Pediatric Exanthems

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McGill Family Medicine Refresher Course 2019

Disclosures

- None to declare

Objectives

- Classify exanthems based on rash morphology
- Identify key features of common pediatric exanthems
- List differential diagnoses that must not be missed

Pediatric Exanthems

- Greek « exanthema » = « a breaking out »
- « anthos » in Greek = « a flower »
- Widespread
- Bilateral
- Symmetrical

Key features

- Initial impression and vitals
- Immunization history
- Medical history
- Infectious contacts
- Prodromal symptoms
- Enanthem

Classification

- A) Maculo-papular
- B) Vesicular, pseudo-vesicular, pustular
- C) Other

A) Maculo-papular

DERMATOLOGIC CONDITION	INTERNIST'S DESCRIPTION OF RASH
Cellulitis	Erythema, edema, and warmth
Drug reaction	Maculopapular rash
Eczema	Maculopapular rash
Erysipelas	Maculopapular rash
Erythema infectiosum	Maculopapular rash
Hand-foot-and-mouth disease	Maculopapular rash
Herpes zoster (shingles)	Maculopapular rash
HSV-1 or HSV-2	Maculopapular rash
Intertrigo	Maculopapular rash
Melasma	Maculopapular rash
Molluscum contagiosum	Maculopapular rash
Pityriasis rosea	Maculopapular rash
Psoriasis	Maculopapular rash
Seborrheic dermatitis	Maculopapular rash
Stevens Johnson/toxic epidermal necrolysis	Maculopapular rash
Tinea capitis, corporis, cruris, or pedis	Maculopapular rash
Varicella zoster (chickenpox)	Maculopapular rash

https://gomerblog.com/2016/07/internist-guide-rashes/

Rash Description

- Macule (flat < 1cm)
- Papule (raised < 1cm)
- Pustule
- Vesicle (< 0.5 -1cm)
- Bullae (> 0.5-1 cm)
- Patch (flat > 1 cm)
- Plaque (raised > 1 cm)
- Colour: skin-coloured, pink, red, brown..
- Size
- Border: flat, raised, well-defined
- Presence or absence of scale, crust
- Scale/crust: colour, thickness, hyperkeratotic
- Localized or diffuse
- Pattern distribution: linear, dermatomal, gravitational sites, sun-exposed area, other…
- Areas spared

Maculo-papular rash

- Macules = flat lesion, less than 1 cm (> 1 cm patch)
- Papules = raised lesion, less than 1 cm (> 1 cm plaque)
- Morbilliform rash = maculo-papular rash

https://www.google.com/search?q=maculopapular&sxsrf=ACYBGNTGbykN4-Ifkcy744uUgn6xuNzRpg:1571421690675&source=lnms&tbm=isch&sa=X&ved=0ahUKEwidv
hVC1lkKHXAjDVYQ_AUIEigB&biw=1000&bih=560#imgrc=IvzL4ZSj456fIM:

Maculo-papular

- Non-specific viral exanthem
- Roseala infantum
- Erythema infectiousum
- EBV and aminopenicillins
- Measles
- Rubella
- Zika
- Toxic shock syndrome
- Kawasaki
- Drug eruption
- Scarlett fever
- Meningococcemia
- Molloscum contagiosum
- Papular acrodermatitis of childhood (Giannoti Crosti)

Case 1

- 15 yo F with oral temp of 39.6 C, presents with 3 day history of cough and coriza.

https://www.dw.com/en/why-measles-is-so-deadly-and-vaccination-so-important/a-47743349

Based on the history and rash, what is the most likely diagnosis?

a) Drug Eruption
b) Erythema infectiosum
c) Measles
d) Roseola
e) Rubella

Measles

- High fever
- Cough
- Coryza
- Conjunctivitis
- Rash 3-5 days after onset of symptoms
- Koplik spots

https://www.google.com/search?q=measles+koplik+spots&sxsrf=ACYBGNSQFSCurykgK8rjc[illegible]Dejw:1572898293982&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjDlNLgrtHlAhXpnuAKHQTXDVw[illegible]tbiw=1000&bih=560&dpr=3#imgrc=Gj7ojBteyvIiHM:

