Neonatal Dermatology

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Neonatal Skin

- Skin of infant differs from adult skin
  - Thinner (40-60%)
  - Less hair
  - Weaker attachment between epidermis & dermis
  - BSA/Weight ratio: 5 x adult
  - ↑TEWL 2° immature stratum corneum (esp. premature)
    - Morbidity 2° dehydration, electrolyte imbalance, thermal instability
    - Percutaneous toxicity from topically applied substances
Skin Care of the Newborn

1. Does not have protective skin flora at birth

2. At least 1 or 2 open surgical wounds
   - Umbilicus
   - Circumcision site

3. Exposed to fomites & other personnel that potentially harbor a variety of infectious agents
Erythema Toxicum Neonatorum (ETN)
Erythema Toxicum Neonatorum

- Occurs in 50% or more of healthy normal newborns
- 1st-3rd day of life
- Resolves spontaneously ~2 weeks
- Classic eruption:
  - Erythematous blotchy macules, papules or pustules
  - Mainly on trunk, face and proximal limbs
ETN

- Appears 1st on FACE → trunk & extremities or anywhere on the body EXCEPT palms/soles

- **Histologically:**
  - Subcorneal pustule filled with eosinophils and occasional neutrophils

- 15% peripheral eosinophilia
Etiology of ETN

- **Etiology**: Unknown
  - GVH against maternal lymphocytes
  - Immune response to microbial colonization through hair follicles

- **Dx**: Clinical appearance alone
  - Wright/Giemsa stain → sheets of eos w/ few scattered neuts.
  - Skin Bx is rarely needed

- **Tx**: Parental reassurance
Transient Neonatal Pustular Melanosis (TNPM)

- Lesions are present from birth
- Location: chin, forehead, nape of neck, back, buttocks, shins, and palms and soles.
- ~5% of black infants, M=F
- Term infants are more likely than pre-term infants
- Dx: Clinical examination
- Tzanck smear (ie. Wright-Giemsa stain) \(\rightarrow\) predominance of **neutrophils** and occasional eosinophils
- No treatment is necessary
At delivery, vesicopustules w/o erythema rupture leaving a collarette of scale and later hyperpigmented brown macules persisting for months
Acne Neonatorum

- “Neonatal Cephalic Pustulosis”
- Occurs in 20% of newborns
- Etiology: An inflammatory response to *Malassezia*
- Appears at 2 weeks of age and resolves within the first 3 months of life.
- Treatment: topical imidazoles (e.g. ketoconazole 2% cream)
- Parental reassurance alone is usually adequate
Clinical Examination

- Small papulopustules (typically not comedones)
- Cheeks and nasal bridge
Congenital Nevus
Congenital Nevus

• Melanocytic nevi present at birth (rarely after birth or within 2 years)

• Locations: Buttocks, thighs, and trunk. Also on face, extremities and sometimes palms, soles, and scalp.

• Changes in thickness, color, and hair content occur through childhood and adolescence.
Congenital Nevus: Classification

- Small: <1.5 cm in diameter
- Medium: 1.5–19.9 cm
- Large: ≥20 cm in diameter
  - Significant greater risk of developing melanoma
Congenital Nevus

- **Special considerations:**
  - May be an associated *neurocutaneous melanocytosis* when large CMN involves axial skin

- **Management of CMN:**
  - Observation
  - Small- to medium (<20 cm)
  - Photographs
  - Surgical
  - Giant CMN (>20 cm) to reduce risk of malignant change.
  - Consultation w/ Neurologist
  - Head or spine involvement
MCC *Candida albicans* (term and preterm)
- Usually acquired during delivery or postnatally
- Appears in first week of life
- If premature or very low birth weight → cultures of blood, urine, and CSF
- First line therapy → topical anti-yeast medications (e.g. Imidazole creams)
- Treatment with parenteral antifungals should be considered if there are signs of systemic disease
Neonatal Candidiasis

- Primarily diaper area and oral mucosa
- Red papules, plaques, w/ sharp demarcation and scale
- Classically w/ surrounding "satellite" pustules
- Erosions may be present
Congenital Candidiasis

