3.8.5. Neonatal Haemorhagic diseases

Unit 3 · Topic 8.5 Neonatal Hemorrhagic Diseases (Navajāta Raktasrāva-vyādhi)

Learning goals

By the end of this chapter you will be able to:

- define neonatal hemorrhagic diseases and list the major causes;
- classify **Vitamin K Deficiency Bleeding (VKDB)** (early, classic, late) and write **risk factors, clinical features, investigations, and management**;
- differentiate VKDB from **thrombocytopenic** bleeding (alloimmune/autoimmune), **DIC/sepsis-associated coagulopathy**, and **congenital factor deficiencies** (e.g., hemophilia);
- write **evidence-based prophylaxis** recommendations for India and international practice;
- counsel parents and document danger signs.

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1) Classical anchor (why bleeding matters)

> **"रक्तं जीवितमित्याहुर्ब्राह्मणा वेदपारगाः ।**
> **तस्मात् तद्भिषजा रक्ष्यं विशेषेण प्रयत्नतः ॥"** — *Suśruta Saṃhitā*, Sūtrasthāna **14/45**.
> *("Blood is life," say the learned; hence the physician must protect it with special effort.)*

This verse justifies our vigilance in **preventing**, **recognising**, and **treating** neonatal bleeding promptly.

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2) Definition & spectrum

Neonatal hemorrhagic diseases are conditions in the first **28 days** of life characterised by abnormal bleeding due to **coagulation factor deficiency (e.g., VKDB)**, **platelet disorders** (alloimmune/autoimmune thrombocytopenia), **disseminated intravascular coagulation (DIC)** (usually with sepsis/asphyxia), **congenital factor deficiencies** (hemophilia A/B), or **hepatic/cholestatic disease**.

Common bleeding sites: umbilical oozing, GI bleed (melena/hematemesis), mucosal/skin petechiae/purpura, post-procedural ooze (heel-prick, injection), cephalohematoma/ICH in severe forms.

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3) Vitamin K Deficiency Bleeding (VKDB)

3.1 What and why

Newborns have **low vitamin K stores** (poor placental transfer, low milk vitamin K, delayed gut colonisation), making factors **II, VII, IX, X** undercarboxylated and the **extrinsic pathway** weak. VKDB was formerly "hemorrhagic disease of newborn."

3.2 Clinical classification

- **Early** VKDB: **<24 h**; usually maternal drugs (warfarin, anticonvulsants—phenytoin/phenobarbital, antituberculars—rifampicin). **Neonatal vitamin K does not prevent early VKDB**; manage maternal meds/pre-delivery dosing.
- **Classic** VKDB: **24 h–7 days**; umbilical/GI/skin bleeding; prevented by neonatal prophylaxis.

- **Late** VKDB: **2–12 weeks** (up to 6 months); mainly **exclusively breastfed** or **cholestatic** infants without effective prophylaxis; **ICH common and life-threatening**. (

3.3 Risk factors

Exclusive breastfeeding without prophylaxis; maternal drugs affecting vitamin K; prolonged antibiotic use; **cholestasis/malabsorption**; home birth without prophylaxis; refusal of injection.

3.4 Lab pattern (VKDB)

- **PT (INR) prolonged** (often more than aPTT); **platelets normal**; fibrinogen usually normal.
- Rapid correction after **vitamin K** supports diagnosis.

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4) Prophylaxis

4.1 India (MoHFW, Government of India)

- **All facility births**: **Vitamin K_1 (phytonadione) IM soon after birth (within 24 h)**.
  - **Birth weight ≥1000 g**: **1 mg IM once**.
  - **<1000 g**: **0.5 mg IM once**.
- IM route preferred; oral regimens need multiple doses and are **not preferred**.

4.2 International (AAP/CPS)

- **AAP 2022**: **1 mg IM** for **>1500 g** within **6 h**; **≤1500 g**: **0.3–0.5 mg/kg IM** single dose.
- **Canadian Paediatric Society (2018)**: **0.5 mg IM if ≤1500 g; 1 mg IM if >1500 g** within **6 h**. If IM declined: **2 mg oral at birth**, repeat at **2–4 weeks** and **6–8 weeks** (less effective; **avoid in cholestasis**).

Key viva line: IM vitamin K at birth nearly eliminates classic and late VKDB; oral regimens are **inferior** for late VKDB and **contraindicated** in cholestasis.

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5) Diagnosing and managing VKDB (stepwise)

5.1 Presentations you must recognise

- **Classic:** oozing from umbilicus/injection sites; melena; pallor.
- **Late:** irritability, seizures, bulging fontanelle (ICH); pallor/shock.

5.2 Investigations

- **CBC** (Hb/platelets), **PT/INR, aPTT**, **fibrinogen**, **LFTs**; consider **neurosonogram/CT** if neuro signs.

