Newborn Skin Disease Part 2: Rashes

Basic Dermatology Curriculum

Content for this module was developed by The Society for Pediatric Dermatology

Last updated March 1, 2015

Goals and Objectives

The purpose of this module is to help learners develop a clinical approach for rashes in newborns.

By completing this module, the learner will be able to:

- Identify the morphology, distribution, and characteristic timing of erythema toxicum, transient neonatal pustular melanosis, miliaria, seborrheic dermatitis and neonatal cephalic pustulosis (neonatal acne).
- Distinguish these benign neonatal rashes from conditions that require diagnostic and therapeutic interventions (such as skin infections and inherited conditions).
- Identify and perform initial work-up and management for a patient with neonatal HSV.
- Identify clinical findings that can suggest neonatal Langerhans cell histiocytosis and discuss approach to managing these patients.

Newborn Skin Disease: Summary

Newborn rashes discussed in this module:

- Erythema toxicum neonatorum
- Neonatal cephalic pustulosis (Neonatal acne)
- Transient neonatal pustular melanosis
- Miliaria
- Seborrheic dermatitis
- Neonatal herpes simplex virus
- Neonatal Langerhans cell histiocytosis

Case One

Gordon

Case One: History

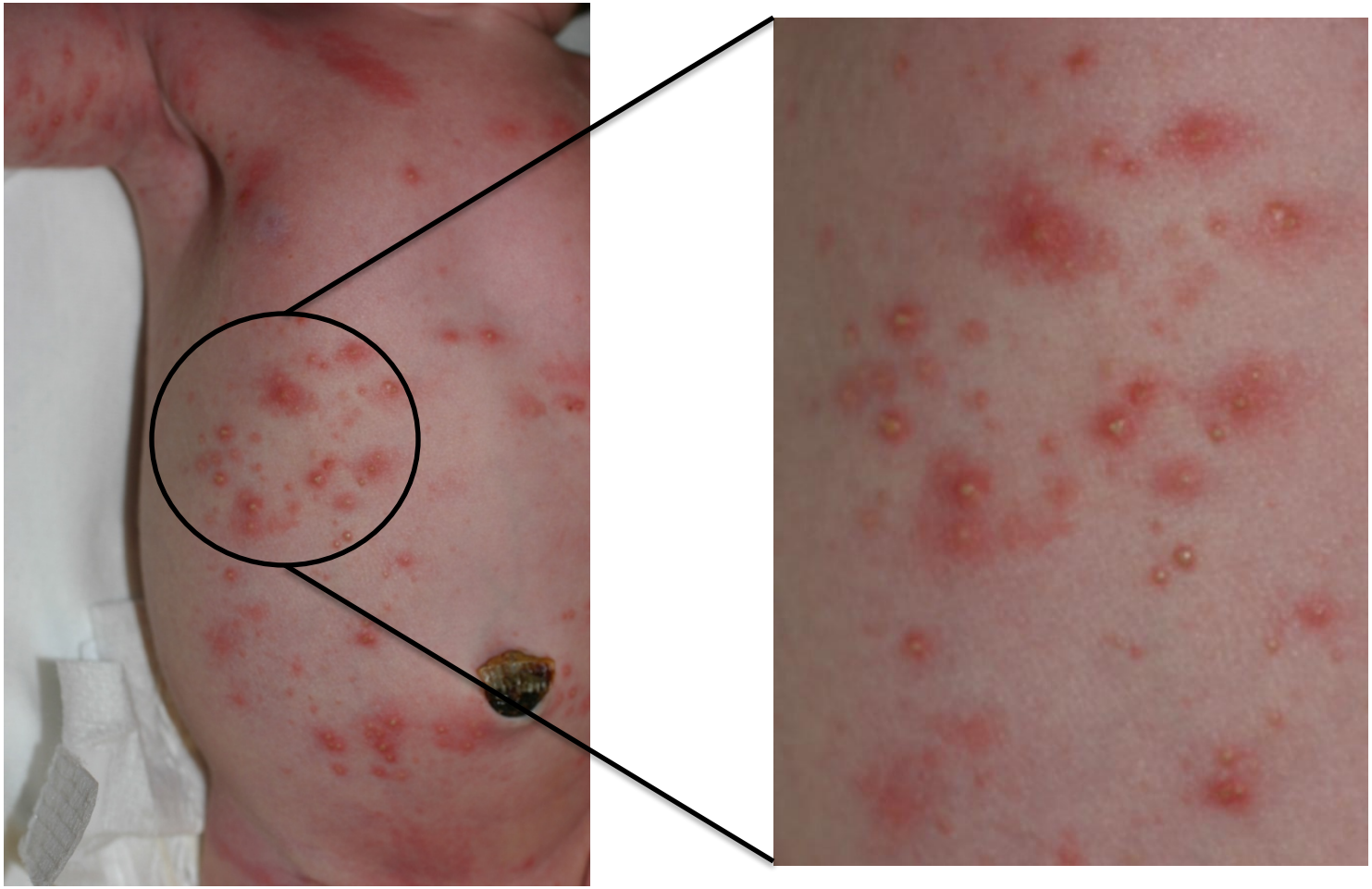
ID: 3-day-old male

HPI: 24 hour history of small white to yellow papules and pustules surrounded by erythematous (blotchy), inflamed skin. Lesions seen on his face, trunk, and extremities.

PMH: Full-term, vaginal birth with no complications.

FHx: Mother is a healthy 30-year-old, no history of medications during or after pregnancy.

Case One: Skin Findings



Case One: Question 1

Based on Gordon's history and this image of Gordon's rash, what is the most likely diagnosis?

A. Congenital candidiasis
B. Erythema toxicum neonatorum
C. Herpes simplex
D. Nonspecific viral exanthem
E. Staphylococcal impetigo

Case One: Question 1

Answer: B

Based on Gordon's history and this image of Gordon's rash, what is the most likely diagnosis?

A. Congenital candidiasis (can present with pustules, erosions or beefy erythematous appearance, generalized scaling, can test with KOH)

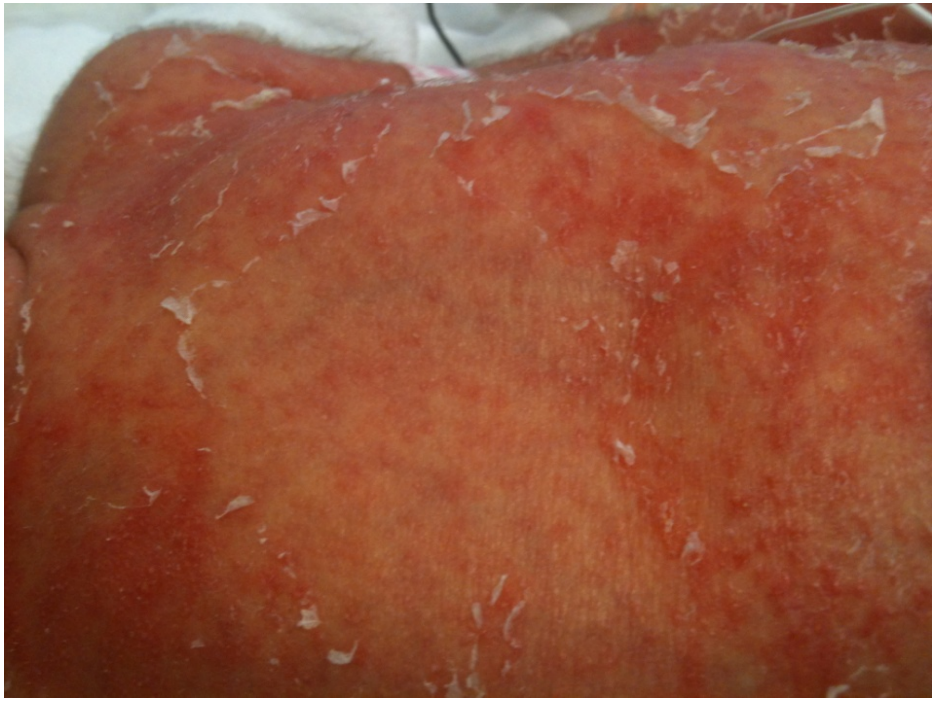
B. Erythema Toxicum Neonatorum

C. Herpes simplex (presents with clusters of vesicles and crusting)

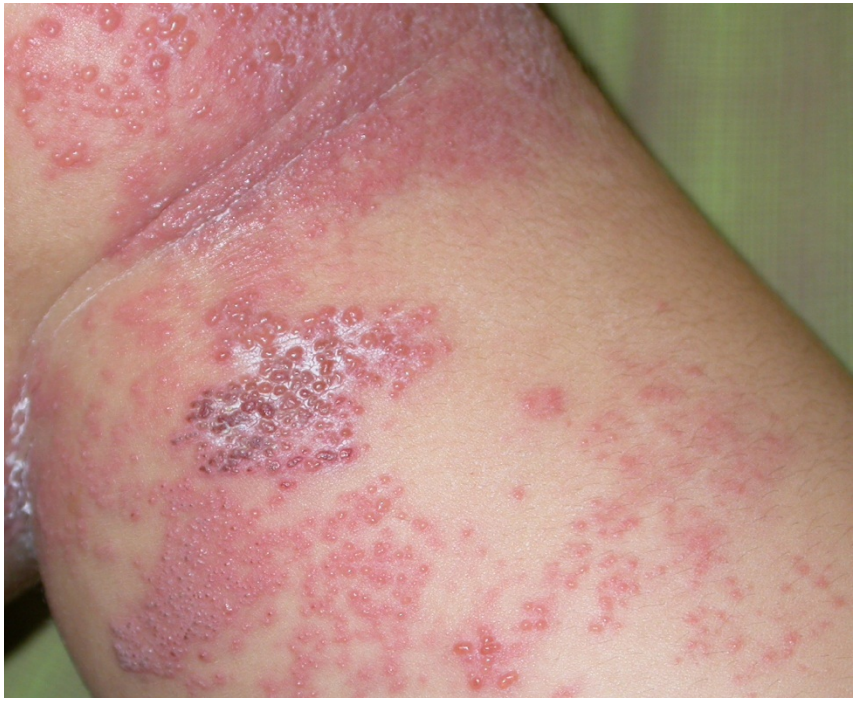
D. Nonspecific viral exanthem (highly unlikely in newborn, usually associated with prodromal symptoms)

