Rapid Fire Visual Diagnosis

Sharpen Your Diagnostic Skills

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Faculty Disclosure

In the past 12 months, I have had the following financial relationships:

The McGraw-Hill Companies, Inc.

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I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation

My Heartfelt Gratitude

For all the children-patients and their families for allowing me to videotape and photograph these images so that we may all become better learners, pediatricians and educators ……

Learning Objectives

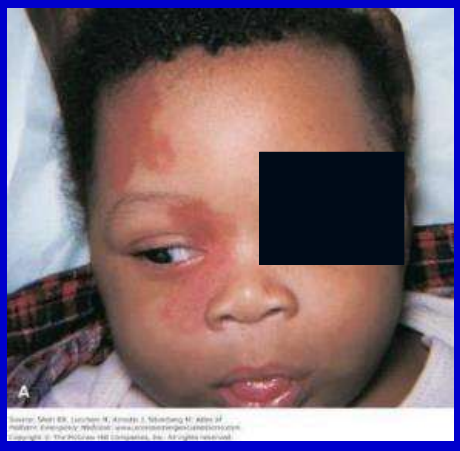
Sharpen Your Diagnostic Skills to

- ✓ Recognize a variety of pediatric conditions through picture potpourri
- ✓ Recognize pediatric *"look-alikes"* conditions

Practice Change

- ✓ Reconsider diagnosis when the physical examination, laboratory findings and/or patient course do not follow the expected pattern of diagnosis

First Patient
An Infant with This "Rash"



Most likely Diagnosis

1. Child abuse (inflicted bruises)
2. Port-wine stain
3. Hemangioma
4. Neonatal lupus

Port-wine Stain (Nevus Flammeus)

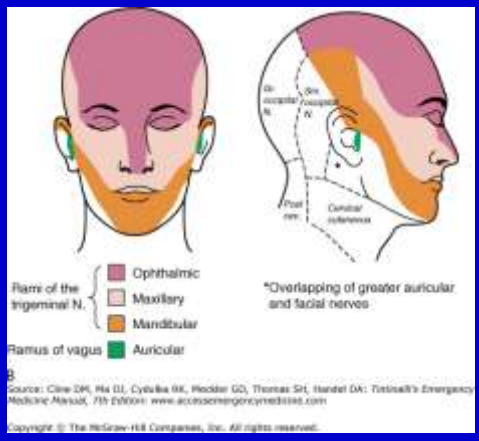
- Irregularly shaped, macular with varying hues of pink to purple
- ***Present at birth***
- Most common location : face
- Usually unilateral (85%)
- Large lesions follow a dermatomal distribution
- Usually does not cross midline

This Infant with Port-wine Stain is MOST at Risk For

A. No associated abnormalities
B. Seizures and glaucoma
C. Arteriovenous malformations & tissue (bone/soft tissue) overgrowth

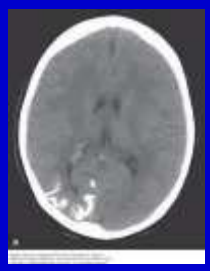
Sturge-Weber Syndrome

- ✓ Concern for SWS is greatest when PWS involves distribution of V1 (especially upper eyelid, forehead), involves V1 along with V2 and/or V3 or is bilateral



Sturge-Weber Syndrome

- Vascular malformations may involve
  - Skin (PWS)
  - Brain (leptomeningeal angiomatosis → **seizures,** stroke)
  - Eyes **(glaucoma)**
- Diagnosis of SWS
  - Requires involvement in at least 2 of these 3 areas

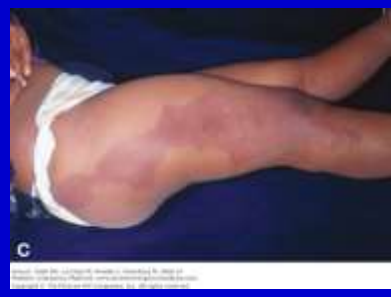


Port-Wine Stain

- **Never disappears spontaneously**
- With increasing age, color deepens
- Papular and nodular vascular lesions develop within macular lesion → progressively increasing disfigurement

