Neonatal *Herpes Simplex* Virus Infection

HIGH-YIELD · NGN

SYSTEM — MATERNAL/NEWBORN
PATHOGEN — HSV-1 / HSV-2
ONSET — FIRST 4-6 WKS OF LIFE
TX — IV ACYCLOVIR

A vertically-transmitted viral infection that disguises itself as routine neonatal lethargy — until it doesn't.

01 Definition & Overview

Neonatal HSV is a potentially devastating viral infection of the newborn, most often acquired during passage through an infected maternal birth canal.

Caused by HSV-2 (most common) or HSV-1, with three clinical presentations: skin/eye/mouth (SEM), CNS disease, and disseminated multi-organ infection.

Mortality and long-term neurologic injury remain high despite treatment — making early empiric IV acyclovir the single most important nursing/medical action.

~85%
INTRAPARTUM (BIRTH CANAL)

~10%
POSTNATAL (COLD SORE CONTACT)

~5%
INTRAUTERINE (CONGENITAL)

25–50%
TRANSMISSION IF PRIMARY MATERNAL HSV AT DELIVERY

02 Pathophysiology *simplified*

STEP 01
Maternal HSV
Primary or recurrent genital infection → viral shedding (often asymptomatic)

STEP 02
Exposure at Birth
Neonate contacts infected secretions during vaginal delivery

STEP 03
Viral Entry
Mucous membranes, skin breaks, conjunctiva, scalp lesions from monitors

STEP 04
Local Replication
Skin, eye, oral mucosa — vesicles appear 1–2 wks

STEP 05
Spread & Disease
Viremia → CNS or multi-organ dissemination if untreated

→ THREE CLINICAL PRESENTATIONS

~45%
SEM Disease
Skin · Eye · Mouth. Vesicles, conjunctivitis, oral ulcers. Best prognosis if treated — but untreated, 70% progress to CNS or disseminated.

~30%
CNS Disease
Encephalitis. Seizures, lethargy, bulging fontanelle, temp instability. High risk of permanent neurologic injury.

~25%
Disseminated
Multi-organ. Liver, lungs, adrenals, CNS, DIC, shock. Highest mortality; presents earliest (5–7 days).

Typical Onset Timeline

DAYS AFTER BIRTH

DAY 0	5-7 DAYS	1-2 WK	2-3 WK	4-6 WK
Birth	Disseminated presents earliest	SEM lesions appear	CNS / Encephalitis onset	Late presentation possible

03 Signs & *Symptoms*

Early & Subtle

DAYS 1-14

- Lethargy, poor feeding, irritability
- Temperature instability — fever OR hypothermia
- **Vesicular skin lesions** — clustered on erythematous base (often on scalp/presenting part)
- Conjunctivitis, watery eye discharge, keratitis
- Oral ulcers, mouth vesicles
- Subtle apnea or tachypnea

Late · Red Flags

ACT NOW

- Seizures · focal or generalized
- Bulging fontanelle, ↑ ICP, coma
- Apnea, respiratory failure
- Jaundice, hepatomegaly, ↑ LFTs
- Thrombocytopenia, bleeding, DIC
- Septic-shock picture (often culture-negative)

> *A vesicular rash on any newborn is HSV until proven otherwise — and 40% of disseminated/CNS cases never develop skin lesions at all.*

04 Priority Nursing *Interventions*

PRIORITY 01 · AIRWAY/BREATHING

Monitor Respiratory Status

Assess for apnea, tachypnea, retractions. Pulse ox continuous. Prepare for intubation if disseminated disease/shock develops.

PRIORITY 02 · CIRCULATION

Hemodynamic Support

Vital signs q1h initially. IV access × 2. Fluid resuscitation per protocol. Monitor for shock, DIC, bleeding.

PRIORITY 03 · TREAT EMPIRICALLY

Start IV Acyclovir NOW

Do **not** wait for culture/PCR results. Empiric IV acyclovir 20 mg/kg/dose q8h is the single most important intervention.

PRIORITY 04 · OBTAIN CULTURES

HSV PCR + Surface Cultures

Swab: nasopharynx, mouth, conjunctivae, rectum, vesicle fluid. Send blood & CSF HSV PCR; LFTs, CBC, coags.

PRIORITY 05 · NEURO & SEIZURE

Continuous Neuro Monitoring

Assess fontanelle, LOC, tone, pupillary response. Seizure precautions. EEG if available. Padded side rails.

PRIORITY 06 · INFECTION CONTROL

Contact Precautions

Gown + gloves. Cover skin lesions. Single-room isolation. Hand hygiene before/after every contact.

PRIORITY 07 · OCULAR PROTECTION

Ophthalmology Consult

Topical ophthalmic antiviral (trifluridine or ganciclovir gel) for eye involvement. Prevents corneal scarring & blindness.

PRIORITY 08 · NUTRITION & FAMILY

Feeding & Bonding

Strict I&O, daily weights. Support breastfeeding (safe unless breast lesions). Emotional support; involve parents in care.