E. Staphylococcal impetigo (flaccid vesicles/bullae, pustules and yellowish crusting)

Differential Diagnosis

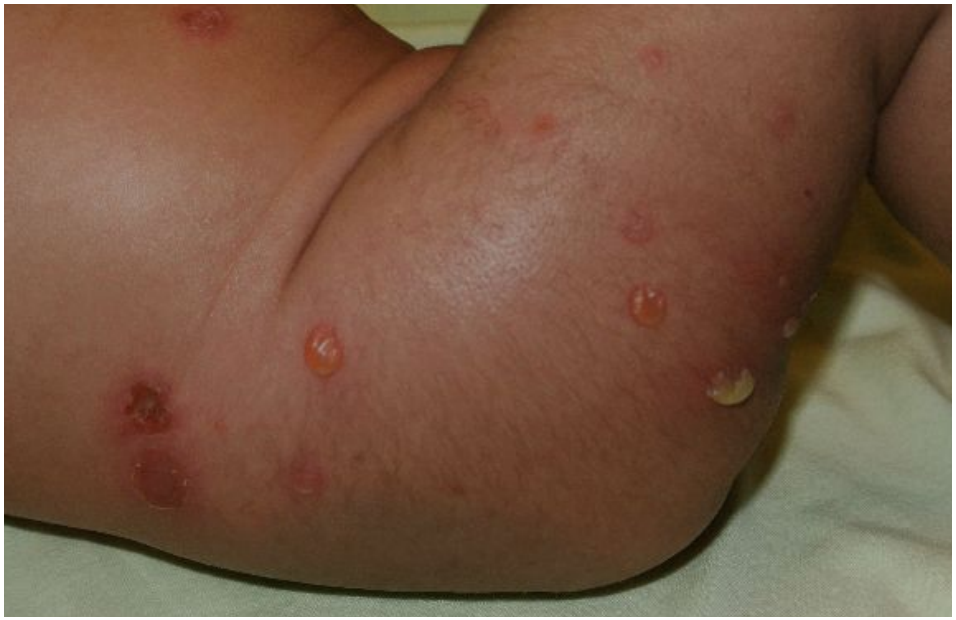


Note the scaling in this example of congenital candidiasis

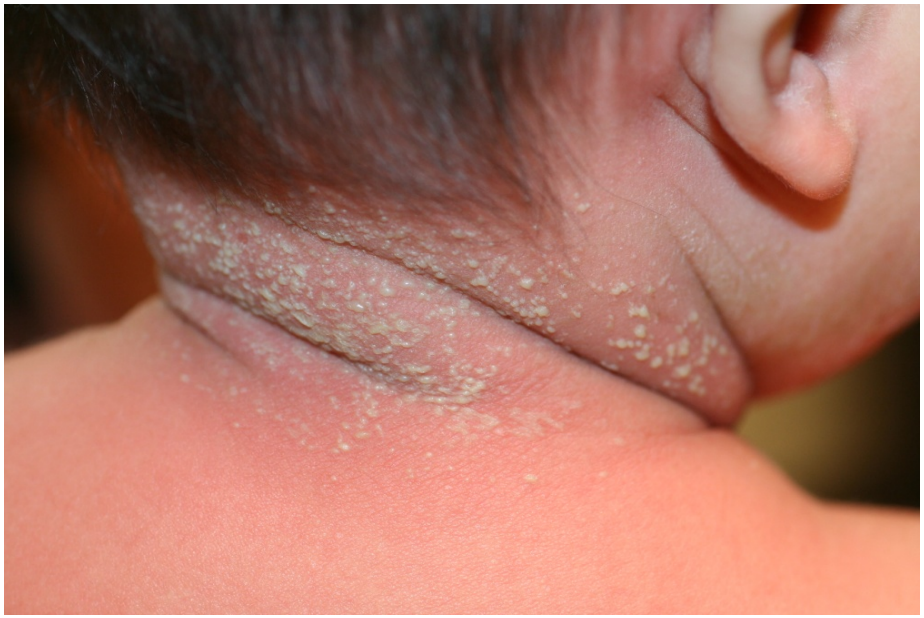


Clusters of vesicles seen in neonatal herpes infection

Differential Diagnosis



Flaccid blisters in a newborn with bullous impetigo secondary to Staph



Well developed pustules in staphylococcal impetigo

Erythema Toxicum Neonatorum (ETN): Clinical Presentation

Common condition of healthy and usually full-term infants.

- Less common in premature and low birth weight babies
- May be present at birth, but typically appears within 24 to 48 hours

Morphology

- Erythematous macules and papules that rapidly progress to flacid pustules on an erythematous base

Distribution

- Face, trunk, buttocks and proximal extremities
- Palms and soles are almost never affected

Aside from the rash, the infant is otherwise healthy

ETN: Diagnosis

The diagnosis of ETN is made clinically, based upon the history and morphology of the lesions. Testing is not necessary.

Histology

- ETN can be confirmed by a Wright-stained smear of a pustule that demonstrates numerous eosinophils

Culture

- If the presentation is atypical, cultures for bacteria, fungus, and virus should be obtained
- Cultures should all be negative in ETN

ETN: Prognosis and Treatment

Treatment

- No treatment is necessary

Prognosis

- The rash usually resolves in five to seven days
- It may wax and wane before complete resolution
- Recurrence are rarely seen

Case Two

Maria

Case Two: History

ID: 18-day-old female

HPI: Maria presents with a 5 day history of several red lesions on both cheeks.

PMH: full-term, vaginal birth with no complications

FHx: Mother is a 26 year old with a history of migraines who took acetaminophen several times during her pregnancy

Case Two: Skin Findings

Case Two: Question 1

From the following options, which best describes the cause of Maria's rash:

A. Maria has a congenital viral infection that was transmitted for her mother during delivery
B. Maria's mother took acetaminophen during the second and third trimester of pregnancy
C. Maria's rash is most likely the result of an inflammatory reaction to Pityrosporum (Malassezia) species.
D. Maria's lesions are result of an allergic reaction to the soap
E. Maria's rash is the result of immaturity of some structures of her skin

Case Two: Question 1

Answer: C

A. Maria has a congenital viral infection that was transmitted for her mother during delivery
B. Maria's mother took acetaminophen during the second and third trimester of pregnancy
C. Maria's rash is most likely the result of an inflammatory reaction to Pityrosporum (Malassezia) species.
D. Maria's lesions are result of an allergic reaction to the soap
E. Maria's rash is the result of immaturity of some structures of her skin

Neonatal Acne: Clinical Presentation

- Background
  - Self limited condition that occurs in up to 20% of newborns
  - Presents between the 2nd and 3rd week of life and resolves around 6-12 months of age
  - It is not true acne, but an inflammatory reaction possibly to *Pityrosporum* (*Malassezia*) species.
  - The term *neonatal cephalic pustulosis* has been proposed to replace the term neonatal acne
- Clinical Presentation
  - Inflammatory papules and pustules
  - Located mainly on the forehead, nose, and cheeks
  - There are no true comedones (black heads or white heads)

Case Two: Question 3

What would be your first treatment option for Maria?

A. Amoxicillin 35mg/kg/day for 7-10 days
B. Tazorotene 0.05% cream qhs for 3 months
C. 10% salicylic acid BID during 2 weeks
D. This is a self-limited condition and usually doesn't require any treatment
E. Refer immediately to the endocrinologist to rule out precocious puberty

Case Two: Question 3

Answer: D

A. Amoxicillin 35mg/kg/day for 7-10 days (this antibiotic has no indication in neonatal acne)

B. Tazarotene 0.05% cream for 3 months(topical retinoids are indicated in comedonal acne patients)

C. 10% salicylic acid BID during 2 weeks (salicylic acid in young children may result in severe skin irritation and there is risk of systemic absorption).