Which of the following statements is false regarding patients with measles?

a) ¼ will be hospitalized
b) 1/3 will develop a complication
c) 1/1000 will suffer from encephalitis
d) 1/5000 will die

Which of the following statements is false

a. 95% of the population must be immunized against measles in order to ensure that the measles virus is unable to spread
b. There have been 112 reported cases of measles in Canada in 2019
c. Vaccination is recommended prior to travel in infants 12 months and up, when travelling to an area where measles is circulating
d. Measles causes long-term damage to the immune system

Case

7 yo F presents with a 6 day history of low-grade fever, headache and tender posterior cervical adenopathy. Yesterday, she suddenly developed a rash on her face and trunk. She has received Ibuprophen for the past 6 days. She has never been vaccinated.

https://www.google.com/search?q=rubella+dermnet&sxsrf=ACYBGNTFjqMOtk7-UbZUMhxVYVhiY1lruA:1573352939095&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiq6md2N7AhXJJt8KHVoHBqEQ_AUIEigB&biw=1000&bih=560#imgrc=Mq_d-sp7rZWJuM:

Based on the history and rash, what is the most likely diagnosis?

a) Drug Eruption
b) Erythema infectiosum
c) Measles
d) Roseola
e) Rubella

Rubella

- Mild childhood illness, EXCEPT in pregnant women, it can cause congenital rubella syndrome
- Incubation period between 12-23 days
- Symtomps: mild fever, sore throat, coryza, malaise, prior to rash, tender lymphadenepathy (retroauricular, occipital and posterior cervical), arthralgia and arthritis
- Rash:
  - Begins on the face, then spreads to the neck, trunk and extremities
  - Pink or light red macules 2-3mm
  - Lasts up to 5 days (average is 3 days)
  - +/- pruritis
  - Desquamation of affected skin
  - **Forchheimer spots: pinpoint or larger petechia on the soft palate and uvula (during prodromal phase)**
- Begings on the face, then spreads to the neck, trunk and extremities
- Treatment is supportive
- Complications includes: Sensorineural hearing loss, eye abnormalities (cataract, glaucoma, pigmentary changes), congenital heart diseases (patent ductus arteriosus), mental retardation, meningoencephalitis, jaundice (hepatitis), diabetes mellitus, thyroid malfunction.

https://www.dermnetnz.org/topics/rubella/

Case

- 2yo F presents with a 5-day history of high fever, irritability and runny nose.

She received an anti-pyretic 2 hrs ago and is afebrile when she presents with this rash. Immunizations are up to date.

Based on the history and rash, what is the most likely diagnosis?

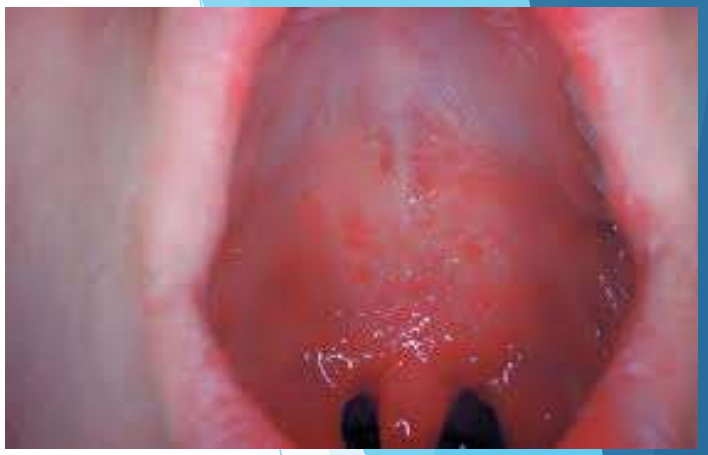
a) Drug Eruption
b) Erythema infectiosum
c) Kawasaki
d) Measles
e) Roseola

