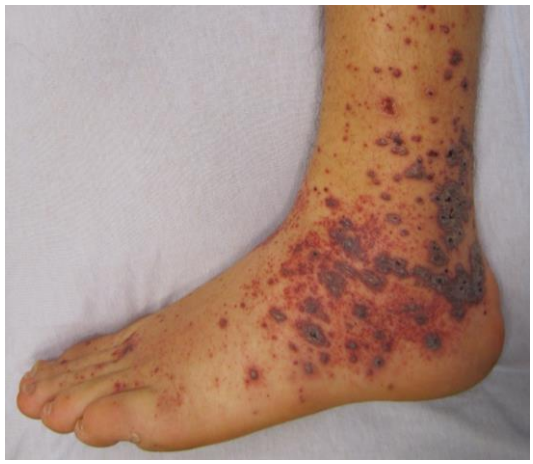
Background

NBR is a term for any rash in which the colour is unchanged with direct pressure. The term NBR is usually used in reference to petechiae or purpura (picture 1 & 2), and in this form it is a relatively common presentation to the emergency department (ED), accounting for around 2% of all attendances. [1,2]



Picture 1:

- Petechia (<2mm)



Picture 2:

- Purpura (2-10mm)
- Ecchymoses (<10mm)

The presence of a NBR is of concern to both parents and clinicians as it is associated with a wide range of underlying diagnoses, some of which are life-threatening. Any serious bacterial infection (SBI) can result in a NBR via disseminated intravascular coagulation (DIC). Some infections, however, feature a NBR as an early sign. The most common infections associated with a NBR as an earlier sign are as follows. [1-6]

- Viral
  - Enterovirus and adenovirus [3]
- Bacterial
  - Streptococcal infections [1-4]
  - Meningococcal disease (1% of cases of fever and NBR presenting to the ED) [6]

Mechanical causes

Mechanical causes are identified in almost a quarter of paediatric NBR with straining, coughing or vomiting being most common. This causes transient raised pressure within the superior vena cava (SVC), with consequent petechiae in the distribution of the superior vena cava (SVC) alone (above the nipple line) [1]. Direct trauma can result in bruising that can be mistaken for a NBR. Typically there is a clear history of trauma, if a child is bruised without a clear and reasonable explanation then non-accidental injury should be considered and the child's case discussed with a senior clinician.

Vasculitic causes

Henoch-Schonlein purpura (HSP) is the most common vasculitic cause of paediatric NBR, with other less common causes including atypical Kawasaki disease, polyarteritis nodosa and anti-neutrophil cytoplasmic

antibody-related vasculitis. HSP typically presents with palpable purpura found in a gravity dependent distribution - classically on the legs and buttocks. [7]

Haematological causes

The main haematological causes are thrombocytopenia, leukaemia and coagulopathy. Immune thrombocytopenia (ITP) is the most common haematological cause and presents with the sudden development of a NBR. In ITP, a full blood count (FBC) should show isolated thrombocytopenia, and a blood film should be normal other than thrombocytopenia. Other rare causes of thrombocytopenia include: [9,10]

- Infection (eg, Epstein-Barr virus) [11]
- Drug induced (ie vaccination, heparin, non-steroidal anti-inflammatory drugs, ranitidine) [12-14]
- Thrombotic thrombocytopenic purpura
- DIC
- Hypersplenism
- Bone marrow failure

Undiagnosed haematological malignancies can present with a NBR, either as an isolated finding or in conjunction with other features such as weight loss, fatigue, pallor and general malaise. [13,15] Clinical features such as lymphadenopathy, hepatomegaly, splenomegaly, jaundice and anaemia should be sought; [12] and any patient with an abnormal blood film or deficiencies in multiple cell lines should be discussed with the local haematology service.

Coagulopathy is an exceptionally rare cause of paediatric NBR in children (<0.01% of cases). [16] A family history of coagulation disorders or a long history of easy bruising may warrant further investigation.

Other causes

It is worth considering whether a well-child's rash is in fact a normal variant. A study of infants attending routine health checks found that petechiae were commonly identified in well infants with over one-quarter having one or more petechiae. [17]

Remember

- The majority of children with a NBR have no cause identified - the NBR is presumed to be secondary to a viral infection [2]
- The incidence of meningococcal disease in children presenting with fever and NBR is about 1%, however recognition and early treatment of the child with meningococcal disease is paramount [16]
- Clinical signs and laboratory investigations can help guide your management

Assessment

Perform a global assessment of the child to assess wellness, nature and distribution of the rash and features of specific diseases.

The presence of purpura (>2mm) or appearing unwell or hypotensive shock or meningism confer a significant risk of invasive meningococcal disease or invasive bacterial infection. These children require immediate investigation and treatment for suspected sepsis/meningitis

In addition to this immediate assessment the child should have a full clinical examination including measurement of vital signs (heart rate, respiratory rate, oxygen saturations, capillary refill time and blood pressure).

Management

NBR management algorithm

Suspected invasive bacterial infection, meningitis or meningococcal disease

- Sepsis management flow-chart (refer to the 'International Guidelines for the Management of Septic Shock & Sepsis-Associated Organ Dysfunction in Children (SSCGC)')

The Child with an Alternate Diagnosis

- Treat underlying cause

The Well Child with a NBR

- Well appearing children with a normal CRP (<20mg/l) who remain clinically well (vital signs are normal & clinically appears well) in the ED with no significant spread of the rash and no new purpura may be suitable for discharge home with clear safety-net advice. Children should be observed until 4 hours from the onset of the rash

Special Considerations

Pre-hospital Antibiotic Administration:

- Any child who received pre-hospital IM antimicrobials (i.e. IM benzylpenicillin or ceftriaxone) from a primary care doctor prior to attending the emergency department but appears well on arrival should be admitted for observation at the very least.

Parental Concern and safety-net advice

- Always address the concerns of parents and caregivers
- When discharging a child home after a period of observation it is important that the patents are involved in the shared decision making process and understand when to return if the clinical picture changes
- Give verbal and written safety-net advice, taking into account the parents capacity to appreciate if the child becomes unwell they should return for further assessment

Companion Documents

- Parent Information Leaflet – Safety Advice

Link to References