D. This is a self-limited condition and usually doesn't require any treatment (some patients may benefit from topical antifungals)

E. Refer immediately to the endocrinologist to rule out precocious puberty (neonatal acne is a benign condition and is not associated with precious puberty)

Case Three

Daniel

Case Three: History

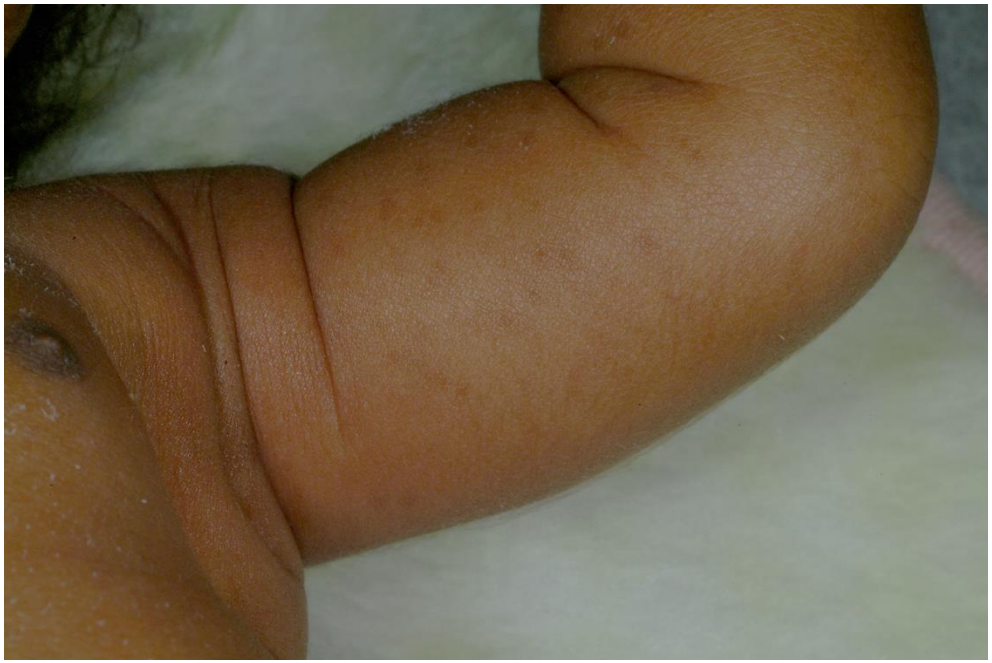
ID: 1-day-old male

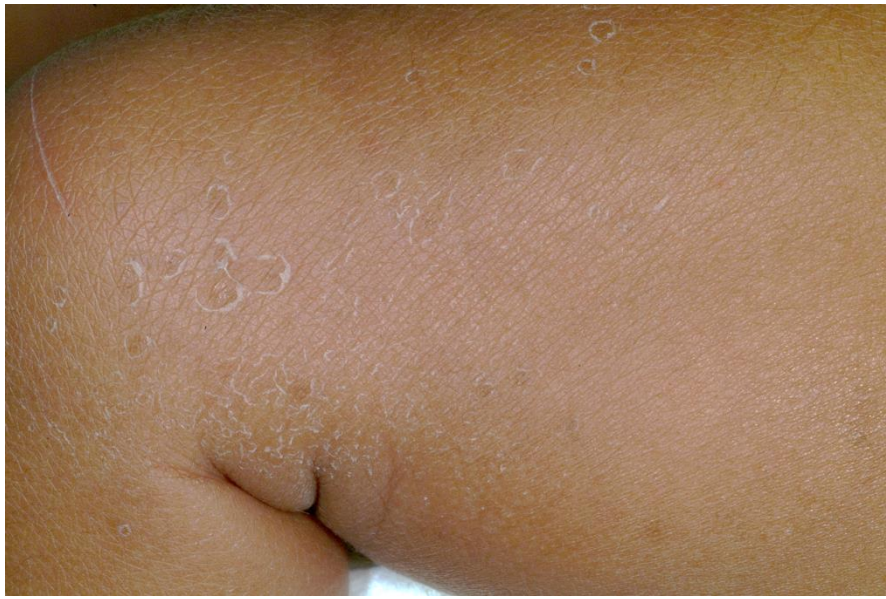
HPI: Daniel presents at birth with a widespread rash involving face, trunk and extremities. His lesions consist of pustules and hyperpigmented macules with discrete scaling. No erythema is evident around the lesions. He is afebrile and otherwise healthy baby

PMH: Full-term, c-section delivery due to breech

FHx: Mother is a healthy 27 year old African-American woman with no history of medications during or after pregnancy.

Case Three: Skin Findings





Photos courtesy of Anthony Mancini, MD

Case Three: Question 1

Based on Daniel's history and this image of his rash, what is the most likely diagnosis?

A. Congenital candidiasis
B. Erythema toxicum neonatorum
C. Transient neonatal pustular melanosis
D. Nonspecific viral exanthem
E. Infantile acropustulosis

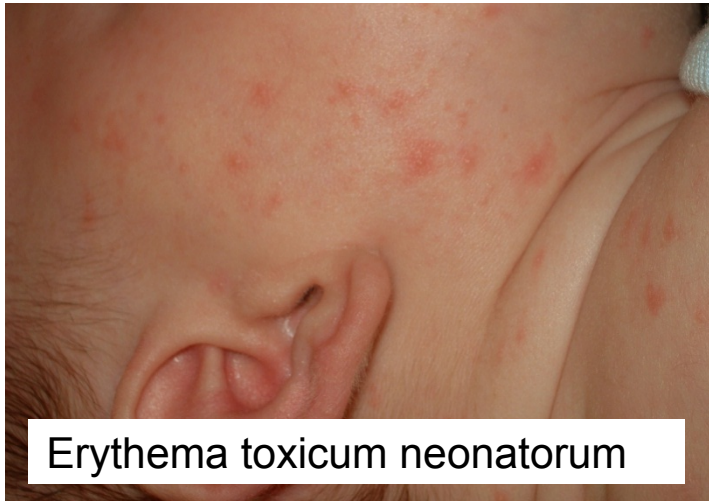
Case Three: Question 1

Answer: C

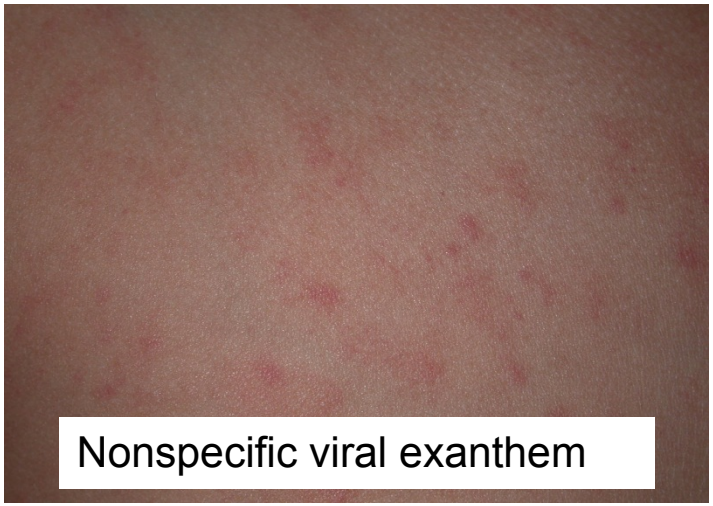
Based on Daniel's history and this image of his rash, what is the most likely diagnosis?

A. Congenital candidiasis (generalized scaling and erythema in an unwell baby, can test with KOH)
B. Erythema Toxicum Neonatorum (Erythematous macules and papules that rapidly progress to pustules on an erythematous base)
C. Transient Neonatal Pustular Melanosis
D. Nonspecific viral exanthem (highly unlikely after birth, usually associated with prodromal symptoms, doesn't present with pustules)
E. Infantile acropustulosis (lesions typically are pruritic and limited to hands and feet)

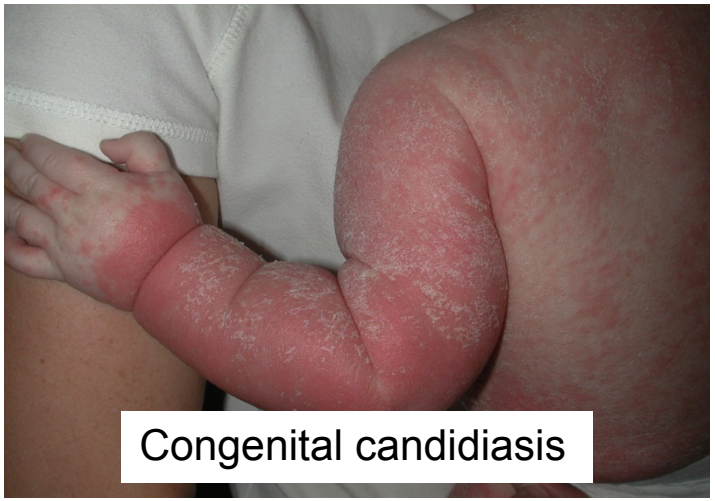
Differential Diagnosis



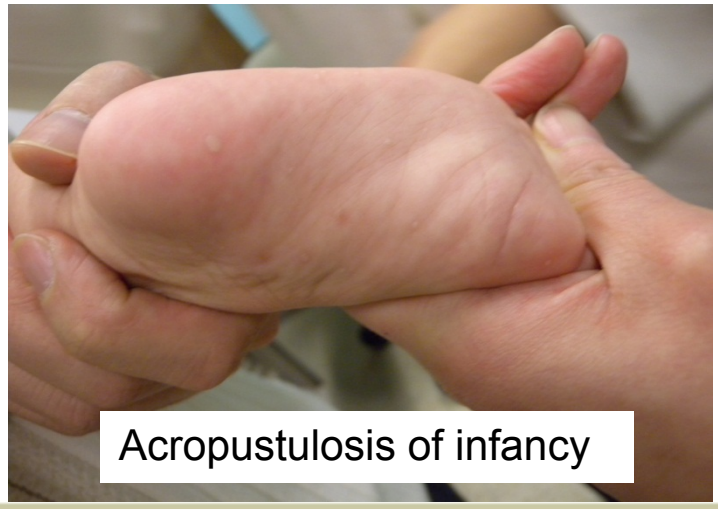
Erythema toxicum neonatorum



Nonspecific viral exanthem



Congenital candidiasis



Acropustulosis of infancy

Transient Neonatal Pustular Melanosis (TNPM): Clinical Presentation

- Benign, asymptomatic and self-limited skin condition
- Mainly seen in healthy newborns with skin of color (5%); however, it can also seen in caucasian infants (0.6%)
- The cause of TNPM is unknown but it has not been associated with any more serious underlying illnesses.