Klippel-Trenaunay Syndrome

PWS associated with arteriovenous malformations accompanied by bone and soft tissue hypertrophy

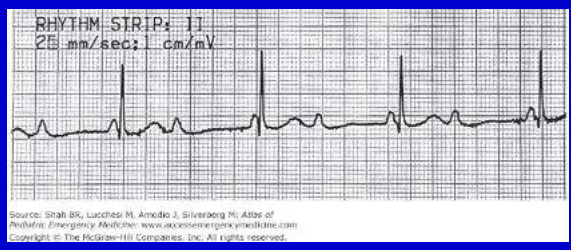


Look-alikes
Hemangioma v/s Port-Wine Stain

Hemangioma

- ✓ Usually not present at birth
- ✓ Typically appears by 4 wks. of age
- ✓ Not flat like a PWS
- ✓ Proliferates during first mos. after birth
- ✓ Growth usually complete by 5 mos.
- ✓ Begins to involute by 6 to 12 mos.

Look-alikes
Neonatal Lupus (NL)



Rash (any of the following)
- ✓ Periocular, scaly rash ("raccoon-eye" appearance)
- ✓ Butterfly rash involving both cheeks
- ✓ Annular erythematous, edematous scaly plaques

- ✓ Complete heart block (~ 30% of pts. with NL)
- ✓ 1st or 2nd degree heart block found at birth can progress to CHB
- ✓ Permanent
- ✓ Pacemaker (30-50% of pts.)

Look-alikes
Port-Wine Stain v/s Abusive Bruises

Buttocks are high target area for corporal punishment

Easy way to Identify Bruises that are of Concern for Abuse

Mnemonic "TEN 4"

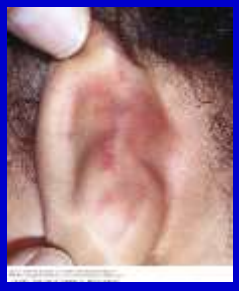
T: torso
E: ear
N: neck
4: in children less than or equal to 4 yrs. of age & in ANY infant under 4 mo. of age

The Evaluation of Suspected Child Physical Abuse
Pediatrics 2015; 135:5 e1337-e1354

"TEN 4"

Characteristics of Abusive Bruises

Location and Pattern



Next Patient
5-mo-old Infant

- ✓ Very itchy rash on feet, soles, hands and palms
- ✓ 2nd episode of similar rash

MOST likely Diagnosis

1. Scabies
2. Acropustulosis of Infancy
3. Hand-Foot-and-Mouth Disease

Acropustulosis of Infancy (Infantile Acropustulosis)

- Skin Lesions
  - ***Most common on palms / soles***
  - May be seen on dorsal surfaces, ankles, forearms
  - Rarely face, scalp and upper trunk
- ***Recurrent crops of lesions = Hallmark***

Acropustulosis of Infancy

- Age at onset: typically b/t 2 to 10 mos.
- Individual episodes last for 7 to 10 days
- May recur as often as every 2 wks. at beginning of disease
- Episodes become less frequent / less severe over time

Look-Alikes : Scabies

Red Flag: Scabies infestation in family members or other close contacts




"Post-scabies syndrome"

Infantile acropustulosis may also be seen after scabies infestation in infants ??

Infantile Acropustulosis in Internationally Adopted Children.

J Am Acad Dermatol. 2011;65(4):763
Good LM, Good TJ, High WA.

- Children with final diagnosis of a infantile acropustulosis
  - Received scabies medications an average of 2.2 times for "recurrent scabies" by a provider
  - Despite lack of scabies infestation in family members or other close contacts

Hand-foot-and-mouth Disease

- ✓ Vesicular lesions in hands, feet & mouth
- ✓ All three anatomic areas need not be affected
- ✓ Mouth most frequently involved, followed by hands & feet




Next Patient

Presenting with Crampy Abdominal Pain and Non-bilious vomiting

POCUS (Point of Care Ultrasound)
Sent to You From ED

Welcome To Tele-Medicine !