5.3 Treatment (acute bleed)

1. **Stabilise ABC**; IV access; blood conservation.
2. **Vitamin K_1** (phytonadione) **1 mg IV slow or IM** (preterm: **0.5–1 mg**; critically ill often given IV slowly).
3. **FFP 10–20 mL/kg** if major bleeding/ICH or markedly deranged PT while vitamin K takes effect; **PCC** if available for life-threatening bleed and guided by haematology.
4. **Packed RBC** for anaemia/shock; **neurosurgery** for ICH as indicated. (Summarised from contemporary guideline syntheses.)

6) Thrombocytopenic bleeding in neonates

6.1 Neonatal alloimmune thrombocytopenia (NAIT/FNAIT)

Pathogenesis: maternal antibodies against fetal platelet antigens (e.g., HPA-1a).
Clues: severe thrombocytopenia (often <30×10⁹/L), petechiae/purpura at birth, risk of **ICH** even before delivery.
Management (neonate):

- **Immediate platelet transfusion** if significant bleeding or platelets very low; matched (antigen-negative) platelets ideal; if unavailable, **transfuse available platelets without delay** and switch when matched become available.
- **IVIG 1 g/kg/day for 1–2 days** as adjunct if counts fail to rise or bleeding ongoing.
- Avoid IM injections invasive procedures until platelets stabilise.

6.2 Neonatal autoimmune thrombocytopenia (maternal ITP)

Mechanism: transplacental maternal anti-platelet antibodies.
Management: IVIG 1 g/kg (single or on 2 consecutive days) if **platelets <30×10⁹/L** or bleeding; platelets only if bleeding severe or before procedures.

Lab pattern (thrombocytopenia): Platelets low; **PT/aPTT normal** (unless DIC).

7) DIC/sepsis-associated coagulopathy

Triggers: severe sepsis, perinatal asphyxia, hypothermia, severe RDS, shock.
Labs: Prolonged PT & aPTT, **thrombocytopenia**, **low fibrinogen**, **high D-dimer/FDP**.
Management: treat the underlying cause + goal-directed blood product support (FFP, cryoprecipitate for fibrinogen <100–150 mg/dL, platelets if <50×10⁹/L with bleeding). **Avoid prophylactic FFP** when not bleeding.

8) Congenital factor deficiencies — focus on hemophilia A/B

Clues: family history; **cephalhematoma**, **prolonged oozing** after procedures, **APTT prolonged** (PT normal), normal platelets; ICH may occur.
Acute management: factor replacement—recombinant FVIII/FIX to target **50–100%** activity for serious bleeds/ICH, under haematology guidance.

Vitamin K in suspected hemophilia?

- Recommendations **vary by institution**. Some centres **still give IM vitamin K** with precautions (fine-gauge needle; **firm pressure 5–10 min**) following haemophilia-society advice; others prefer **oral/subcutaneous** dosing to avoid intramuscular hematoma. **Follow local haemostasis team protocol.**

9) Quick differential diagnosis (high-yield table)

Feature	VKDB	NAIT/Autoimmune Thrombocytopenia	DIC	Hemophilia
Onset	Early: <24 h (maternal drugs); Classic: 1–7 d; Late: 2–12 w	Birth–first days	Any time with sepsis/asphyxia	Birth–neonate
Bleeding pattern	Umbilical/GI/skin; **ICH in late**	**Petechiae/purpura**, mucosal; risk ICH	**Oozing**, petechiae, organ bleed	Procedure bleeds, cephalohematoma, ICH
Platelets	**Normal**	**Low**	**Low**	Normal
PT/INR	**Prolonged** (± aPTT)	Normal	**Prolonged** both	**aPTT prolonged**, PT normal
Fibrinogen	Normal	Normal	**Low**	Normal
Key therapy	**Vit K + FFP if severe**	**Platelets ± IVIG**	**Treat cause + FFP/cryoprecipitate/platelets**	**Factor VIII/IX**
Prevention	**IM Vit K at birth**	—	Infection prevention	Genetic counselling

(Compiled from MoHFW/AAP/CPS and haemostasis literature.)

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10) OSCE-ready algorithms

A) “Umbilical oozing on Day 3”

1. Vitals, ABC → IV access.
2. **Labs:** CBC, PT/INR, aPTT, fibrinogen.
3. If **PT↑, platelets normal** → **VKDB likely** → **Vit K_1 1 mg IV slow/IM**; if bleeding significant, **FFP 10–20 mL/kg**.
4. Observe for cessation; investigate risk factors (breastfeeding without prophylaxis).

B) “Day 20, breastfed infant with seizures”

1. Suspect **late VKDB with ICH**.
2. ABC, neuroprotective care, **Vit K + FFP**, urgent **neuroimaging**, neurosurgery/haematology liaison.

C) “Term baby with widespread petechiae at birth; platelets 18×10⁹/L”

1. **NAIT** likely → **immediate platelet transfusion** (matched if available; else any readily available unit), **IVIG 1 g/kg**.
2. Avoid IM shots; monitor for ICH.

