

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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Editor-in-Chief: Binita R. Shah

Atlas of Pediatric Emergency Medicine; 2nd ed 2013

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

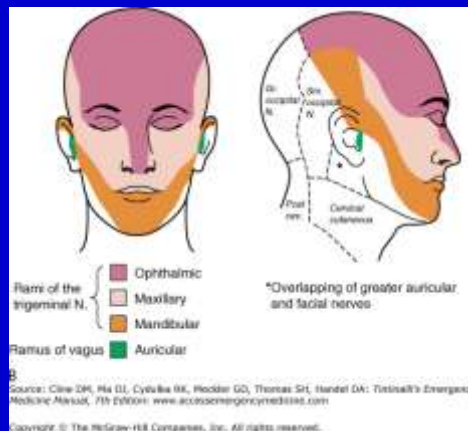
This Infant with Port-wine Stain is MOST at Risk For



- 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 angiomas → **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



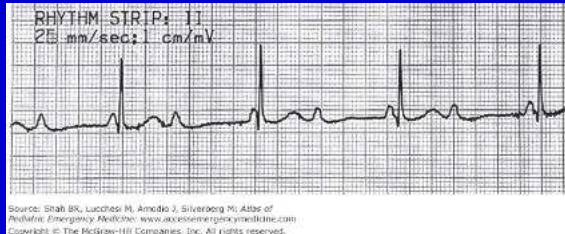
Look-alikes

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



Source: Shah BK, Laxmea D. Role of Patch in Erythema Multiforme. <https://doi.org/10.4103/0974-7800.199014>.
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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

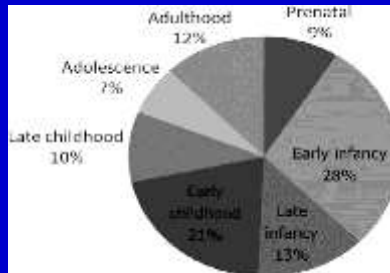
1. Sudden startle response
2. Infantile spasms
3. Infantile colic

**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



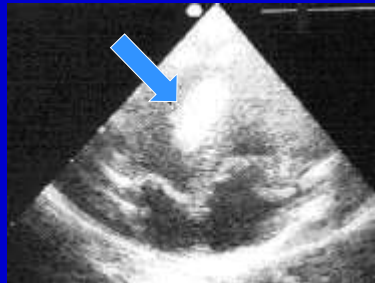
ash leaf spots



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

Lemons

Celery

Figs

Parsnips

Carrots

Garlic

Dill

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. Meningococemia
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^o 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
- Mucoïd 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

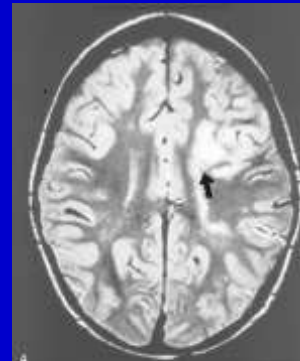
Total paralysis of ipsilateral face

Sickle Cell Anemia and Stroke

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

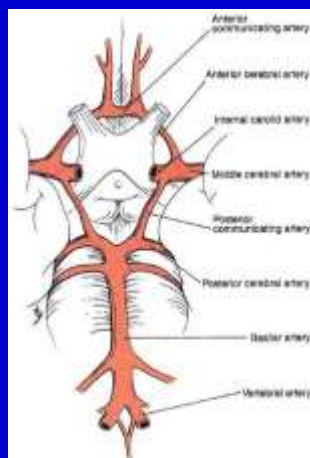
Overt Stroke

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



Source: Shah BE, Lindquist RJ. *Atlas of Pediatric Emergency Medicine*. <http://www.accessmedicine.com>.
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MRI Angiography of Circle of Willis



Source: Shah BE, Lindquist RJ. *Atlas of Pediatric Emergency Medicine*. <http://www.accessmedicine.com>.
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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

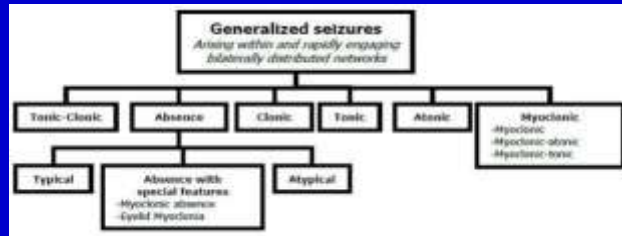
"daydreaming"

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

- Shah BR et al. Atlas of Pediatric Emergency Medicine; 2nd ed 2013; McGraw-Hill Co.
- Shah BR and Lucchesi M. Atlas of Pediatric Emergency Medicine. 2006; McGraw-Hill Co.
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Thank You For Your Attention

**“Lets cultivate our powers of
observation as we learn together ”**

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