MOST likely Diagnosis

1. Something that looks "long and creepy"
2. What the hell is this ?

Ascaris Lumbricoides (Roundworm) Ascariasis

- Adult worms live freely in small intestine shedding eggs in stool leading to fecal-oral transmission
- G/I S/S : abdominal pain, distension, vomiting, diarrhea, acute intestinal obstruction (heavy infection)
- KUB showing a curvilinear radiopaque density representing a roundworm (left iliac region)

Ascariasis (Roundworm)

- Worm vomited in ED by a patient presenting with abdominal pain & several episodes of nonbilious vomiting
- Sites from which adult worms may be passed include rectum, nose (after migration through nares) & from mouth

Next Patient

A 9-yr-old child in your office with non-bilious vomiting & abdominal pain

MOST likely Diagnosis

1. Tinea capitis
2. Traction alopecia
3. Trichotillomania

Trichotillomania (Hair-Pulling Disorder)

- ✓ Incomplete hair loss with hairs of varying lengths
- ✓ Hair density greatly reduced at affected site but true alopecia (complete loss of hair) is not present
- ✓ Often patients/parents deny h/o of hair pulling *(thus a diagnostic challenge)*

Trichotillomania

- ✓ Usually involves scalp
- ✓ Can affect any hair-bearing area (eg, eyebrows, eyelashes)
- ✓ Hair loss due to hair pulling, plucking or twisting
- ✓ Hemorrhage represent sites from which hairs were pulled

Trichotillomania

- ✓ Older children / adolescents
- ✓ More common in females
- ✓ Obsessive-compulsive-related disorders
- ✓ Other comorbidities : depression and anxiety

Trichotillomania

- No US FDA-approved pharmacologic agents for treatment
- Referral to child psychologist or psychiatrist
- Habit reversal training (HRT; cognitive behavioral therapy)
- ✓ Patients taught to monitor hair-pulling behavior
- ✓ Identify circumstances / emotions associated with pulling
- ✓ Avoid triggers
- ✓ Initiate a competing response when the urge to pull hair develops (eg, manipulating a stress ball or clenching fists)

Differential Diagnosis : Tinea capitis





Differential Diagnosis: Traction Alopecia

- ✓ Thinning of hair at the site of tight braiding
- ✓ Often temporal-occipital Region

But Why Our Patient Was Vomiting and C/o Abdominal Pain ?

Abdominal CT scan with Contrast

- ✓ Stomach completely filled with a large inhomogeneous mass measuring 4.9 ×6 × 18 cm
- ✓ Findings consistent with gastric bezoar

Bezoar

accumulation of exogenous material in stomach or intestine

- Accumulated material can be
  - hair (trichobezoar)
  - food (phytobezoar)
  - milk (lactobezoar)
  - medicine (pharmaco bezoar)
- Rare causes (eg. chewing gum, gummy bears, sunflower or pumpkin seeds, plaster casts)
- Commonly seen in pts. with psychiatric conditions

Next Patient Name of This Sign is

1. Nikolsky's Sign
2. Darier Sign

Nikolsky's Sign Positive

With slight thumb pressure, skin wrinkles and separates from dermis

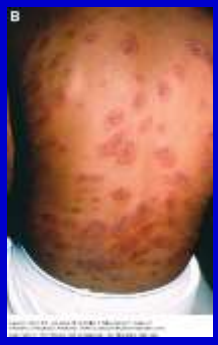
Nikolsky's Sign is Positive in All Of The Following Except