Morphology: characterized by vesicles, superficial pustules and pigmented macules. Vesicles and pustules are fragile and may present with a rim of surrounding scale

Distribution: usually located on the chin, neck, forehead, chest, buttocks, and less often on palms and soles

TNPM: Diagnosis

- Diagnosis of TNPM is clinical, based upon history and morphology of the lesions
- When there is doubt about the diagnosis, a Wright stain of a vesicle/pustule can be completed

Histology: smear shows numerous neutrophils and Gram stain is negative

Culture: should always be negative in TNPM

Case Three: Question 2

What would you advise Daniel's parents?

A. Daniel can go home with 7 day course of oral antibiotics (Cephalexin 25mg/kg/d)

B. Daniel will need extensive work up to rule out neonatal sepsis

C. Topical steroids (Hydrocortisone 1% cream) will improve Daniel's rash

D. Daniel doesn't need any treatment. Papules and pustules will resolve in couple of days, but the residual hyperpigmentation may last for 3-6 months.

Case Three: Question 2

Answer. D

A. Daniel can go home with 7 day course of oral antibiotics (Cephalexin 25mg/kg/day) (Daniel hasn't have any infection and doesn't need any antibiotics)

B. Daniel will need extensive work up to rule out neonatal sepsis (TNPM is a benign condition and doesn't require further work up)

C. Topical steroids (Hydrocortisone 1% cream) will improve Daniel's rash (Topical steroids are not indicated in TNPM)

D. Daniel doesn't need any treatment. Papules and pustules will resolve in couple of days, but the residual hyperpigmentation may last for 3-6 months.

Case Four

Emma

Case Four: History

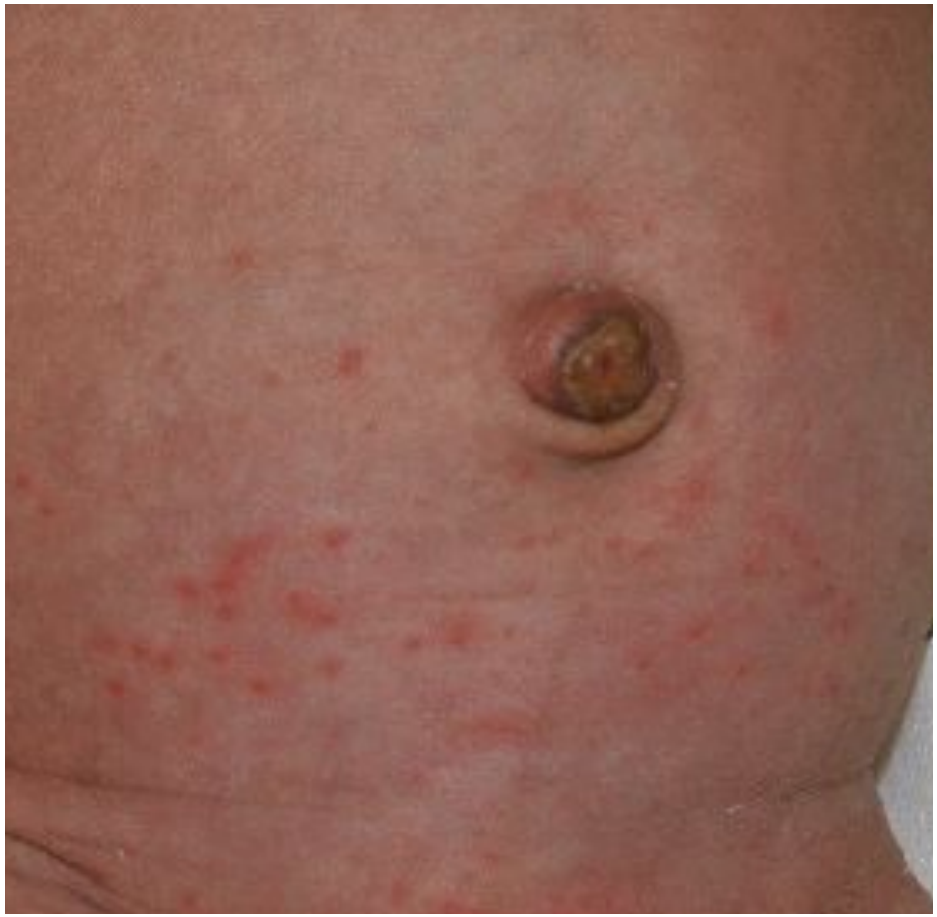
ID: 10-day-old female

HPI: Emma's mother reports that her baby has recently developed a rash on the trunk and she thinks that this might be a milk allergy. Emma is fed with formula since birth. She is afebrile, has no vomiting or diarrhea and is otherwise healthy baby

PMH: 37 week, normal pregnancy and vaginal delivery

FHx: Mother is 40 year old and had asthma as a child. There is no history of medications during or after pregnancy.

Case Four: Skin Findings



Case Four: Question 1

What would you tell Emma's mother regarding her daughter's diagnosis?

A. Emma has milk allergy and she needs to take an amino-acid based infant formula.

B. Emma has a self-limited viral infection and she doesn't need any treatment.

C. Emma's rash is due to sweat retention caused by partial closure of eccrine structures. Avoiding overheating will improve her rash.

D. Emma has eczema and she will need topical steroids and moisturizer.

Case Four: Question 1

Answer. C

A. Emma has milk allergy and she needs to take and amino-acid based infant formulas

B. Emma has a self limited viral infection and she doesn't need any treatment

C. Emma's rash is due to sweat retention caused by partial closure of eccrine structures. Avoiding overheating will improve her rash

D. Emma has eczema and she will need topical steroids and moisturizer

Miliaria: Clinical Presentation

- Miliaria is common skin condition that affects about 15% of newborns
- It is caused by blockage (occlusion) of the sweat ducts
- More common in warm climates or in febrile, overdressed babies

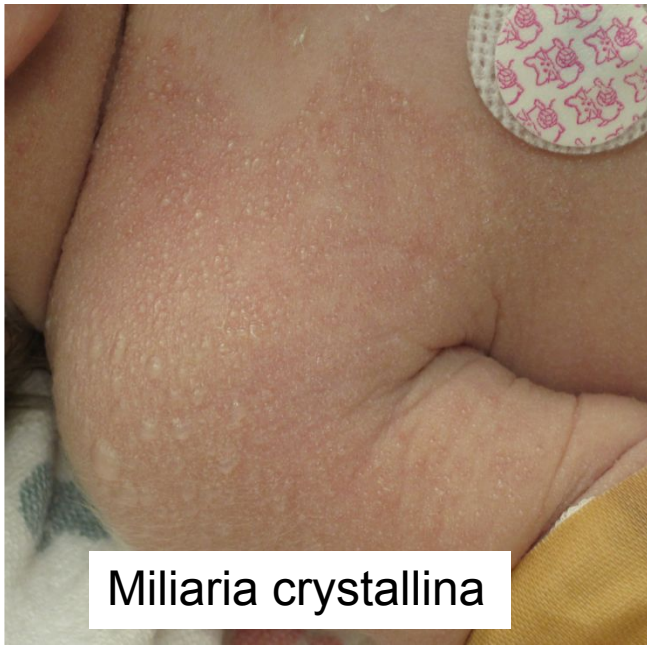
Morphology

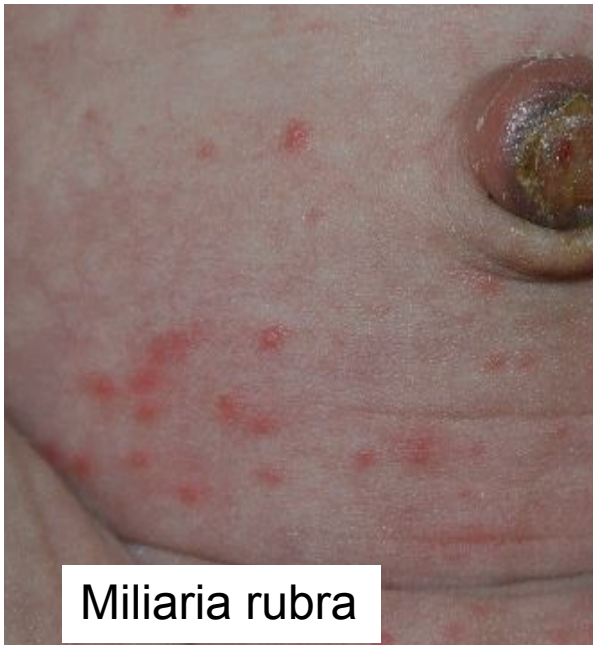
Clinical presentation differs according to level of eccrine obstruction

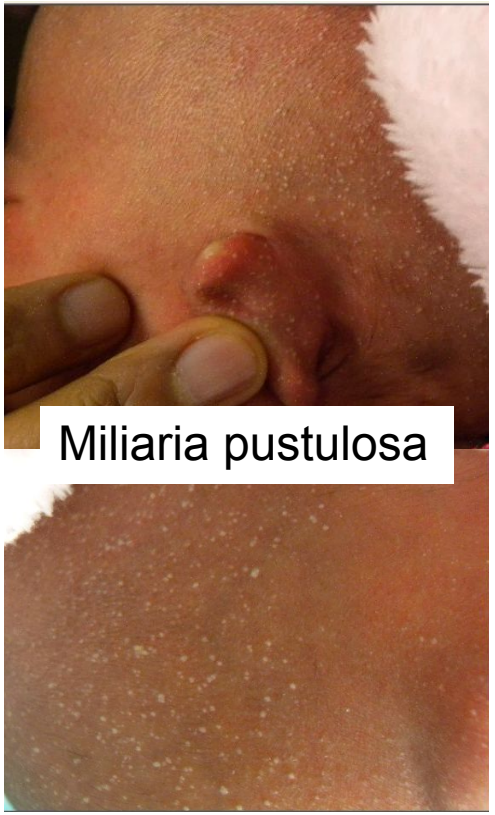
Three distinguishable subtypes are described:

