Approach to Bleeding Neonate

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Hemostasis

5 key players
- Blood vessels
- Platelets
- Clotting Factors
- Anti clotting Factors
- Clot lyses
Blood coagulation *in vivo*

initiation phase

- TF (tissue factor) → VII → IX → TF-VIIa → X → Xa

amplification phase

- (αTHR) Xla → XI
- (APC) VIIIa → VIII
- (αTHR) Xa → X

prothrombin → THROMBIN

fibrinogen → fibrin → XIIIa → XIII

platelets

activated platelets

stabilised, cross-linked fibrin clot
**Vessel injury**

**Vasospasm**
- VWF
- Binds platlets to matrix
- Platlet surface changes
- Fibrinogen binds further platlets
- Temporary plug is formed

**Exposure of subendothelial matrix**
- Tissue factor
- Factor VII (Extrinsic pathway)
- Surface activation (Intrinsic pathway)
- Clot Formation
- Clot retraction
- Lysis
What is not a bleeding disorder?

- Swallowed maternal blood
- Bleeding from umbilical granuloma
- Vaginal bleeding
- Urate crystals
- Subconjunctival and retinal Haemmorhage and sometimes petechiae on head and neck
Swallowed maternal blood

- Usually bleeding in first 2-3 days
- Mainly blood or bloody stools (sometimes vomiting)
- Apt test: Fetal blood - pink (Alkali resistant)
  - Maternal blood – yellow brown
When to suspect a Hemorrhagic disorder?

- Spontaneous bleeding into skin, mucous membrane, joints, internal tissues
- Excessive or prolonged bleeding following trauma, Surgery
- Bleeding from more than 1 site
- Associated family history of Abnormal bleeding
Fetal hemorrhage

- Twin – Twin transfusion
- Fetomaternal Hemorrhage
- Placenta previa, Abruptio placenta
Neonatal Hemorrhage

- Coagulation defects:
  - Most common
  - HDN, Hepatic insufficiency, inherited defects of coagulation, Maternal medication
  - Petechiae are rare. Ecchymosis, internal bleeds
Neonatal Hemorrhage

Platlet disorder:
- Petichiae and bleeding from mucus membrane are common. Echymosis < 2mm.
- Causes
  - Qualitative disorder: Glanzmans disease, Acquired (Drugs)
  - Quantitative: Auto or Allommune Thrombocytopenia
  - Depression of megakeryocytes
  - Hereditary
  - Sequestration
  - idiopathic
Neonatal Hemorrhage

Vascular defects
- Bleeding mainly confined to skin.
- Increased permeability in preterm, Asphyxia, Vascular malformation
- Trauma: presenting part, slipped ligatures, trauma by catheters, NG tube, thermometer.
Hemorrhagic Disease of newborn

- Physiologic deficiency of factors II, VII, IX, X
- More in preterm
- Maximum fall in 48-72 hours with a gradual return by 7-10 days (lack of maternal free vit k and absence of bacterial flora)
- D/D: congenital absence of clotting factors, DIC
Hemorrhagic Disease of newborn

- Classical: approx 2% chances if no Vit K
  - 2\textsuperscript{nd} and 7\textsuperscript{th} day
  - Bleeding: GI, nasal, subgaleal, I/C, post-circumcision
  - Treatment: slow I/V 1-2 mg of Vit K
- Early onset: 0-24 hours, Maternal medications
- Late onset: upto 6 months, Neonatal Hepatitis, Biliary atresia.
- Tests: Prolonged PT, APTT. PIVKA
Investigations

- Essential: Complete hemogram
- Screening: BT, platelet count, PT, APTT
  - PT- Extrinsic pathway
  - APTT- Intrinsic pathway
- Special tests: Thrombin time, VWF factor, coagulation factor assay, platelet function tests
## SICK NEONATE

<table>
<thead>
<tr>
<th>PLATLET COUNT</th>
<th>PT</th>
<th>APTT</th>
<th>Diagnostic possibilities</th>
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<tbody>
<tr>
<td>N</td>
<td>N</td>
<td>N</td>
<td>DIC</td>
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<tr>
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<td>PLATLET CONSUMPTION</td>
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<td>LIVER DISEASE, HEPARIN</td>
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<td>ALTERED VASCULAR INTEGRITY</td>
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## HEALTHY NEONATE

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<td>IMMUNE THROMBOCYTOPENIA</td>
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<td>BONE MARROW HYPOPLASIA</td>
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<tr>
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<td>UP</td>
<td>HDN</td>
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<tr>
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<td>HEREDITARY CLOTTING FACTOR</td>
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<td>SWALLOWED MAT BLOOD</td>
</tr>
<tr>
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<td>LOCAL FACTORS FAC xiii DEF(RARE)</td>
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Management

- Supportive treatment with blood component therapy plus
- Identification of treatment and cause
- Vit K 2mg i/v should be given after collecting investigations (if not given earlier)
- In GI bleed Xray abdomen erect
Management (infant in shock)

- Immediate BT
- NS Bolus 15-20 ml over 5-15 minutes
  or (15-20 ml O-ve blood)
- Aim: BP- 40mm & CVP< 8cm H2O
- If necessary, further transfusion cross matched against maternal blood 10-30 ml over 2-3 hours
Management (infant not in shock)

- Transfuse with PCV 10ml/kg over 2-3 hours (Hb: 10-12g/dl)
- Critically ill infants < 1500 gr: FFP 10ml/kg if PT and APTT prolonged
- Platlet transfusion < 20000/mm³
Treatment of specific cause

- **HDN**: Vitamin K 1-2 mg I/v
- **Alloimmune thrombocytopenia**: platelet transfusion when platelet <30000/mm³ plus IVIg 1-2 g/kg/day × 2 days
- **Autoimmune thrombocytopenia**: Mother- prednisolone 10-20 mg four time daily for 10-14 days, LSCS preferred esp fetal scalp platelets < 50000/mm³
- **Congenital def of factors**: 10-15 ml/kg FFP
- **DIC**: Treat cause, correct shock, acidosis, hypoxia
  Replacement of coagulation factors and platelets
Thank you