1. Stevens-Johnson Syndrome
2. Toxic Epidermal Necrolysis
3. Erythema Multiforme
4. Staphylococcal Scalded Skin Syndrome

Differential Diagnosis

Distinction important for appropriate treatment

EM **SSSS** **SJS** **TEN**



Nikolsky's sign Negative

Nikolsky's sign Positive

Erythema Multiforme

Separate entity from SJS

- ✓ Mucosal involvement (usually none or one mucosa)
- ➢ Usually lips or oral mucosa
- ✓ Shorter duration (unlike SJS/TEN)
- ✓ May recur
- ✓ EM Major = EM with mucosal involvement
- ✓ EM minor = EM without mucosal involvement

Erythema Multiforme

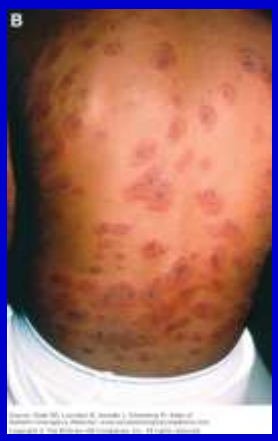
- Infections (viral, bacterial or fungal) >90 %

1. Herpes simplex virus (most common etiology)
   - Recurrences of EM common with HSV recurrences
2. Mycoplasma pneumoniae infection

- Medications (<10%)

Target Lesion (Hallmark) of EM

Central bullous or dusky, inner pale zone and outer erythematous halo
(Classic "bull's-eye lesion)



Erythema Multiforme

Symmetrical Involvement of Palms and Soles

Next Patient
4-mo-old Infant with This Rash

MOST likely Diagnosis

1. Bed bug bites
2. Café au lait macules
3. Urticaria pigmentosa

Urticaria Pigmentosa

- Most common form of mastocytosis in childhood
- Mastocytosis
  - ✓ Excessive mast cell accumulation
  - ✓ Spectrum of disorders: solitary cutaneous lesions to diffuse infiltration of skin & other organs

Urticaria Pigmentosa

Skin Lesions

- ✓ At birth (±) ; often develop in first yr
- ✓ New lesions rarely arise after 3-4 yrs. of age
- ✓ Macular, papular or nodular
- ✓ Non-tender
- ✓ Size: few millimeters to several centimeters
- ✓ Color: yellowish tan to brownish red

Typical History

- ✓ Few reddish tan lesions that appeared shortly after birth
- ✓ More lesions have appeared since then
- ✓ These "birthmarks" sometimes become larger & redder

Darier Sign

Virtually diagnostic of Mast Cell Disease

- Firmly rubbed lesion → area will turn red, swell (wheal & flare) due to local histamine release

Darier Sign

Virtually diagnostic of Urticaria Pigmentosa

- Lesions may occasionally vesiculate (e.g. when rubbed or induced by drugs [eg, NSAIDs] or heat)

Urticaria Pigmentosa

- Most common symptom = pruritus (triggered by changes in temperature, friction, stress, ingestion of hot or spicy foods)
- Most infants do not require treatment
- ✓ Intermittent symptomatic control with antihistamines
- Lesions become more difficult to urticate or blister with age
- Patients often asymptomatic by 5 yrs. of age
- Typically complete resolution of lesions by adolescence

Next Patient
A 4-month-old Infant Presenting with These Findings

Video

Most likely diagnosis based on observation of these movements

1. Sudden startle response
2. Infantile spasms
3. Infantile colic

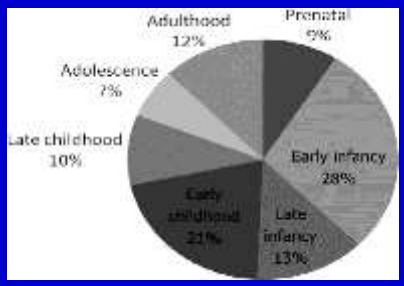
Infantile Spasms

Seen in 30-40 % of pts. with Tuberous Sclerosis Complex (TSC)