Must rule-out Kawasaki

- Acute febrile illness with inflammation of small and medium-sized vessels
- 20% of non-treated patients will develop coronary artery damage and 1% will die (most likely from a heart attack)
- Diagnosis is clinical : 4 of the 5 cardinal signs + fever, in the absence of other disease
  - 1. Rash (morbilliform : maculopapular, diffuse)
  - 2. Non-purulent conjunctivitis
  - 3. Peripheral limb signs (redness of palms and soles, edema of hands and feet, desquamation during convalescences)
  - 4. Lymphadenopathy
  - 5. Oral signs: erythema of the mouth, pharynx, tonge and red or cracked lips
- Treatment
  - IVIG ad resolution of symptoms + ASA until normal follow-up echo
- Follow-up
  - Echocardiography 6-8 weeks
  - IVIG affects the efficacy of live virus vaccines, therefore these must be delayed 1-11 months (depending on vaccine and resource) months after the last dose of IVIG or repeated 1-11 months if given earlier

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4462293/

Roseola



- Caused by HHV-6B or HHV-7
- Rash typically develops on face and body, as the fever subsides
- 6 months to 3 years (most commonly)
- Rash
  - Small pink or red papules (2-5 mm in diameter which blanch with pressure
  - Trunk (can spread to the neck, face and legs)
  - Nagayama spots (papules on the soft palate and uvula)
  - Non-itchy
  - May fade within a few hours or last as long as 2 days
- Treatment
  - supportive

https://www.dermnetnz.org/topics/roseola/
https://www.google.ca/search?q=nagayama+spots&sxsrf=ACYBGNQ6q1cOIKYuVo0ra7-BUyJg0PdgEQ:1573443533425&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiZ2oj3ne[illegible]HSCxDWkQ_AUIEigB&biw=1200&bih=673&dpr=2.5#imgrc=dJsQZ_DAevfvyM:

Case

- 3 sibblings (3, 6 and 9 years old) present to your clinic with a 2 day history of fever. The eldest complains of mild headache. They are otherwise well and immunizations are up to date. They have red cheeks and diffuse lace-like erythematous rash on their limbs.

https://www.dermnetnz.org/topics/erythema-infectiosum/

Which of the following is false regarding this viral exanthem?

a) It is also known as Erythema infectiosum and human erythrovirus infection.
b) It is caused by Parvovirus B19
c) The rash on the cheeks can persist for up to 2 weeks
d) Arthropathy can occurs in 10% of children and 60% of adults

Vesicular, pseudovesicular, pustular

- Clear fluid-filled papule
- Pseudovesicle: pus-filled papule surrounded by erythema (Sweet's Syndrome)
- Acute generalized exanthematous pustulosis
- Eczema herpeticum
- Hand-foot-and-mouth disease
- Pustular psoriasis
- Varicella

https://www.google.com/search?lr=lang_fr&biw=1000&bih=560&tbs=lr%3Alang_1fr&tbm=isch&sxsrf=ACYBGNTU204ZdpDN8mSLxcfI3uxXh49BYw%3A1573358102791&sa=1&ei=ForHXff4L-GkggeC94vgAg&q=vesicular+rash&oq=vesicular+rash&gs_l=img.3..0j0i30l9.2488.3230..3557...0.0..0.126.521.2j3......0....1..gws-wiz-img.0PvOoGYE5ws&ved=0ahUKEwj328jW397lAhVhkuAKHYL7AiwQ4dUDCAc&uact=5

Case

- 3 yo M presents with 7 day history of rash: diffuse pruritic punched out papules on his face, and surface of skin flexures. He developed fever this morning. His vaccinations are up to date and he has a history of eczema.

https://www.google.com/search?q=eczema+herpeticum&sxsrf=ACYBGNTiZwG2wzK1ikM1J[illegible]A
p-
w:1573438266925&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjtjOeniuHlAhWQm1kK[illegible]QUIEi
gB&biw=1000&bih=560&dpr=3#imgrc=dHmsxPQrIrcleM:

Based on the history and rash, what is the most likely diagnosis?

