Approach To The Bleeding Child

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Why is the child bleeding?

- Is it a local cause only?
- Is it an abnormality of the hemostasis?

Bleeding suggesting a hemostatic abnormality

- Excessive in relation to its cause
- Prolonged duration
- Recurrent

Bleeding History

- Epistaxis
  - Prolonged (> 15-30 min)
  - Requiring medical treatment (packing, cauterization)
  - Recurrent / Leading to anemia
  - Not explained by trauma / nose-picking, allergy, URI

Bleeding History

- Bruising
  - Large ecchymoses (> 5 cm diam.)
  - Multiple sites
  - Located in areas not usually associated with trauma
- Skin laceration
  - Bleeding lasting more than 30 min
  - Bleeding restarting over the next 7 days

Bleeding History

- Oral cavity bleeding
  - Lasting over 30 min.
  - Restarting within 7 days
  - Requiring medical treatment
  - Prolonged bleeding after dental extractions
- Menorrhagia
  - Requiring medical attention
  - Leading to anemia
Bleeding History

- **Gastrointestinal hemorrhage**
  - Spontaneous / unexplained by local causes
  - Requiring medical attention
  - Leading to anemia

- **Hemarthroses, hematomas**
  - After no or minimal trauma

Medical History

- **History of hemostatic challenges**
  - Surgeries, dental extractions, trauma

- **Associated pathology**
  - Allergic rhinitis
  - Liver disease
  - Renal failure / uremia

Medical History

- **List of medications**
  - Aspirin, other NSAID
  - Anticoagulants
  - Anticonvulsants (e.g. Valproic acid)

Family History

- **X linked disorders**
  - Hemophilia A (Fct VIII)
  - Hemophilia B (Fct IX)

- **Autosomal dominant**
  - Von Willebrand Disease

- **Autosomal recessive**
  - Fct VII deficiency
  - Fct XIII deficiency
  - Afibrinogenemia

Family History

- **Sites and patterns of bleeding**

- **Hemostatic challenges**
  - Surgeries
  - Major trauma
  - Dental extractions

- **Gynecologic history** for female relatives
  - Severe bleeding after childbirth
  - PRBC transfusion after delivery
  - Menorrhagia
  - Early hysterectomy for menorrhagia
**Physical examination**
- Is usually negative
- Purpura
- Ecchymosis
- Hemarthroses / chronic joint changes

**Physical examination**
- Telangiectasia:
  - Hereditary hemorrhagic telangiectasia
- Oculocutaneous albinism:
  - Hermansky Pudlak syndrome
- Skeletal abnormalities:
  - Thrombocytopenia absent radii
- Joint laxity:
  - Ehlers Danlos syndrome

**Pattern of Bleeding**
- **Mucocutaneous bleeding**
  - von Willebrand Disease
  - Platelets: number abnormalities
  - function
- **Deep Bleeding** (hematomas, hemarthroses)
  - Coagulation factor deficits F VIII, F IX, vWFct
- **Generalized bleeding**
  - DIC, hepatic insufficiency,

**Screening tests**
- Platelet count
- Platelet Functional Assay
- PT
- PTT
- Fibrinogen
Platelet Count / Blood Smear

- Pseudothrombocytopenia
  - EDTA induced in vitro agglutination of platelets
  - Confirmed by
    - Using a different anticoagulant (citrate, heparin)
    - Estimating the platelet count on the peripheral smear

Platelet Count / Blood Smear

- RBC morphology
  - Schistocytes = intravascular coagulation
    - DIC
    - TTP
    - HUS
    - Kasabach Merritt syndrome (giant hemangioma)

Decreased Platelet Count

- Increased destruction
  - ITP
  - DIC
  - HUS
  - Sepsis

- Decreased production
  - Leukemia
  - Lymphoma
  - Neuroblastoma
  - Sepsis
  - Drugs

Thrombocytopenia in newborn

- Well looking newborn
  - Maternal ITP
  - Alloimmune
  - Neonatal Thrombocytopenia
  - Absent Radii
  - Wiisckott-Aldrich
  - Fanconi Anemia

- Sick Newborn
  - Sepsis
  - RDS
  - DIC
  - Thrombosis
  - Viral infections
  - Giant hemangioma
    - Kasabach Merritt

Platelet Functional Assay

- Prolonged PFA times
  - Von Willebrand disease
  - Platelet functional defects
    - Inherited
      - Glanzmann’s thrombasthenia
      - Bernard Soulier
      - Storage pool defects etc.
    - Acquired
      - anti-platelet medication
      - uremia
  - Thrombocytopenia platelet counts below 100,000/mm²
Prolonged PFA times

- von Willebrand factor panel
  - vWF factor antigen
  - vWF factor activity (ristocetin time)
  - Factor VIII
  - vWF factor multimeric analysis
- Blood type
- Platelet aggregation studies

Abnormal PT and PTT

- Mixing studies: plasma from a normal person is added to the patient's plasma
- The PT and / or PTT is determined immediately and after 2 hrs

Abnormal PT and PTT

- PT or PTT will correct with mixing studies
  - Coagulation factor deficit
- No correction with mixing studies
  - Inhibitor of the test
    - Lupus anti-coagulant
    - Anti-Cardiolipin AB

Coagulation Factor Deficits

- Prolonged PT only: Fct VII
- Prolonged PTT only: Fct VIII, IX, XI, XII, Pre-kallikrein, HMWK
- Prolonged PT and PTT: Fct II, V, X, fibrinogen
- Prolonged PT, PTT low fibrinogen: DIC

Approach to the Bleeding Child

- Is the bleeding prolonged, excessive or unexpected?
- What is the bleeding pattern?
- Any prior hemostatic challenges?
- Family history
- Screening tests