D) “Septic neonate, oozing from lines; PT/aPTT prolonged, fibrinogen 80 mg/dL”

1. Treat sepsis; **cryoprecipitate** for low fibrinogen, **FFP** for coagulopathy, **platelets** if <50×10⁹/L and bleeding.

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11) Prevention & counselling (copy for discharge notes)

- **Vitamin K at birth**: ensure **documentation** (dose, route, time). If parents initially refused, re-counsel using data that IM vitamin K **prevents fatal ICH**; oral options are **inferior** and **not for cholestasis**.
- **Breastfeeding** is encouraged; **vitamin K prophylaxis** complements—not contradicts—exclusive breastfeeding.
- **Danger signs** to return urgently: poor feeding, pallor, **black stools**, vomiting blood, persistent oozing, excessive bruising, lethargy, seizures, bulging fontanelle.
- For families with a **history of hemophilia/bleeding disorder**: involve haemostasis team **antenatally**; delivery planning; clarify local policy on the **route of vitamin K**.

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12) Practical documentation template

- **Bleeding site/time:** …
- **Vitals & haemodynamics:** …
- **Labs:** Hb …; platelets …; PT/INR …; aPTT …; fibrinogen …
- **Provisional diagnosis:** VKDB / NAIT / DIC / Hemophilia / mixed …
- **Immediate treatment given:** Vit K (dose/route/time), blood products with dose, antibiotics (if sepsis) …
- **Consults:** neonatology/haematology/neurosurgery …
- **Parent counselling + follow-up**: done/handouts provided.

13) Quick revision (mnemonics)

- **VKDB "E-C-L"**: **E**arly (<24 h, maternal drugs), **C**lassic (1–7 d), **L**ate (2–12 w, **L**ethal ICH).
- **Thrombocytopenia bleed** = **Platelets low; PT/aPTT ok**.
- **DIC** = **PT↑ + aPTT↑ + Fibrinogen↓ + D-dimer↑ + Platelets↓**.
- **Hemophilia** = **aPTT↑ only; treat with factor**.
- **Prevention** = **IM Vitamin K at birth** (India: **≥1000 g—1 mg; <1000 g—0.5 mg**).

Self-assessment

MCQs (one best answer)

1. A term, breastfed baby on day 25 presents with seizures and pallor. The most **likely** diagnosis is:
   A. Sepsis with DIC B. **Late VKDB** C. Hemophilia A D. NAIT
2. In **VKDB**, the **most typical** lab abnormality is:
   A. PT normal, aPTT prolonged B. Platelets <30×10⁹/L
   C. **PT (INR) prolonged, platelets normal** D. Fibrinogen very low
3. For **NAIT** with platelets 18×10⁹/L and petechiae at birth, the **first step** is:
   A. Wait for HPA-matched platelets only
   B. Start steroids
   C. **Transfuse available platelets immediately ± IVIG**
   D. Give IM vitamin K in the same thigh as Hep-B vaccine
4. Which **pair** is correctly matched?
   A. DIC—normal fibrinogen
   B. **Hemophilia—prolonged aPTT with normal PT**
   C. VKDB—low platelets
   D. NAIT—PT prolonged
5. According to **MoHFW India**, recommended vitamin K prophylaxis **at birth** is:
   A. 1 mg IM for all weights
   B. **1 mg IM if ≥1000 g; 0.5 mg IM if <1000 g**
   C. Oral 2 mg once for all
   D. 0.3 mg/kg IV for all

Answer key: 1-B, 2-C, 3-C, 4-B, 5-B.

Short answers (3–5 lines)

1. Classify VKDB and list two risk factors for each.
2. Write the **laboratory differences** between VKDB and NAIT.
3. Outline **DIC management** in a bleeding neonate.

4. In suspected hemophilia at birth, how do policies differ regarding **vitamin K** administration?
5. Write a **one-page algorithm** for “Day-3 umbilical oozing” including treatment doses.

Long answers (10–12 marks)

1. Discuss **Neonatal Hemorrhagic Diseases** under causes, clinical patterns, investigations, management and prevention; emphasise **VKDB** and its prophylaxis (Indian & international).
2. Write short notes on **NAIT vs Autoimmune thrombocytopenia** (pathogenesis, diagnosis, treatment, prognosis) and **DIC in neonates** (triggers, labs, product therapy).

60-second recap

Neonatal bleeding arises from **VKDB, thrombocytopenia (NAIT/autoimmune), DIC, or factor deficiencies (hemophilia)**. **IM vitamin K at birth** is the single most powerful preventive step (India: **≥1000 g—1 mg; <1000 g—0.5 mg**). Late VKDB presents between **2–12 weeks** with **ICH**—treat rapidly with **vitamin K + FFP**. Thrombocytopenic bleeds need **platelets ± IVIG**; **DIC** requires **cause-directed resuscitation and blood products**; **hemophilia** needs **factor replacement** and locally agreed **vitamin K** strategy. Keep **rakta-rakṣaṇa** in mind—*protect the blood, protect life*.