- More widespread eruption
- Evident at birth or 6th day of life
- Acquire *in utero*
- Risk factors: foreign body in cervix, premature infants, maternal vaginal candidiasis
- Skin lesions: face, trunk, extremities (*diaper area and oral mucosa spared*)
- Erythematous papular eruption appears first and is followed by pustules and *desquamation*
**Congenital Candidiasis**

- Numerous pink papules with small superficial pustules
- Desquamation
- **Plantar involvement**

Congenital Candidiasis

Treatment

- **Premature or Weight < 1500g** → parenteral antifungal agents after cultures from the blood, urine and CSF
- **More advanced gestational age** with no evidence of systemic infection → topical imidazole therapy
- **Respiratory distress**, elevated **WBC** w/ a left shift, or signs of **systemic dz** → systemic antifungal therapy
Seborrheic Dermatitis

- ~1 week after birth and may persist several months.

- Initially, scaling and hyperkeratosis adhere to the vertex and anterior fontanelle of the scalp

- Inflammation & exudate may develop→a scaly, crusted lesions on scalp→"CRADLE CAP"

- Can become ERYTHRODERMIC.
Neonatal Seborrheic Dermatitis
“Cradle Cap”

Early

Late

Disseminated
Neonatal Seborrheic Dermatitis Pathogenesis¹

- Often occurs in areas with active sebaceous glands.
- In neonates, sebum is produced a few weeks after birth.
- Suspected role of immune mechanisms against *M. furfur*
Neonatal Seborrheic Dermatitis
Treatment

- Mild shampoos are recommended to remove scale/crust.
- Ketoconazole cream 2% is indicated in more extensive or persistent cases³.
- Short courses of low-potency topical corticosteroids may be used.
Neonatal Scabies
General Overview

- Infestation w/ mite *Sarcoptes scabiei* var. *hominis*.

- Secondary infection with *Streptococcus pyogenes* or *Staphylococcus aureus* may develop.

- Transmission usually occurs from direct close contact with an infested person.
Neonatal Scabies
Pathogenesis

- Incubation period can range from days to months.
  - First time exposure can take 2-3 weeks before the host’s immune system becomes sensitized
  - Subsequent infestation is usually symptomatic within 24-48 hours.
  - Asymptomatic scabies-infested individuals are common.
Neonatal Scabies
Clinical Features

- Pruritus is severe, worse at night.
- All skin surfaces are susceptible, including the scalp and face.
- Small erythematous papules, often w/ vesicles, nodules, eczematous dermatitis and secondary bacterial infection.
Neonatal Scabies

- Acral vesiculopustules can represent a clue to Dx of scabies in infants.
- Dx confirmation: Light microscopy of mineral oil preparations of skin scrapings
Infantile Scabies
Pathology

- Patchy to diffuse infiltrate of:
  - eosinophils, lymphocytes and histiocytes is seen in dermis.
- Mites may be seen
- Chitin “pigtail” structures
- Scybala
- Eggs
Neonatal Scabies Tx

- Two topical treatments (1 week apart) with a prescription antiscabietic medication applied overnight to the entire body surface, from head to toe, in infants and the elderly.

- **Permethrin Cream (5%)** - FDA approved for infants $\geq 2$ months of age.
  - Good efficacy, but some signs of tolerance developing

- **Sulfur ointment (5-10%)** - considered safe for infants

- **Crotamiton lotion/cream (10%)** - considered safe for infants.
  - Very poor efficacy, does have antipruritic properties.
Neonatal Lupus (NLE)
Annular erythematous macules and plaques with a predilection for the periorbital region and scalp.
NLE

- No lesions at birth, but develops during the **first few weeks** of life.

- Most commonly occurs in girl infants whose mothers have **anti-Ro/SSA** autoantibodies.

- Linkage to **HLA-DR3** in the mother.

- Almost 100% of babies are **anti-Ro/SSA +**.
NLE

- Resolves spontaneously by **6 months of age** without scarring
  - Dyspigmentation may persist for many months
  - Residual telangiectasias.