- 'Age-specific disorder'
  - Begin b/w 4-6 mos.
  - 85-90% before 12 mos.
- Flexor spasms
- Extensor spasms
- Mixed flexor-extensor
- Spasms
  - Clusters
    - 20-40 spasms/cluster
    - 5-30 seconds apart
- Common on awakening

Age at diagnosis of TSC

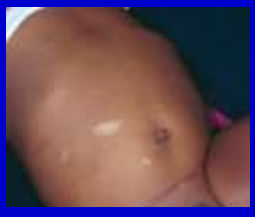
Prenatal (0 to 1 wk); early infancy (1 wk -6 mo.)
Late infancy (6 mo.- 1 yr); early childhood (1-5 yrs.)
Late childhood (6-10 yrs.); adolescence (11-20 yrs.)
Adulthood (21 yrs. & older)



Staley B et al. Pediatrics 2011;127:e117-e125; AAP

Hypopigmented Macules

- May serve as first evidence of TSC
- Present at birth or appear in early infancy
- Seen in ~ 90% of pts.
- May need UV light to see

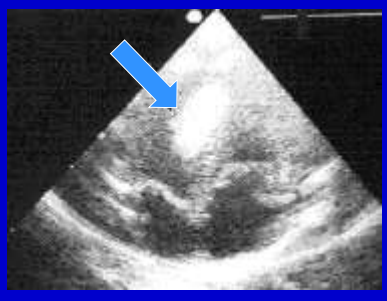


ash leaf spots

Age of Onset of Cutaneous Signs Tuberous Sclerosis Complex

- Hypomelanotic macule – infancy to childhood
- Fibrous forehead plaque – infancy to childhood
- Facial angiofibroma – infancy to adulthood
- Shagreen patch – childhood
- Ungual fibroma – adolescence to adulthood
- Confetti-like lesions – adolescence to adulthood

Tuberous Sclerosis Complex
Multiple Organs Involvement
Hamartomas



Cardiac Rhabdomyoma

Shah BR . Atlas of Pediatric Clinical Diagnosis. WB Saunders; 2000.

Next Patient
A Toddler with These Findings

Playing outdoor on a hot sunny day

Mom & toddler were drinking --- ! (No not alcohol !!)

Most likely Diagnosis

1. Child abuse (inflicted injuries)
2. Allergic contact dermatitis
3. Phytophotodermatitis

Phytophotodermatitis
Phototoxic Inflammatory Dermatitis

Mom squeezed limes for lemonade in backyard & picked-up toddler with wet hands

Phytophotodermatitis

- Certain plants, fruits or vegetables containing Photosensitizer

and

UV-A radiation (sun exposure)

- Examples:

Limes	Figs	Garlic
Lemons	Parsnips	Dill
Celery	Carrots	Hot peppers

Phytophotodermatitis

- Photo-irritant contact dermatitis
- Reaction seen during hot / humid sunny days with outdoor activities
- Common scenarios
  - ✓ Squeezing limes outdoors
  - ✓ Gardening and agricultural work
  - ✓ Hiking in areas of causative plants

Phytophotodermatitis

- Lesions appear hours-days after exposure
- Erythematous patches (corresponds to sites of contact with offending photosensitizer)
- Puzzling rash, bizarre configuration
- Streaks, drip-marks, hand prints
- Blistering (vesicles/bullae) may be present
- Lack of reaction on sun-protected skin
- Hyperpigmented patches (recovery phase)

Phytophotodermatitis

Hands & mouth often extensively affected

Phytophotodermatitis (PPD)

- UVA blocking sunscreen can minimize effects of PPD
- Condition benign and self-limited
- Severe cases
  - ✓ Mild-to-intermediate potency topical steroids
  - ✓ Analgesics (e.g. acetaminophen)

Next Patient
A 14-yr-old adolescent girl

- Received IV Ampicillin / Sulbactam for 2 days followed by amoxicillin for thigh cellulitis
- Five days later (day 3 of amoxicillin) presents with with this rash---

