

PEDIATRIC EMERGENCIES

Pediatric Emergencies, Case #1

Written by Becky Latch, M.D.

A three-year-old child presents to the Emergency Department with acute onset of stridor and tachypnea. Discuss your approach to this patient including important aspects of the history and physical exam, the differential diagnosis and management principles.

Definitions for Specific Terms:

Stridor- What is stridor? Stridor is a short, medium- to high-pitched sound heard during inspiration that is consistent with upper airway obstruction.

Describe the physiologic causes of stridor. Narrowing of the upper airway space causes resistance to airflow through the airway. Negative pressure during inspiration leads to further narrowing of that space with partial obstruction, leading to inspiratory stridor.

Tachypnea- What is a normal respiratory rate for a 3yo? (24-40 bpm)

How does respiratory rate vary with age? Respiratory rate is generally higher in infants and gradually decreases until adolescence.

Review of Important Concepts:

Historical Points

- Acute onset: The differential diagnosis varies between patients with acute onset of respiratory distress and a more gradual onset. The history of an acute onset of distress leads one to think about one precipitating event, such as aspiration of a foreign body or exposure to an allergen leading to anaphylaxis and respiratory distress. More gradual onset and other associated symptoms such as fever or rhinorrhea leads one to put infectious causes such as croup, epiglottitis or bacterial tracheitis higher on your differential diagnosis.
- Events immediately preceding onset of symptoms: Asking about preceding symptoms or events is very important in these patients. In addition, the age of the patient may change your differential. Crawling infants and toddlers notoriously put items such as toys or buttons in their mouths, but they're unable to relate that history back to their parents or doctors. Older siblings may increase a patient's risk for foreign body aspiration or ingestion by "feeding" their younger siblings small toys or other items. It is also important to ask about any known allergies.
- Other associated symptoms: Associated symptoms such as fever, rhinorrhea and sick contacts may help you narrow your differential. If the patient has urticaria, you may move allergic reaction/anaphylaxis higher on your differential.
- Immunization status: Underimmunized patients with stridor, fever and a toxic-appearance may have epiglottitis secondary to Haemophilus influenzae type B.

Physical Exam Findings

1. Primary Survey:
ABC: Airway, Breathing, Circulation
2. Evaluation of degree of respiratory distress.
 - a. Tachypnea, subcostal and intercostal retractions, nasal flaring, head-bobbing, tripodding, cyanosis, and altered mental status are all signs of respiratory distress.
 - b. Cyanosis and altered mental status are late findings and immediate intervention is needed.
3. Adjuncts to physical exam.
 - a. Pulse oximetry can be an important adjunct to your physical exam. A normal pulse oximetry reading is greater than 95%. Patients may be significantly hypoxemic before appearing cyanotic; therefore, an accurate pulse oximetry reading in addition to visual inspection can be helpful during assessments of patients with respiratory distress.
 - b. Stridor vs. Wheezing: It is important to differentiate stridor from wheezing on physical exam, as stridor is typically associated with upper respiratory tract obstruction and wheezing is associated with lower respiratory tract obstruction. Stridor is a medium- to high-pitched noise heard mostly on inspiration. It can typically be heard both with and without a stethoscope. Wheezing is a noise heard over the lung fields on expiration and usually requires a stethoscope to auscultate.

Clinical Reasoning

1. Generate a differential diagnosis for stridor and tachypnea in a three-year-old.
 - a. Foreign body aspiration
 - b. Anaphylaxis
 - c. Croup
 - d. Epiglottitis
 - e. Bacterial tracheitis
 - f. Retropharyngeal abscess
2. Given the information above, what is the most likely diagnosis and why? What would you expect to see or hear on physical exam?
Given the acute onset, age of the child and lack of other symptoms, foreign body aspiration with partial upper airway obstruction is most likely. Partial obstruction in the upper airway will result in inspiratory stridor, whereas lower airway obstruction will cause wheezing and/or diminished breath sounds on the side with the foreign body. Foreign bodies are most often found in the right mainstem bronchus.
3. What would be your initial approach to this patient?
 - a. ABC: airway, breathing, circulation.
 - b. Supplemental oxygen may be helpful.
 - c. Leaving the patient in a position where he is most comfortable (in mom's arms) may alleviate some respiratory distress until you can offer further management.
 - d. Airway and/or chest radiographs may help you identify or locate the foreign body.
4. What is the management of a patient with a foreign body aspiration?
Patients with a foreign body in their airway require rigid bronchoscopy to remove them.