- Lesions are histologically identical to those of SCLE in adults.

- Risk that 2\textsuperscript{nd} child will have NLE is **25%**

- **Photosensitivity** is very common in NLE, but sun exposure is not required for lesions to form
Annular Erythematous lesions of NLE

NLE

- Extracutaneous findings include:
  - **Congenital heart block** (Almost always present at birth)
  - Hepatobiliary disease
  - Thrombocytopenia.

- Cardiac NLE has a mortality rate ~20%
  - 2/3 children require pacemakers.

- Evaluation of NLE includes:
  - Physical Exam
  - EKG
  - CBC
  - LFTs
Indurated coalescing lesions of NLE

Aplasia Cutis Congenita (ACC)
- Localized or widespread areas of skin that are absent or scarred at birth.

- **Scalp** is the MC site for ACC at or near vertex.

- ACC may be an isolated defect, or with other anomalies and disorders.

- Appearance ranges from an erosion, deep ulceration, scar, or membrane covered ovoid defect

- Etiologies: genetics, vascular compromise, trauma, teratogens and intrauterine infections.
• **Membranous aplasia cutis**
  • Most common form
  • Presents as a “punched-out” oval defect covered by a thin, translucent, glistening epithelial membrane surrounded by a "Hair collar sign."
  • May represent a neural tube defect.

Membranous ACC may also be seen on the fusion lines of the face.

Membranous ACC with a large defect of the underlying skull

ACC

- **Stellate ACC**
  - 2nd major type of ACC consists of
  - Stellate or angulated lesions, which are thought to result from vascular abnormalities and/or intrauterine ischemic events.

Stellate ACC on the lateral trunk of a neonate.

ACC

- Imaging studies
  - underlying bone defects
  - vascular anomalies
  - brain malformations.

- Elevated $\alpha$-fetoprotein in mid-trimester,

- Elevated acetylcholinesterase in the amniotic fluid
  - neither sensitive nor specific for this condition.
Small lesions heal within the first few months of life
- Leave an atrophic or, less often, hypertrophic (“lumpy”) scar.
- Underlying skull defects tend to resolve spontaneously

Complications
- Sagittal sinus hemorrhage/thrombosis and meningitis
- Complications increase if the period of healing is prolonged.

Management
- Daily cleansing & application of a topical ABX
- Early surgical repair: large stellate scalp lesions, dural defect, exposure of the sagittal sinus.
MILIA

- **Onset**: Birth, 15% of newborns.
- MC seen on face.
- 1-2 mm pearly white subepidermal papules.
- Milia in newborns can be seen on:
  - Hard palate (Bohn’s nodules) or
  - Gum margins (Epstein’s pearls).
- Spontaneous resolution in 1st month
  - NO Tx necessary.
- Widespread distribution may be a/w DEB, Bazex, ROMBO, or hereditary trichodysplasia.
MILIARIA

- 2 main types:
  - Miliaria Crystallina (MC)
    - Birth to 1<sup>st</sup> wk
  - Miliaria Rubra (MR).
    - After 1<sup>st</sup> wk.

- MC- Clear, small “dew drop” vesicles.

- MR- Erythematous papules and pustules MCseen in intertriginous areas.

- Caused by obstruction of eccrine sweat ducts in the stratum corneum (MC) or malpighian layer (MR) of epidermis.

- Resolves w/ cooling and removal of occlusion.
MILIARIA CRYS TALLINA

MILIARIA RUBRA
Neonatal Herpes Simplex Virus Infection

- Occurs in 1:10,000 newborns in US
- Exposure to HSV during vaginal delivery
- Transmission is greatest (30-50%) for women who acquire a primary genital HSV infection during pregnancy

Neonatal HSV: Grouped papulovesicles on erythematous base; scalloped borders in areas of lesion coalescence

Neonatal HSV
Neonatal HSV
Neonatal Herpes Simplex Virus

- Risk of transmission to newborn is LOW (<1-3%) in women with recurrent genital herpes.