Most likely Diagnosis

1. Toxic Epidermal Necrolysis
2. Acute Generalized Exanthematous Pustulosis
3. Pustular psoriasis
4. Staphylococcal Scalded Skin Syndrome

Acute Generalized Exanthematous Pustulosis (AGEP)

- ✓ Fever, generalized erythema
- ✓ Eruption of multiple sterile pustules
- ✓ Pustules may be irregularly dispersed or grouped
- ✓ Mucous membrane involvement – mild
- ✓ *Nikolsky's sign negative*

Acute Generalized Exanthematous Pustulosis

Drug-induced (>90%)

- β-Lactam antibiotics (penicillins, cephalosporins), macrolides, clindamycin, sulfonamides, NSAIDs,
- Anticonvulsants
- Rash within 1-3 wks. of starting a drug

Acute Generalized Exanthematous Pustulosis

- Biopsy: Subcorneal and/or intraepidermal pustules
- Discontinue the drug
- Internal organ involvement uncommon
- Short, self-limited course (unlike TEN)
- Consider systemic steroids
  in severe cases

Next Patient

Burning on Hands and Feet and Sore Throat

MOST likely Etiology for This illness

1. Coxsackievirus
2. Henoch-Schönlein purpura
3. Meningococcemia
4. Parvovirus B19

Location - Important clue !

"Gloves-and-Socks" distribution

Sharp demarcation at wrists & ankles

Papular-Purpuric Gloves and Socks Syndrome

- Parvovirus B19 most common cause
- Other viruses (e.g. HHV-6, HHV-7, measles, CMV)
- Spring/summer
- Older children & adolescents
- Resolves in 1-2 wks.

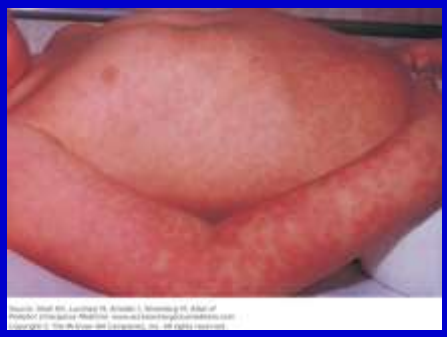
Papular-Purpuric Gloves and Socks Syndrome

- ✓ Erythema & edema of palms & soles
  ➔petechiae/purpura
- ✓ Pruritus, pain or burning at site
- ✓ Fever (±), myalgia, joint pain etc.
- ✓ Vesicles/erosions (palate, posterior pharynx, tongue, lips)

Classic Erythema Infectiosum

"Slapped-cheek" appearance followed by

Erythematous reticulated rash



Next Patient
Presenting with These Findings

The Most Likely Diagnosis

1. Dacryocystocele
2. Dacryocystitis
3. Dacryostenosis

Dacryocystitis

- Bacterial infection of lacrimal sac
- Erythema, swelling & pain just below medial canthus
- Pressure over lacrimal sac ⟹ severe discomfort, reflux of purulent material & tears from punctum
- May lead to preseptal cellulitis

Dacryocystitis

- Neonates
  - ✓ *S. pneumoniae, S. aureus, H. influenzae, S. agalactiae*
- Older Children
  - ✓ Alpha-hemolytic streptococci, *S. aureus, S. epidermidis*
- Hospitalize & IV antibiotics
  (MRSA coverage; if prevalent in community)
- Emergent ophthalmology consult (possible I & D)

Dacryocystitis

- Complications
  - ✓ Cellulitis
  - ✓ Fistula formation
  - ✓ Bacteremia
  - ✓ Meningitis
  - ✓ Cavernous sinus thrombosis

Dacryocystocele

- ✓Bluish discoloration of skin with swelling of nasolacrimal sac due to fluid accumulation within sac 2^0 dacryostenosis
- ✓If decompression does not occur ➡ dacryocystitis
- ✓Urgent referral to ophthalmologist to decompress (before infection)