5. How can you differentiate between a foreign body aspiration and an infectious cause of stridor?
 - a. Infectious causes of stridor include croup and epiglottitis. These patients typically have other signs and symptoms of infection as well.
 - Epiglottitis is a serious infection that can cause rapid deterioration and airway occlusion, it is a medical emergency. These patients usually have a high fever and are toxic-appearing.
 - Croup is caused by a viral infection and patients may have some fever or upper respiratory symptoms in addition to the stridor.
 - Both of these infections have a more gradual onset.
 - b. On chest auscultation of a patient with foreign body aspiration, you will likely hear diminished breath sounds on the side with the foreign body.

Suggestions for Learning Activities:

- Ask the student to develop a differential diagnosis and list supporting findings for each diagnosis.
- Review chest and lateral neck radiographs of patients with croup, epiglottitis, retropharyngeal abscess, foreign body aspiration and foreign body ingestion.
- Review appropriate anticipatory guidance for toddlers, specifically discussing injury prevention.
- Develop a simulated patient scenario with a high-fidelity mannequin for students to work through this case, including emergency care and recognizing the diagnosis and ultimate management.

Other Resources:

- Louie M, Bradin S. Foreign body ingestion and aspiration. *Pediatr. Rev.*, Aug 2009; 30: 295 - 301.
- Audio clip of stridor. <http://www.rale.ca/Stridor.htm>
- Audio clips of wheezing.
- http://www.rale.ca/Wheezing_a.htm
- http://www.rale.ca/Wheezing_b.htm
- http://www.rale.ca/Wheezing_c.htm

Pediatric Emergencies, Case #2

Written by Becky Latch, M.D.

A four-month-old baby presents to the Emergency Department with a fever of 104°F and petechiae. How would you evaluate and manage this patient?

Definitions for Specific Terms:

Petechiae- Tiny 1-2 mm red or purple non-blanching flat lesions caused by hemorrhage of small blood vessels.

Review of Important Concepts:

Historical Points

- Significance of petechiae: Patients with invasive bacterial disease frequently develop petechiae and/or purpura (larger non-blanching lesions caused by hemorrhages of blood vessels). Patients may progress to have fulminant disseminated intravascular coagulation (DIC). Approximately 8 to 20% of patients with fever and petechiae have a serious bacterial illness, requiring thorough evaluation and prompt management.
- Onset and associated symptoms (What other questions should you ask during the history?)
 - How long has this patient been sick? Rapid onset of symptoms should prompt more concern for bacterial process. A slower onset is more likely with some viral illnesses, such as parvovirus.
 - What other symptoms has the patient experienced? Forceful vomiting or coughing can result in a petechial rash localized to the face, shoulders and upper extremities.
 - What has the patient's mental status been like? Infants who are lethargic are much more concerning than those who demonstrate a normal mental status. It is important to differentiate between sleepy or listless children and those who are truly lethargic. Patients who are lethargic are difficult to arouse on exam and may not respond to normal stimuli. For example, lethargic infants may not cry with noxious stimuli such as IV placement or catheterization. In addition, it is helpful to differentiate between infants who are fussy, but consolable and those who are truly inconsolable. Inconsolable infants are more concerning and one should maintain a high index of suspicion for occult injury or illness.
- Exposure history: As with any patient with an infectious disease, it is important to take a thorough social history, specifically exploring any possible exposures. A detailed knowledge of such things as sick contacts, travel history or certain exposures could significantly alter your differential diagnosis.
- Immunization status: What immunizations should a four month-old have received that would protect her from meningitis? Both *S. pneumococcus* and *H. influenza* type B can cause meningitis in infants. At four months of age, she should have received two doses of both the conjugate pneumococcal vaccine and the H. flu vaccine. The conjugate pneumococcal vaccine previously covered the 7 most common pneumococcal serotypes that cause invasive disease. As we have protected patients from those 7 serotypes, we have seen an increased incidence of severe disease from several other serotypes, leading to the recent release of a new 13-valent conjugate pneumococcal vaccine. Other common causes of bacterial meningitis in children include *N.*

meningitidis, *Staphylococcus aureus*, *Haemophilus influenzae*, and in neonatal patients, group B streptococcus, *Escherichia coli*, and *Listeria monocytogenes*.

- Family History: Obtaining a detailed family history of bleeding or clotting disorders could be important in this patient with petechiae. In addition, family history of immune deficiencies could raise your index of suspicion for something similar in this patient

Physical Exam Findings

1. Vital Signs:

- a. Recognizing tachycardia as an early sign of shock is imperative in pediatric patients. Infants and children are able to increase their cardiac output by increasing their heart rate, so may easily have a heart rate in the 200 range when in shock.
- b. When they are no longer able to compensate with elevated heart rate, their blood pressure will fall. Hypotension is a very late symptom and prompt, aggressive fluid resuscitation before this point will lead to the best outcome for the patient.

2. Perfusion:

Along with vital signs, assessing perfusion is very important. This can be done by measuring capillary refill and assessing pulses, both centrally and distally.