- Neonatal infection can be 2/2 to HSV-2 or HSV-1.
  - HSV-1 infection accounts for 30-50% of cases.

Risk Factors for Mother-to-Child Transmission of HSV

- Vaginal delivery
- Prolonged duration of rupture of membranes
- Maternal infection with HSV-1 or HSV-2
- Use of fetal scalp electrode (disrupts the infant’s cutaneous barrier)

Use of Fetal Scalp Monitor Associated with HSV Infection
Neonatal HSV Infection

- Onset: birth to 2 weeks of age
  - Usually ~5 days of age

- Lesions:
  - Localized, favoring the scalp and trunk, or
  - Disseminated cutaneous lesions

- Involvement of oral mucosa, eye, CNS, and internal organs may occur

Neonatal HSV Infection

- Encephalitis may present with
  - lethargy, irritability, poor feeding, temperature instability, seizures, bulging fontanelle

- MORTALITY for CNS dz or Disseminated dz
  - >50% without Tx
  - ~15% w/ Tx

- Many survivors have neurologic defects

Best Tests for Diagnosis

- Tzanck smear
- Direct fluorescent antibody test
- Viral Cx
- PCR from CSF
- Serologic studies are NOT recommended for diagnostic purposes
- Prompt recognition and timely initiation of antiviral therapy is critical

Recommended Treatment

- **Disseminated & CNS dz:**
  - Acyclovir 20 mg/kg body weight IV q8 hours (60 mg/kg/day) x 21 days

- **Dz limited to the skin and mucous membranes**
  - Acyclovir 20 mg/kg IV q8 hours x 14 days

- **Toxicity of acyclovir** is limited to transient neutropenia during therapy (monitor neutrophil counts)

Treatment of Neonatal HSV

- Ophthalmologic evaluation
- Prophylactic topical ophthalmic preparation
Treatment of Neonatal HSV

- After completion of full course of parenteral Tx, administering a **suppressive course** of oral acyclovir has been shown to be beneficial
  - Suppressive regimen is 300 mg/m2/dose, TID x 6 mo

- **Monitor neutrophil count**
  - 2\textsuperscript{nd} and 4\textsuperscript{th} week of suppressive treatment,
  - Then monthly

- Hold acyclovir if neutrophil count drops to:
  - <500 cells/microliter

Treatment of Neonatal HSV

- **Supportive care**
  - management of possible seizure,
  - management of respiratory distress
  - metabolic derangements

- **Contact precautions**
Neonatal Varicella

- Respiratory secretions or direct contact
- Children < 1 year have more severe illness
- Transmission to neonate can occur
  - In utero (sx before 10 days of life)
  - After birth by direct contact (sx after 10 days)

Neonatal Varicella
Neonatal Varicella
Neonatal Varicella
Clinical Features and Diagnosis

- RAPIDLY progressive vesiculopustular eruption
- Crops of lesions develop over 3-4 days & are crusted over by 6-7 days
- **Pathognomonic features:**
  - simultaneous lesions in DIFFERING stages of evolution
- Mucous membranes may be affected
Timing of Transmission

- Generalized neonatal varicella leading to DEATH is more likely if mother develops the disease between 4 days before and 2 days after delivery.

Timing of Disease Onset

- FATAL outcome more likely if neonatal disease occurs between 5-10 days of life
- Neonatal varicella within first 4 days of life is comparatively mild

Diagnosis

- Most sensitive, specific method is:
  - **PCR** for viral DNA
  - Immunofluorescent staining

Treatment & Prophylaxis

- Acyclovir 10-15 mg/kg q 8 hours x 5-7 days
- Tx ALL symptomatic neonates within 48 hours of rash onset

Prophylaxis

- Mother has signs of varicella 5-7 days before delivery or 2-3 days after delivery
- Hospitalized premature infants <1000 g birth weight or under 28 weeks of age when exposed to varicella, regardless of maternal history
- Hospitalized premature infants born 28 weeks or later to mothers with a negative or unreliable history of varicella, when exposed to varicella

References