a) Acute generalized exanthematous pustulosis
b) Eczema herpeticum
c) Hand-foot-and-mouth disease
d) Varicella

Eczema herpeticum lesions may be:

a) Blood-filled
b) Crusted and eroded
c) Fluid-filled or purulent
d) Monomorphic
e) All of the above

Eczema herpeticum

- Disseminated viral infection characterized by fever and itchy blisters or punched out erosions
- Most cases are due to *Herpes Simplex type 1 or 2*
- Typically occurs with 1st episode of Herpes Simplex, 5-12 days after contact with infected individual
- Most commonly seen in children with atopic dermatitis (mild to severe, inactive or active) (thermal burns, pemphigus vulgaris)
- Starts with clusters of itchy and painful blisters, often on the face, spreading over 7-10 days
- Patient is unwell, with lymphadenopathy and fever
- Diagnosis : clinical +/- viral culture, Tzank smear, bacterial swabs (to r/o impetigo)
- Treatment: oral acyclovir (IV if not responding to treatment or unable to take PO), antibiotics for secondary infection and ophthalmology consult for eye involvement

Case

- A 5 yo boy presents with a 3 day history of mild fever with a rash that started 2 days ago. The initial lesions were croped papules, which then became vesicular and finally pustular. There are lesions at all 3 stages present. Immunization history is unclear. There is no history of varicella.

Based on the history and rash, what is the most likely diagnosis?

a) Acute generalized exanthematous pustulosis
b) Eczema herpeticum
c) Hand-foot-and-mouth disease
d) Varicella

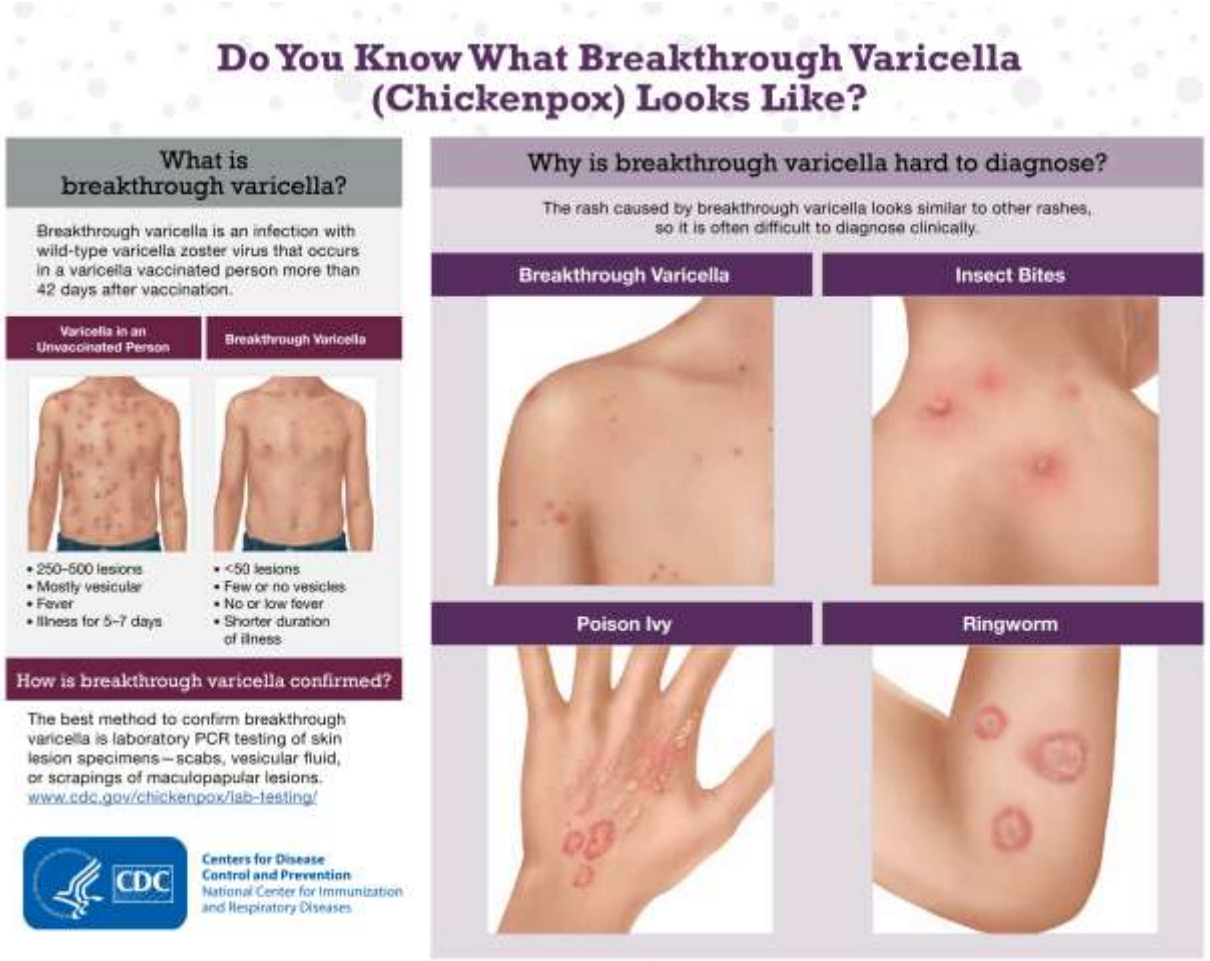
Which of the following symptoms is false regarding varicella?