- **Miliaria crystallina**: 1-2mm vesicles (clear fluid) without surrounding erythema (obstruction is superficial)
- **Miliraria rubra** (heat rash): small, erythematous, papules and vesicles (obstruction is deep intraepithelial)
- **Miliaria pustulosa:** considered a variant of miliaria rubra with severe inflammatory response (obstruction is deep intraepithelial)

Miliaria: Clinical subtypes


Miliaria crystallina


Miliaria rubra


Miliaria pustulosa

Miliaria: Diagnosis and Treatment

Distribution: often affects forehead, neck and upper trunk

Prognosis: usually resolve within a few days with cooling and removing occlusive clothing. Vesicles and pustules erode leaving mild desquamation that may last for hours to days

Diagnosis: is made clinically base on morphology of the lesions

Treatment: avoidance of overheating, removal of excess clothing, cooling baths and air conditioning are recommended for treatment and prevention of new lesions

Case Five

Jacob

Case Five: History

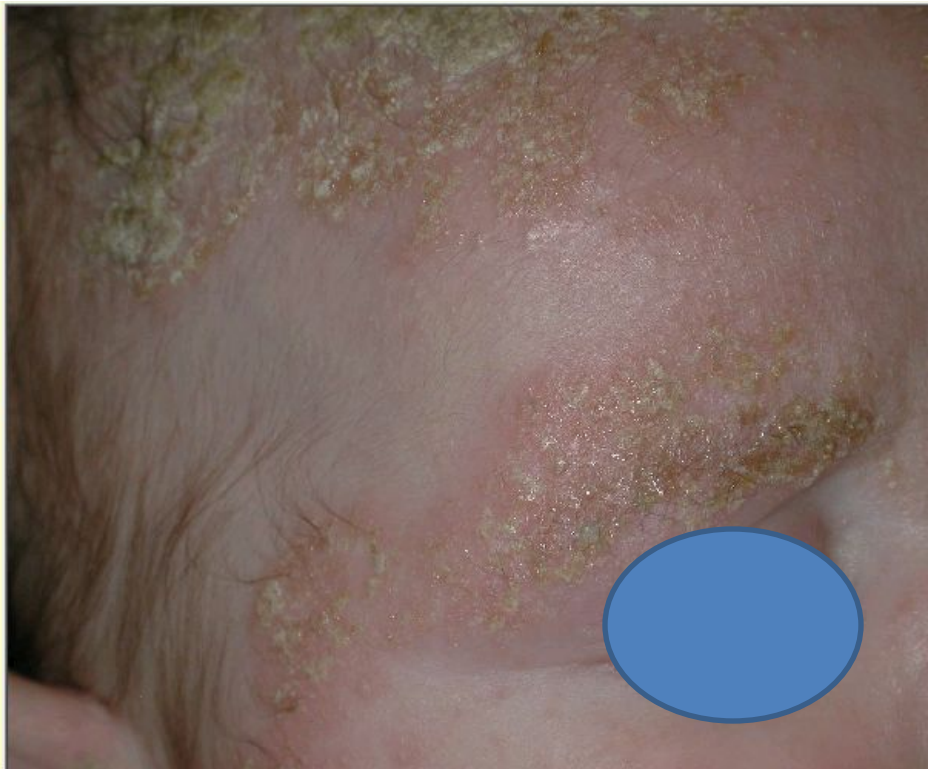
ID: 4-week-old male

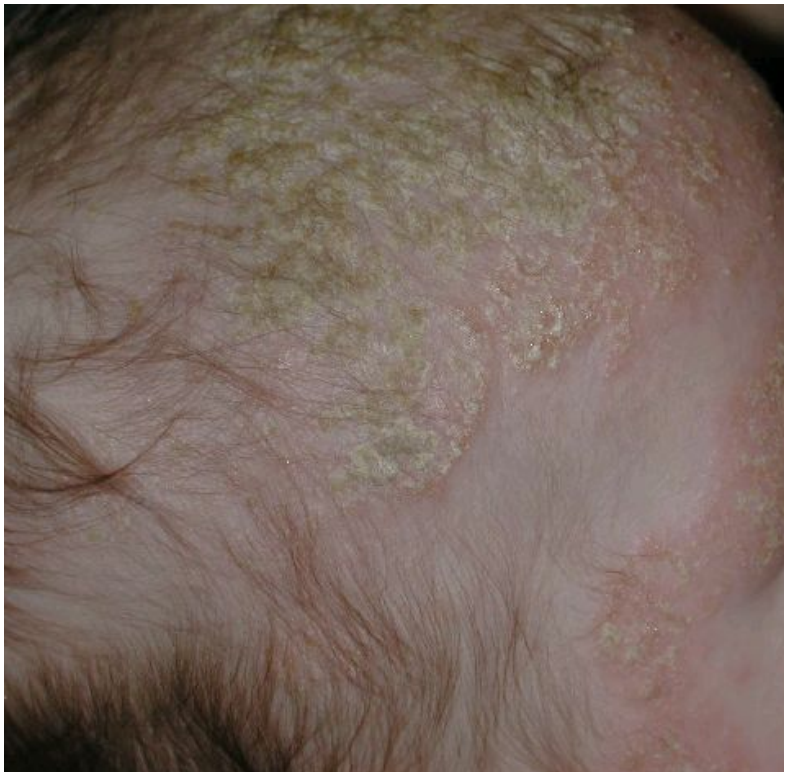
HPI: At Jacob's one- month old visit, his adoptive mother tells you about a skin rash present on his face, scalp, retro auricular area and diaper area

PMH: full-term, vaginal birth.

FHx: Mom adopted Jacob when he was 2 weeks old and has no information regarding his biological parents

Case Five: Skin Findings





Case Five: Question 1

Based on the previous image what is the morphology of Jacob's rash?

A. Inflammatory papules and pustules
B. Erythematous plaques and greasy scales
C. Well defined plaques with thick adherent scale
D. Clustered vesicles and crusting
E. Large hyperpigmented thick scales

Case Five: Question 1

Based on the previous image what is the morphology of Jacob's rash?

Answer. B

A. Inflammatory papules and pustules (commonly seen in neonatal acne)

B. Erythematous plaques and greasy scales

C. Well defined plaques with thick adherent scale (usually present in psoriasis)

D. Clustered vesicles and crusting (characteristic of HSV infection)

E. Large hyperpigmented thick scales (common clinical feature of Icthyosis)

Seborrheic dermatitis (SD) : Clinical Presentation

Epidemiology

- SD usually occurs in infants between the ages of 3 weeks and 12 months
- It presents in the neonatal period in about 10% of children and affects around 7% of children between their first and second year of life

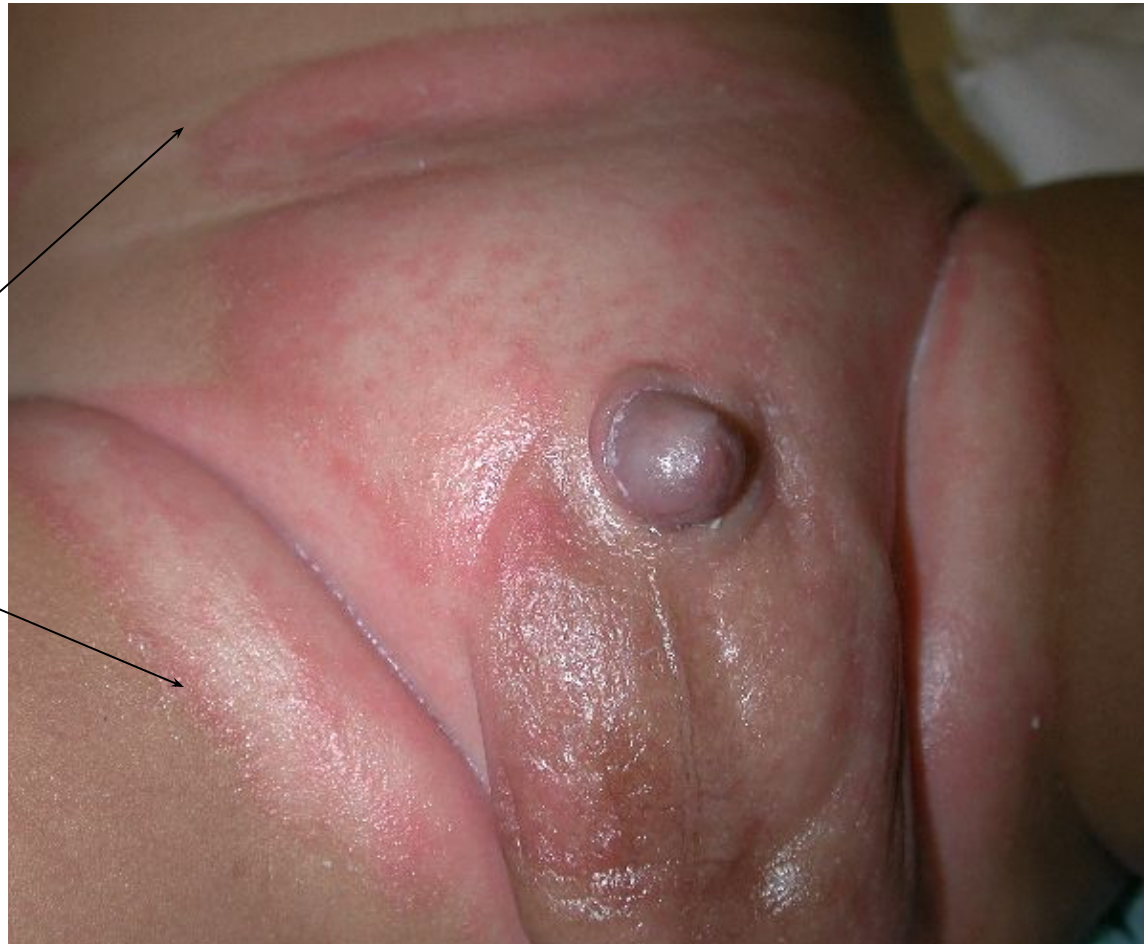
Morphology: characterized by erythema, greasy scales, and salmon-colored oval scaly patches.