05 Pharmacology — *the only drug that matters*

Acyclovir (IV)

ANTIVIRAL · NUCLEOSIDE ANALOG

MECHANISM	SIDE EFFECTS	NURSING	KEY TEACHING
Phosphorylated by viral thymidine kinase → inhibits viral DNA polymerase → halts HSV replication. Selective for infected cells.	**Nephrotoxicity** (crystalluria), neutropenia, thrombocytopenia, phlebitis & tissue necrosis at IV site, transient ↑ LFTs.	Ensure adequate hydration. Monitor BUN/Cr & ANC. Infuse **over ≥1 hour**. Verify patent line (vesicant). Adjust dose for renal function.	Course continues with **oral acyclovir suppression × 6 months** after IV completion to reduce skin recurrences and improve neurodev outcomes.

SEM: 20 mg/kg/dose IV q8h × **14 days** **CNS / Disseminated:** 20 mg/kg/dose IV q8h × **21 days**

Then: PO acyclovir 300 mg/m² TID × 6 months

↑ MATERNAL SUPPRESSION

Oral acyclovir or valacyclovir from 36 wks gestation for any HSV-positive mother. Reduces shedding, lesions, and C-section rates. *Not* used in neonate.

OCULAR ANTIVIRALS

Topical **trifluridine 1%** or **ganciclovir gel 0.15%** for HSV keratoconjunctivitis — given alongside IV acyclovir, never alone.

06 NCLEX Test *Traps* ⚠

TRAP 01

~~*"Mom has no symptoms, so the baby is safe."*~~

Truth: Most mothers transmitting HSV are **asymptomatic at delivery** with no known history. Absence of symptoms does *not* rule out HSV.

TRAP 02

~~*"Wait for the PCR to confirm before starting acyclovir."*~~

Truth: Empiric IV acyclovir is started **immediately on suspicion**. Delay = death or permanent neurologic injury.

TRAP 03

~~*"C-section eliminates the risk."*~~

Truth: Cesarean **reduces** but does *not* eliminate risk — especially if membranes have been ruptured >4–6 hours.

TRAP 04

~~*"Use a fetal scalp electrode to monitor — she has HSV but no active lesions."*~~

Truth: **Avoid scalp electrodes, vacuum, and forceps** with any HSV history. Any skin break is a portal of entry.

TRAP 05

~~*"Mom can't breastfeed because she has HSV."*~~

Truth: Breastfeeding **is allowed** unless there are HSV lesions on the breast. Strict handwashing required; cover oral cold sores.

TRAP 06

~~*"No vesicles = no HSV."*~~

Truth: Up to **40% of CNS & disseminated cases never show skin lesions**. Sepsis-like neonate <6 wks = include HSV in workup.

07 Patient & Family *Education*

For the Pregnant Patient with HSV

- → Disclose HSV history to **every** prenatal provider — even if dormant for years
- → Take suppressive antiviral therapy from **36 weeks gestation** as prescribed
- → At onset of labor: report any **prodromal symptoms** (tingling, burning, lesions) — may need C-section
- → Avoid sexual contact in 3rd trimester if partner has HSV and you do not

For Parents of an HSV-Exposed Newborn

- → Watch for: skin blisters, fever, hypothermia, poor feeding, lethargy, seizures, breathing changes
- → Hand hygiene **every time** before holding baby
- → Cover any cold sores with mask; **do not kiss** the baby on the face/mouth
- → Family/visitors with active cold sores: no contact with baby
- → Complete the full **6 months of oral acyclovir** — even when baby looks well
- → Attend all neurodevelopmental, ophthalmology, and audiology follow-ups

08 Memory *Boosters*

THREE CLINICAL FORMS

S · C · D

- **S** **SEM** — Skin · Eye · Mouth (~45%)
- **C** **CNS** — Encephalitis · seizures (~30%)
- **D** **Disseminated** — multi-organ + shock (~25%)

WHEN TO SUSPECT HSV

VESICLE

- **V** Vesicles (clustered, on red base)
- **E** Eye drainage / conjunctivitis
- **S** Seizures & sepsis-like picture
- **I** Irritability + Instability (temp)
- **C** CSF pleocytosis (CNS form)
- **L** Liver enzymes up · DIC
- **E** Empiric Acyclovir — *don't wait*

ACYCLOVIR NURSING PRIORITIES

A · C · E

- **A** **Adequate hydration** (prevent crystalluria)
- **C** **Check renal & CBC** (BUN/Cr, ANC)
- **E** **Extended infusion ≥1 hr** (vesicant; avoid extravasation)

MATERNAL DELIVERY RULE

"NO SCALP"

- → Active lesions or prodrome → **C-section**
- × **No** scalp electrodes
- × **No** vacuum extraction
- × **No** forceps
- × **No** artificial ROM if avoidable
- ! *Any skin break = portal of entry*