Dacryostenosis
Nasolacrimal Duct Stenosis

- Affects ~ 20% of newborns
- Most often unilateral (sometimes bilateral)
- Most frequent location for impatency = distal end of NLD (valve of Hasner beneath inferior turbinate of nose)
- Excessive tearing *without light sensitivity*
- Pooling of tears onto lower lid, cheeks & maceration of eyelids
- Mucoid debris ±

Dacryostenosis

Nasolacrimal Duct Massage

- *Parents bothered more than child*
- NLD massage 2-3 times/day
  - ✓ Only access to lacrimal sac = corner of eye
  - ✓ Place firm pressure over lacrimal sac using a clean finger
  - ✓ Stroke downward for 2-3 seconds (causes rupture of membranous obstruction)
- Resolution without surgery
  - ✓ 65% by 6 mos. / 90% by 1 yr.

Dacryostenosis

- If persists after 6 mos. of age ⇨ referral
- Lacrimal duct probing by ophthalmologist
  - ✓ In-office or wait until 1 yr. of age under GA (since most cases resolve spontaneously)
  - ✓ Both approaches clinically effective
  - ✓ In-office probing at younger age shown to be equally or more cost-effective (with earlier relief of symptoms) compared to probing at older age under GA

Next Patient

A 13-yr-old adolescent girl
With These Findings

Most Likely Diagnosis

- Bell's Palsy
  (Lower motor neuron / peripheral facial palsy)
- Central or Upper motor neuron facial palsy
- *OMG !* Do you expect me to remember this ?
  (I learned this in medical school –
  now have forgotten !)

Upper Motor Neuron Facial Palsy

- ✓ Contralateral weakness of lower face
- ✓ Spares contralateral upper face

Lower Motor Neuron Peripheral Facial Palsy

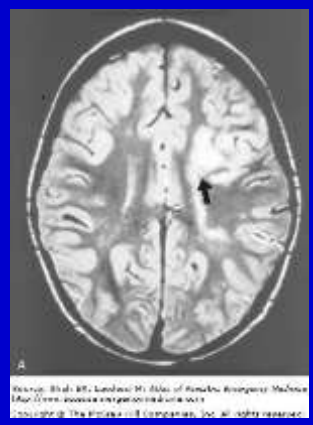
Total paralysis of ipsilateral face

Sickle Cell Anemia and Stroke

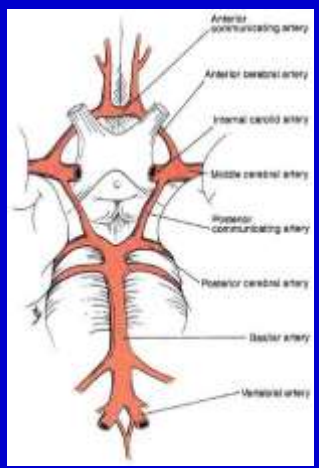
OOPS !! She Forgot to Tell Us that She has SCD

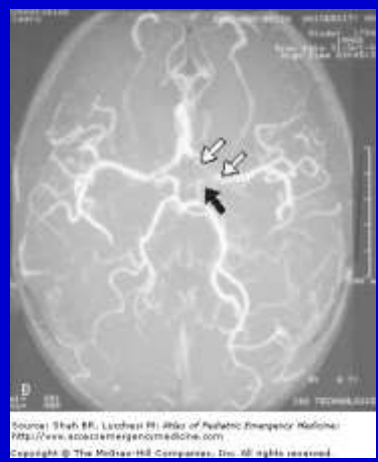
Overt Stroke

- Focal neurologic deficit >24 hr **and/or**
- Increased signal intensity - T2-weighted brain MRI indicating cerebral infarct



MRI Angiography of Circle of Willis





Take Home Points

Exclude Additional Pathology in Patients with Facial Palsy *if*

- *Any abnormality on otoscopy (including OM)*
- Associated cranial neuropathies or neurological signs
- Skin rash or possible exposure to tick (exclude Lyme Dis.)