Distribution: predilection for scalp ("cradle cap"), face, forehead, eyebrows, trunk, intertriginous and flexural areas including diaper area

Etiology: precise etiology is unknown, but the yeast *Malassezia furfur* has been implicated on its pathogenesis

Seborrheic dermatitis in diaper area

Well demarcated, pink plaques, less scale than in other areas



Case Five: Question 2

What would be your initial treatment for Jacob?

A. Oral terbinafine for 2 weeks
B. Clobetasol ointment 0.05% BID
C. Low potency topical steroids and mineral oil
D. Tacrolimus (Protopic®) oint 0.03%
E. Salicylic acid and Coal Tar

Case Five: Question 2

Jacob's rash hasn't improved despite that mom was told that it would self limited in couple of weeks. What would be the next step to treat Jacob?

Answer. C

A. Oral terbinafine for 4 weeks (antifungal often prescribed for fungal infections of hair, nails or diffuse in the body)

B. Clobetasol ointment 0.05% BID (ultrapotent topical steroid not commonly used in newborns)

C. Low potency topical steroids and mineral oil (they have shown to improve neonatal/infantile SD)

D. Tacrolimus (Protopic®) (immunomodulador usually prescribed to treat eczema)

E. Salicylic acid and Coal Tar shampoo (may be indicated for SD in adults but not in newborns)

Seborrheic Dermatitis: Prognosis and Treatment

Prognosis

- Neonatal SD has a good prognosis, usually self-resolves within several weeks to months; however, clears quickly after appropriated topical therapy
- 8% of children may have persistent SD, but the link between infantile and adult seborrheic dermatitis remains unclear

Treatment

- Many don't require any treatment
- Low potency topical steroids and petrolatum or mineral oil may be considered particularly if itchy
- Topical antifungal creams may help secondary colonization with pityrosporum/yeast
- Tar-containing and Selenium sulfide shampoos may be used if the lesions persist.
- Salicylic acid is not recommended because of concerns about systemic absorption

Case Six

Nolan

Case Six: History

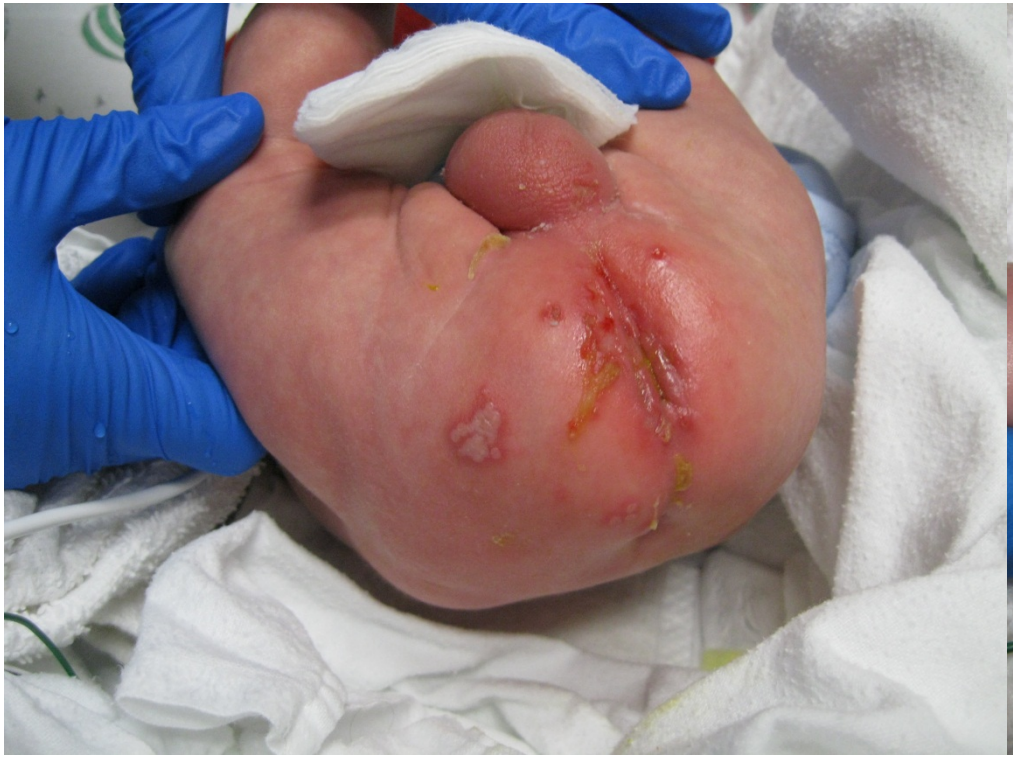
ID: 2-week-old male

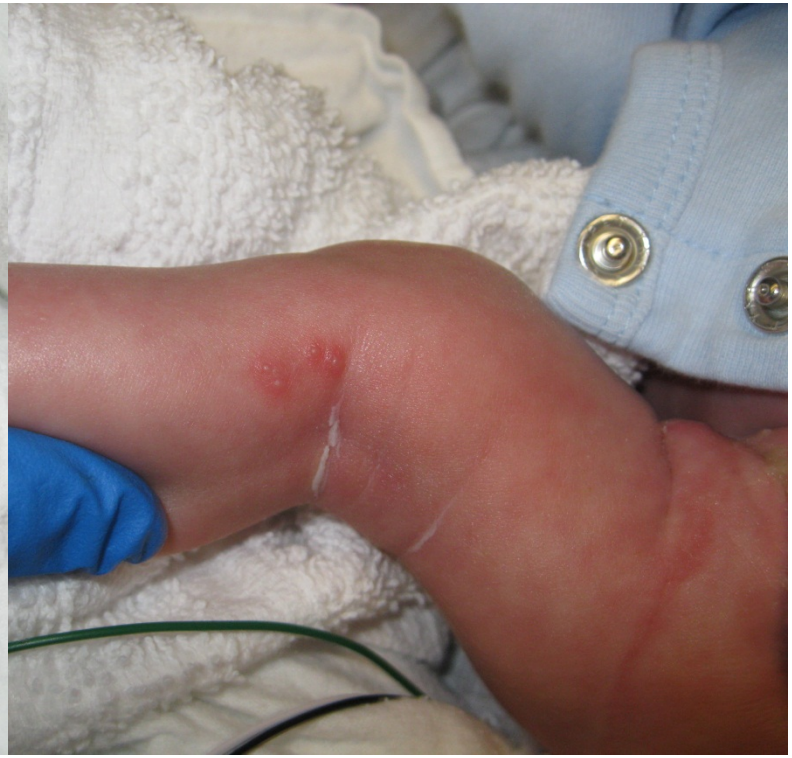
HPI: Nolan was brought to your clinic by her mother because he has developed small blisters on the diaper area and on the leg.

PMH: Full term, vaginal delivery.

FHx: Mother is a healthy, single 24-year-old.

Case Six: Skin Findings





Case Six: Question 1

Based on Heather's history and these images of Heather's rash, what is the most likely cause of her skin findings?

A. Adenovirus
B. Herpes simplex virus
C. Incontinentia pigmenti
D. Langerhans' cell histiocytosis
E. Transient neonatal pustular melanosis

Case Six: Question 1

Answer: B

Based on Heather's history and these images of Heather's rash, what is the most likely cause of her skin findings?

A. Adenovirus (Respiratory distress and fever are the main symptoms. No specific skin findings are found)

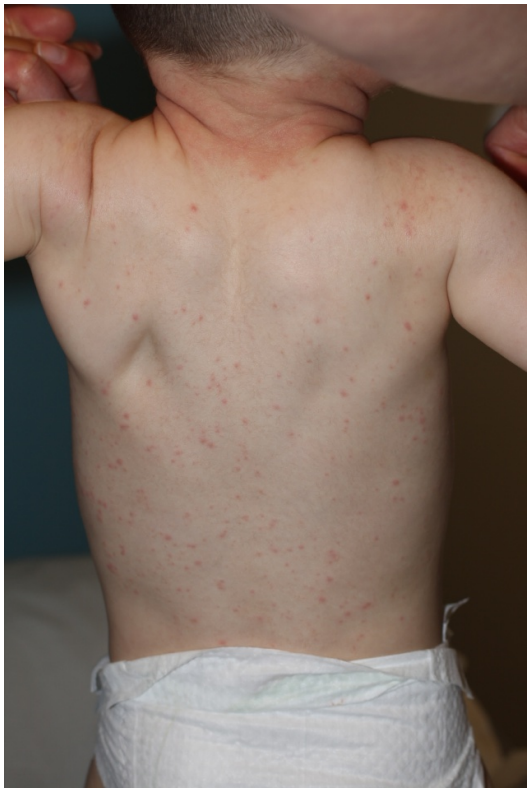
B. Herpes simplex virus

C. Incontinentia pigmenti (vesicles have a linear distribution (Blaschko's lines) skin biopsy shows eosinophils and there is peripheral eosinophilia)