a) The average incubation period is 7-14 days
b) Patients are contagious 2 days before the rash develops until the lesions crust over
c) The most common complications are pneumonia in adults and secondary bacterial infections in children
d) Patients with breakthrough varicella develop a rash which differs only in the number of lesions

Varicella

- Fever and malaise may appear 1-2 days before the rash (in children, the rash is often the 1st sign of disease)
- Rash
  - Generalized and pruritic
  - Progresses rapidely from macular to papular to vesicular, then crusts
  - Lesions are presents in all stages of development at the same time
  - Lesions 1st appear on the chest, back and face, and then spread to the entire body
  - Symptoms last 4-7 days
  - Scarring (anetoderma or hypertrophic)
- Severe disease can occur in infants, adolescents, pregnant women and immunocompromised people
- Varicella is highly contagious (transmission is approximately 90% among susceptible household contacts from varicella and 20% from herpes zoster)
- Treament includes
  - Trimming nails
  - Calamine lotation
  - Oral acyclovir for high risk patients and IVIG post exposure of virus for contacts at risk

Breakthrough varicella



https://www.cdc.gov/chickenpox/downloads/Breakthrough-Varicella-fact-sheet-508.pdf

Case

- 3 yo F presents with painful lesions on hands, feet and mouth. Her father reports there was a child at daycare with a similar rash. The patient is well, but the parents require a medical note for her to return to daycare. Her immunizations are up to date.

https://www.dermnetnz.org/topics/hand-foot-and-mouth-disease/

Based on the history and rash, what is the most likely diagnosis?

a) Acute generalized exanthematous pustulosis
b) Eczema herpeticum
c) Hand-foot-and-mouth disease
d) Varicella

Hand-foot-and-mouth Disease

- Mild viral infection common in children, 95% under 5 yo (rare in adults)
- Caused by an enterovirus, usually Coxsackie virus A16
- Lesions appear on the dorsal and palmar surfaces of hands and feet
- Lesions progress from pink macules to small, greyish blisters and within a week, these peel off leaving no scars
- Enanthem : small vesicles and ulcers in and around the mouth, palate and pharynx
- Lesions can also occur on the buttocks and genitalia
- Atypical HFMD may be caused by CV A6 : widespread rash, red crusted papules, absence of blisters or large ones, targetoid lesions and involvement of unusual sites such as the ears
- Fingernail and toenails changes occur 1-2 months after CVA6 infection: transverse lines and onychomadesis
- Treatment is supportive
- Complications include
  - Widespread vesicular rash
  - Enteritis (gut infection)
  - Myocarditis (heart muscle infection)
  - Meningoencephalitis (brain infection)
  - Acute flaccid paralysis (spinal cord infection)
  - Pulmonary oedema and pneumonia (lung infection)
  - In pregnancy, first trimester spontaneous abortion or fetal growth retardation.