Next Patients

Rapid Fire Visual Diagnosis

Videos

Metastatic Neuroblastoma Opsoclonus-Myoclonus Syndrome

- "Dancing eyes-dancing feet syndrome"
- ✓ Rapid, spontaneous, irregular eye movements
- ✓ Rhythmic myoclonus (limbs, trunk) and/or ataxia
- Neuroblastoma (NB)
- ✓ Most common malignancy with OMS in children

Neuroblastoma

- ✓ Most common solid tumor of infancy arising from sympathetic nervous system
- ✓ Most present ~ 2 yrs. (75% birth-2 yrs.)

Next Patient: Video

15 mos. old Toddler with This Finding

Basilar Skull Fracture

Hemotympanum
CSF Otorrhea

Fracture involving petrous portion of temporal bone, external auditory canal and tympanic membrane

Basilar Skull Fracture

"Raccoon eyes"
Periorbital ecchymosis

Fracture site in anterior portion of skull base
(intraorbital bleeding from orbital roof fractures)

Basilar Skull Fracture

Battle's Sign
Retroauricular ecchymosis

Fracture communicates with mastoid air cells

Basilar Skull Fracture

Cranial nerve palsies
Typically Nerves VI, VII, VIII

Facial paralysis from fracture involving temporal bone

Next Patient: Video

She has been accused of

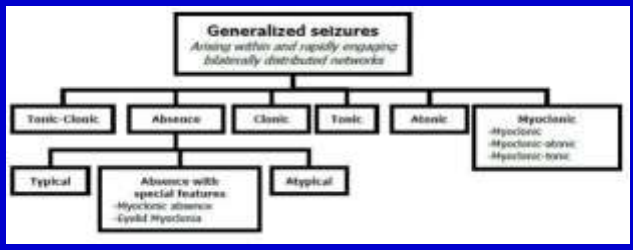
"daydreaming"

and

not paying attention during class

Normal birth, growth/development & neurological exam

CLASSIFICATION OF SEIZURES



ILAE Revised terminology for Organization of Seizures & Epilepsies 2011-2013

Absence Seizures

Most common in children from age 4-14 yrs.

Typical

- Most common type
- Child suddenly stops all activity & may look like staring into space or has a blank look
- Eyes may turn upwards with eyelids fluttering
- Begin & end abruptly lasting only a few seconds *(often missed / may not be detected for months)*
- Several episodes/day

Absence Seizures v/s Daydreaming
Look- alikes

Absence Seizures

- Can happen anytime, including during physical activity
- Sudden onset without warning
- Cannot be interrupted
- Ends on their own (typically within seconds)

Daydreaming

- More likely to happen when child is bored (e.g. during long class at school)
- Usually comes on slowly
- Can be interrupted
- Tends to continue until something stops it
  (e.g. parent getting child's attention)

Last Patient

6-yr-old boy known to have Bipolar Disorder in Your Waiting Room Develops These Findings

Extrapyramidal Symptoms
Oculogyric Crisis

- Eyes may converge, deviate upward & laterally or deviate downward
- Eye blinking, lacrimation, pupil dilation, drooling, facial flushing
- Backward & lateral flexion of neck
- Widely opened mouth
- Tongue protrusion

Oculogyric Crisis

- Onset of a crisis paroxysmal or stuttering over several hrs.
- Other symptoms include restlessness, agitation, malaise or a fixed stare followed by sustained upward deviation of both eyes

Oculogyric Crisis (OGC)

Several medications have been associated with the occurrence of OGC

- neuroleptics
- benzodiazepines
- carbamazepine
- chloroquine
- lithium,
- metoclopramide
- nifedipine
- levodopa

Oculogyric Crisis

Abrupt termination of symptoms after the use of diphenhydramine is diagnostic, therapeutic and most striking

Images Credit

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Thank You For Your Attention

"Lets cultivate our powers of observation as we learn together "

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