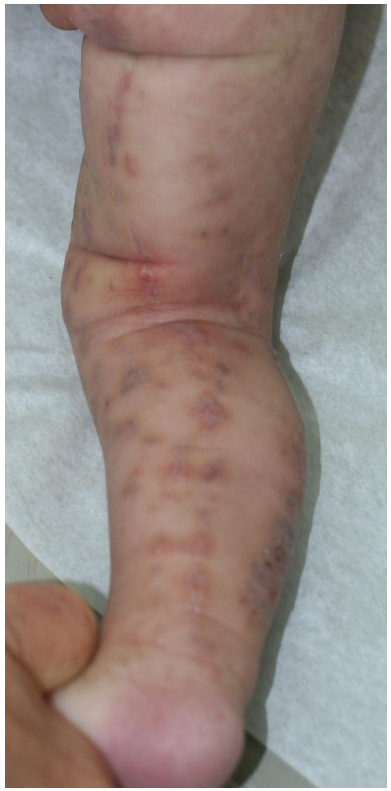
A. Langerhans' cell histiocytosis (skin rash presents as reddish-brown papules or papulo-vesicular lesions. Tzanck preparation would reveal histiocytes and absence of multinucleate giants cells)

B. Transient neonatal pustular melanosis (the original lesions are vesiculo-pustules. Multinucleated giant cells would not be present on Tzanck preparation)

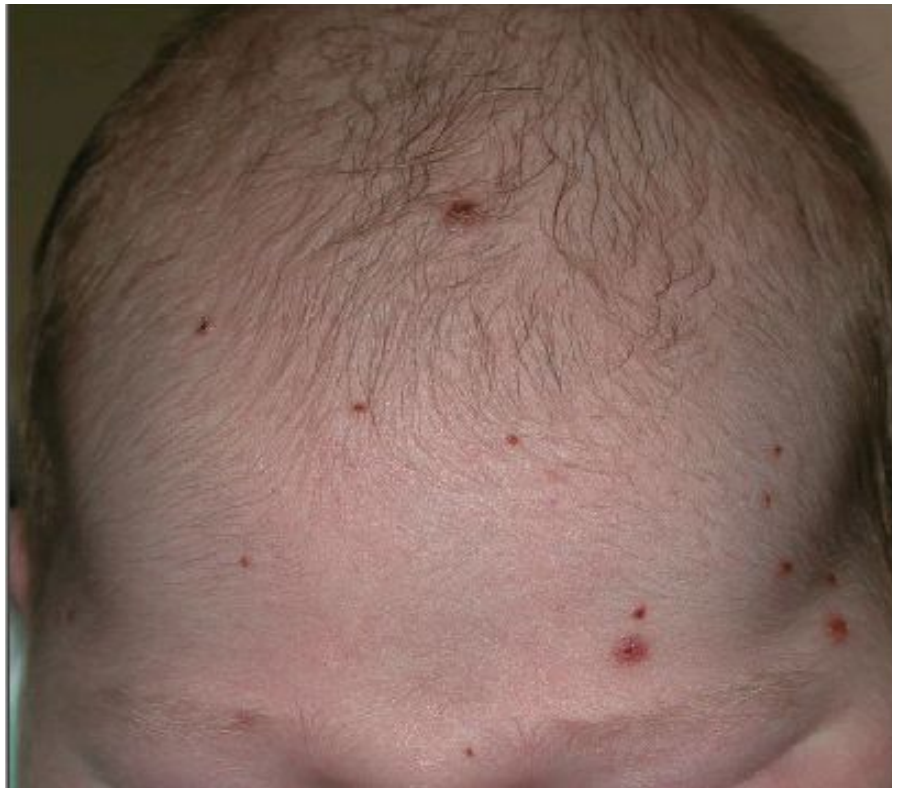
Differential Diagnosis



Adenovirus Exanthem
Maculopapular, non-specific rash



Incontinentia Pigmenti – linear vesicular rash



Langerhans' cell histiocytosis – reddish/brown papules and papulo/ vesicles

Neonatal Herpes Simplex Virus (HSV)

- HSV may be acquired in utero, perinatally, or postnatally
- It is more common to see HSV infection during perinatal or neonatal period

Neonatal HSV is be classified into three main syndromes:

- Localized skin, eye, and mouth (SEM)
- Central nervous system (CNS) with or without SEM
- Disseminated disease involving multiple organs

Neonatal HSV

Morphology and Distribution

- Localized SEM disease is characterized by:
  - Skin: Clusters or coalescing 2-4 mm vesicular lesions with surrounding erythema (vesicles progress to pustules, and later crusting)
  - Eyes: excessive tearing, eye pain, conjunctival edema
  - Mouth: localized small ulcers

*Infants with evidence of SEM disease should undergo a thorough evaluation for CNS and disseminated disease

Neonatal HSV: Clinical Presentation

Neonatal HSV may present with additional signs:

CNS Abnormalities

- Seizures (focal or generalized)
- Lethargy
- Irritability
- Tremors
- Poor feeding
- Fever
- Hypothermia
- Full anterior fontanel

Sepsis-Like Illness

- Respiratory distress
- Apnea
- Abdominal distension
- Ascites
- Progressive pneumonitis
- Temperature dysregulation
- Hepatitis
- Thrombocytopenia

HSV: Diagnosis

- The diagnosis of neonatal HSV infection may be established through:
  - Tzanck-stained smears of lesions
  - Isolation of HSV in culture from surface sites or blood
  - HSV PCR assay from surface sites or blood
  - Detection of HSV DNA in the cerebrospinal fluid or blood using polymerase chain reaction (PCR) assays
  - Detection of HSV antigens using rapid direct immunofluorescence assays or enzyme immunoassays
- Negative HSV cultures, PCR, and rapid tests do **not** exclude neonatal HSV
  - Electroencephalography and neuroimaging are performed in neonates with suspected CNS involvement

Case Six: Question 2

You confirm the diagnosis of HSV, which of the following treatments is most appropriate?

A. Oral cephalexin
B. Parenteral acyclovir
C. Supportive care
D. Topical docosanol
E. Topical imiquimod

Case Six: Question 2

Answer: B

You confirm the diagnosis of HSV, which of the following treatments is most appropriate?

A. Oral Cephalexin (this antibiotic would not be effective in this viral infection)

B. Parenteral acyclovir (this should be initiated as soon as possible to prevent progression of HSV to CNS and disseminated infection)

C. Supportive Care (early treatment with acyclovir can prevent progression of HSV to CNS and disseminated infection)

D. Topical docosanol (over-the-counter antiviral used in cold sores. It is not indicated for this condition)

E. Topical imiquimod (is an immune response modifier indicated for skin cancer and some cases of genital warts)

HSV: At risk infants

Prognosis: early diagnosis and treatment is critical. Treatment can prevent progression from localized SEM to CNS and disseminated infections. Untreated disseminated neonatal HSV has a mortality rate exceeding 80%

Referrals: pediatric infectious disease specialist, ophthalmologist if there is ocular involvement and pediatric dermatologist can help confirm the diagnosis and rule-out other diagnoses

All infants exposed to HSV should be monitored for evidence of infection during the first six weeks of life

Case Seven

Hector

Case Seven: History

ID: 1 day/old male

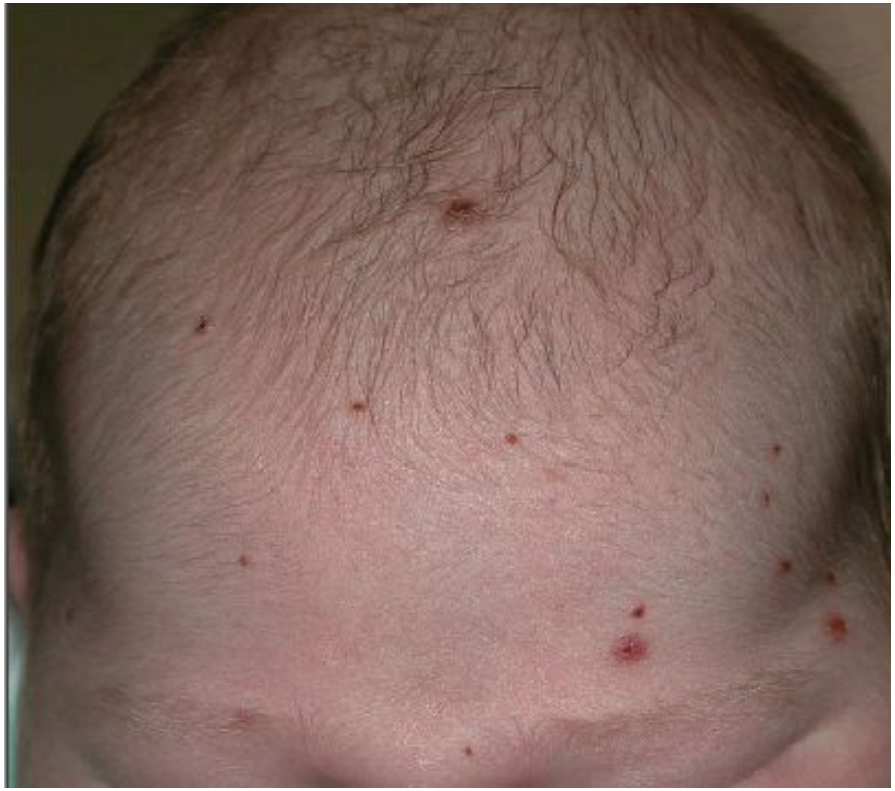
HPI: presents at birth with multiple, papulonodular, reddish-brown erythematous lesions and crusts of different sizes located on the face, trunk, upper and lower limbs

PMH: full-term male infant, delivered by cesarean section

FHx: Mother is a single parent and healthy 32-year-old. No history of medications or infections during pregnancy

Case Seven: Skin Findings

During your physical examination, Hector presents the following findings. He is afebrile and has no other anomalies associated.



Case Seven: Question 1

Based on Hector's history and lesional morphology, what is the most likely diagnosis?