Acute Generalized Exanthematous Pustulosis

- Rare eruption characterized by acute onset of fever and nonfollicular, pinpoint sterile papulopustules on generalized erythematous skin
- Fever
- Viral trigger in 80% of patients (also caused by medication)
- Diagnosis is clinical
- Treatment is supportive (remove offending medications)

https://www.medscape.com/viewarticle/724882_3

Other

- Papulosquamous
- Urticarial
- Non-specific viral exanthem
- Other

Case

- 7 yo M presents with his mother who is concerned about white patches on his neck and back

Which of the following is true regarding pityriasis versicolor?

a) Characterized by hypo or hyperpigmented scaly macules that coalesce into patches
b) Located on the upper trunk, upper arms and neck
c) Pruritis may occur
d) Caused by *Malassazia (furfur)*
e) *All of the above*

Differential diagnosis

Vitiligo
-depigmentation
-strong genetic component

Post-inflammatory hypopigmentation
-localized
-history is key

Pityriasis alba
-prevalent in atopic patients
-diffuse scale

Pityriasis rosea
-Herald patch
-scale: colarette

Psoriasis
-positive family history
-often triggered by strep pharyngitis
-less scale than adults

https://www.google.ca/search?biw=1200&bih=673&tbm=isch&sxsrf=ACYBGNRu5f_vST8QRBVvx2zOnnewpFBFUQ%3A1573249737140&source=hp&ei=OWCIrL_Qa80ZfYDA&q=hypopigmentation&oq=hypopigmentation&gs_l=img.3..0i67j0l7j0i30l2.57194620.57199923..57200149...2.0..0.612.2507.0j2j1j0j1j1.....0....1..gws-wiz-img.....10..35i362i39j0i10.oSUyZqxPNY8&ved=0ahUKEwjznub9y9vlAhWKZd8KHbzoBcsQ4dUDCAc&uact=5

Which of the following is false regarding the treatment of pityriasis versicolour

a) Topical selenium sulfide shampoo can be can used DIE x 7 days
b) Topical ketaconazole can be used DIE x 7 days
c) Recurrences can be treated with oral itraconazole (5-10 mg/kg/d)
d) Refractory cases can be treated with oral itraconazole (5-10 mg/kg/d)

Case

- 2 yo F with intermittent pruritic lesions on the limbs and a 3-day history of moderate fever. She is otherwise well with no respiratory or GI symptoms and no angio-edema. Immunization history is up to date. PMHx: eczema.

Based on the history and rash, what is the most likely diagnosis?

a) Acute urticaria
b) Erythema multiforme
c) Pityriasis rosea
d) Urticarial vasculitis

Differential diagnosis

Urticarial vasculitis
-painful, long lasting (including HSP)

Erythema multiforme
-target lesions with central papule, blister, purpura or ulcer
-non pruritic
-often mucosal involvement

https://dermnetnz.org/topics/urticarial-vasculitis/
https://dermnetnz.org/topics/erythema-multiforme/

Acute urticaria

- Common causes: virus or idiopathic
- History:
  - Events hours to days prior to the onset of rash
  - Frequency, timing, duration and pattern of recurrence of lesions
  - Specific conditions under which the rash appears (allergy)
  - Exercise-induced
  - Recent infectious symptoms
  - Medication history (PNC 5-21 days after commencing course)
  - Contact allergy to plants, animals, latex
  - Foods are infrequence causes
  - Bites and stings
  - Physical triggers (pressure, cold and rarely water)
  - Prior to menstruation (autoimmune progesterone dermatitis)
- Lesions
  - Pruritic, elevated skin lesions surrounded by an erythema
  - Polymorphic
  - Transient individual lesions
- Acute urticaria < 6 weeks
- Treatment: anti-histamines