A. Acropustulosis of infancy
B. Neonatal Lupus
C. Incontinentia pigmenti
D. Langerhans' cell histiocytosis
E. Transient neonatal pustular melanosis

Case Seven: Question 1

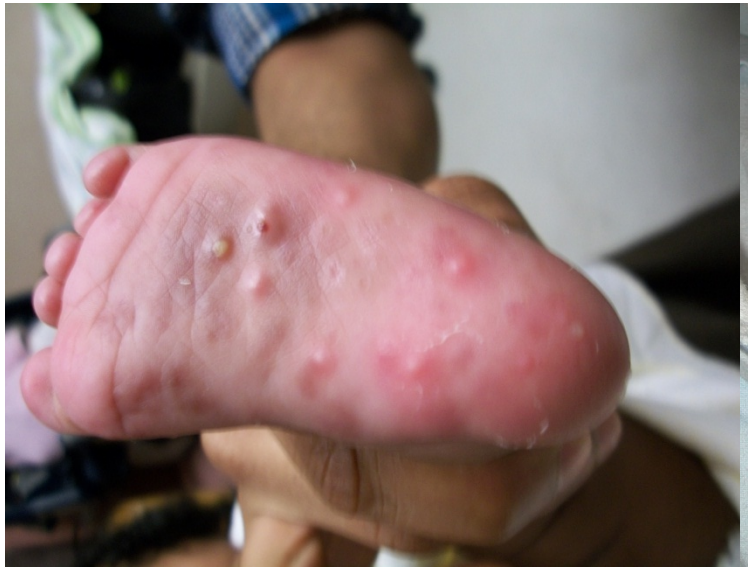
Based on Hector's history, cuataneous lesions, skin biopsy and laboratory finding, what is the most likely diagnosis?

A. Acropustulosis of infancy (extremely pruritic, tense vesiculopustules presented mainly on hands and feet)
B. Neonatal Lupus (annular erythematous plaques with a slight scale, usually seen on the scalp, neck, or face. Histology shows interface dermatitis with vacuolar degeneration in the basal cell layer.
C. Incontinentia pigmenti (vesicles have a linear distribution (Blaschko's lines) skin biopsy shows peripheral eosinophilia)
A. Langerhans' cell histiocytosis
B. Transient neonatal pustular melanosis (the original lesions are a vesiculopustulas. Skin biopsy shows sterile lesions with few neutrophils)

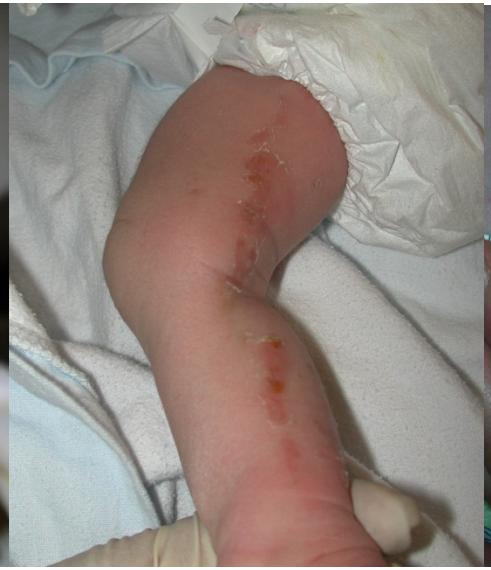
Work-up for LCH

- Routine blood work normal
- Serological test for TORCH (toxoplasmosis, rubella, cytomegalovirus, herpes and syphilis) are negative
- Skull, chest and long bone X-rays and abdominal ultrasound were normal
- Skin biopsy shows histiocyte aggregates with granulomatous formation in the middle and deep reticular dermis
- Immunohistochemical tests are positive for CD1A/S100

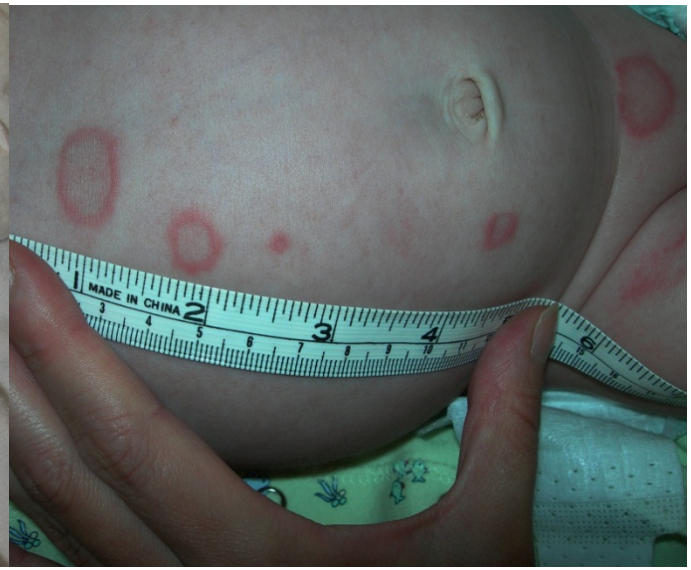
Differential Diagnosis



Acropustulosis of infancy



Incontinentia pigmenti



Neonatal Lupus

Neonatal Langerhans cell Histocytosis

- Neonatal LCH often presents early with cutaneous findings, however some infants can progress to multisystem involvement and thus interval follow up is recommended
- This variant usually manifests at birth or during the neonatal period
- Usually normal delivery following a normal-term pregnancy is reported

Morphology: multiple reddish-brown papules than can later become crusts (most common). Other manifestations: vesicles, pustules, plaques, scaly patches, blue nodular skin infiltrates (blueberry muffin syndrome), hemorrhagic bullae, and hemangioma-like lesions.

Distribution: head, neck, and distal extremities. May be localized or widespread. Solitary lesions in 25% of the cases. Rarely extracutaneous involvement seen (lymph nodes, liver, soft tissue, CNS, bone, lungs)

Neonatal LCH: Diagnosis

Diagnosis: suspected with clinical findings, confirmed with skin biopsy

Histopathologic findings: CD-1A positive staining and Birbeck granules on electron microscopy

Work-up should include: Baseline investigations should include complete blood cell count, liver function tests, coagulation studies, chest radiography, skeletal surveys, and urine osmolality testing.

Other studies may be considered depending on the clinical presentation to rule out other conditions or multi-system disease: Gram stain, skin scrapings for scabies, potassium hydroxide and Tzanck preparations, bacterial, viral, and fungal cultures and TORCH serologies, abdominal US or other imaging studies depending on clinical presentation

Neonatal LCH: Prognosis

- In many cases, the prognosis is good with resolution of the cutaneous lesions within 3-4 months. However, due to the risk of multi-system disease in the future, regular follow up is recommended.
- Residual hypopigmented, hyperpigmented, or atrophic scars has been reported
- Patients with evidence of extracutaneous involvement should be referred to oncology for further work up and treatment

Summary table – Transient benign rashes

	Erythema toxicum neonatorum	Benign cephalic pustulosis	Transient neonatal pustular melanosis	Miliaria	Seborrheic dermatitis
Onset	24-48 hours	2nd and 3rd week of life	Present at birth	Days to weeks	3 weeks to 12 months
Morphology	Erythematous macules, papules and pustules on erythematous base	Inflammatory papules and pustules; no true comedones	Vesicles, superficial pustules and pigmented macules, rim of scale	Small vesicles, vesicles with surrounding erythema, papules, small pustules	Erythema, greasy scales, and salmon-colored oval scaly patches
Distribution	Face, trunk, buttocks, and proximal extremities	Forehead, nose, and cheeks	Chin, neck, forehead, chest, buttocks, and less often on palms and soles	Forehead, neck and upper trunk	Scalp, face, forehead, eyebrows, trunk, intertriginous and flexural areas
Duration	5-7 days	6-12 months of age	Few days, pigmentation 3-6 months	Few days	Weeks to months

Summary table – Rashes requiring work-up/treatment

	Neonatal HSV	Neonatal LCH
Onset	Perinatal, postnatal	Birth, neonatal period
Morphology	Clusters of 2-4 mm vesicules with surrounding erythema (vesicles progress to pustules, and later crusting) Mouth: small ulcers	Multiple reddish-brown papules, later become crusts. Other morphologies also seen.
Distribution	Any where in the body	Head, neck, and distal extremities. Rarely extracutaneous.
Diagnosis	Tzanck smear, culture, PCR, rapid immunofluorescence assays or enzyme immunoassays	Skin biopsy CD-1A positive staining and Birbeck granules on electron microscopy
Work-up	Rule out CNS involvement and eye involvement	CBC, serum chemistries, liver function tests, coagulation studies, and urine osmolarity.
Prognosis	Good for early diagnosis, untreated disseminated neonatal HSV 80% mortality	Usually good, resolution in 3-4 months. Patients should be followed for progression/recurrence. 3% risk of mortality, 10% chance of relapse.

Acknowledgements

- This module was developed by the Society for Pediatric Dermatology Education Committee for the American Academy of Dermatology Medical Student Core Curriculum Workgroup
- Primary authors: Blanca Del Pozzo-Magana, Matthew Dizon, Erin Mathes and Irene Lara-Corrales
- Peer reviewers: Jim Treat, Sheilagh Maguiness, Patrick McCleskey
- Revisions and editing: Irene Lara-Corrales

References

- Newborn skin: Part 1. Common rashes. O'Connor NR, McLaughlin MR, Ham P. ***Am Fam Physician***. 2008 Jan 1;77(1):47-52. Review.
- Transient Benign Cutaneous Lesions in the Newborn. Neonatal Dermatology. Eichenfield LF, Frieden IJ, Esterly NB (eds). Neonatal Dermatology. 2nd edition. Elservier 2008. China. 85-9.

End of Module