3. Mental Status:

- a. Altered mental status can also be a late sign of shock in pediatric patients. The mental status of an infant or toddler can be quickly assessed using the AVPU (Alert, responds to Voice, responds to Pain, Unresponsive) scale.
- b. Infants who are unresponsive or who only respond to pain are much more concerning than those who are fully alert.
- c. Altered mental status is a sign of poor cerebral perfusion.

4. Fontanelle:

Infants with bacterial meningitis may have a bulging or full fontanelle.

5. Skin/Rash:

A detailed evaluation of the rash is important in this patient. As mentioned before, petechiae located over the upper body in a non-toxic-appearing child with history of forceful vomiting or coughing is less worrisome than generalized petechiae in a toxic-appearing child. In addition, petechiae can rapidly progress to purpura and areas of poor-perfusion and necrosis in septic patients. Recognizing these signs as early as possible is important.

Clinical Reasoning

1. What would be your initial management of this patient?

Rapid assessment and management of this patient is very important. Initial management should include placing the patient on a monitor, on oxygen if needed, and obtaining intravenous access. Rapid fluid resuscitation using isotonic fluid, is essential with any signs of shock. In addition, broad-spectrum antibiotics should not be delayed.

2. What are most common causes of invasive bacterial disease in this age range? What antibiotics would you start empirically?
 - a. Streptococcus pneumoniae and Neisseria meningitidis are the most common, Haemophilus influenzae in unimmunized patients, Staphylococcus aureus, group A streptococcus and gram negative bacilli are all less common causes.
 - b. Antibiotic choice should cover gram negative and gram positive bacteria. A third generation cephalosporin such as cefotaxime or ceftriaxone will cover Neisseria, haemophilus and some strains of pneumococcus. Adding vancomycin will broaden coverage to include resistant pneumococcus and staphylococcus aureus.
3. What are some other causes of petechiae in patients this age?

Viral illnesses, thrombocytopenia of various causes including HUS and ITP, leukemia, aplastic anemia, tick-borne illnesses and trauma.

Suggestions for Learning Activities:

- Ask the students to generate a differential diagnosis using only the case prompt, then work through the case keeping that differential in mind. Using that method, you may cover the illness scripts for bacterial meningitis, certain viral illnesses, thrombocytopenia, new onset leukemia and tick-borne diseases such as ehrlichia and Rocky Mountain spotted fever.
- What would the cerebral spinal fluid gram stain results be for patients with meningitis caused by each of the following pathogens?
 - Neisseria meningitidis (gram negative diplococci)
 - Streptococcus pneumoniae (gram positive cocci in chains)
 - Haemophilus influenzae (gram negative coccobacillus)
 - Staphylococcus aureus (gram positive cocci in clusters)
 - Enterovirus (negative)
- Ask the student to list signs of shock. Sort these signs into the uncompensated vs. compensated categories.
- Use a high-fidelity simulator to review the management steps of this patient with the students. If a simulator is not available, simply discussing what your management plan and reviewing the sequence of your orders with the students could be helpful.
- Discuss indications for antibiotic prophylaxis and need for isolation in patients with each of the illnesses on your differential diagnosis.

Other Resources:

- AAP Red Book; 2009 Report of the Committee on Infectious Disease.
- American Society of Hematology Image Bank: <http://imagebank.hematology.org/> Search for “petechiae,” “purpura,” or “thrombocytopenia,” for images to demonstrate terms above.

Pediatric Emergency, Case #3

Written by Noa Cohen, M.D.

A three-year-old boy presents to the Emergency Department with worsening cough, wheezing and shortness of breath. He has difficulty talking in the Emergency Department. How would you manage this child?

Definition for Specific Terms:

Asthma- A chronic disorder of the airways that is complex and characterized by variable and recurring symptoms, airflow obstruction, bronchial hyperresponsiveness, and an underlying inflammation.

Bronchiolitis- An inflammation of the bronchioles usually caused by a lower respiratory tract infection, most commonly due to RSV. It may also be defined as the first episode of wheezing in a child younger than 12 to 24 months who has physical findings of a viral respiratory infection and has no other explanation for the wheezing.

Wheeze- A musical and continuous sound produced by the forceful movement of air through a narrowed airway.

Hypoxia- Body/tissue deprivation of adequate oxygen supply

Hypoxemia- Oxygen concentration within the arterial blood is abnormally low
Respiratory distress: characterized by signs of increased work of breathing, such as stridor, wheeze, tachypnea, use of accessory muscles, and/or retractions

Review of Important Concepts:

Historical Points

- How would you determine the etiology of wheezing?
- The key to managing this patient correctly will come from a thorough history and physical examination.
- Features in the history that favors asthma diagnosis: Wheezing
Plus a history of any of the following:
 - Cough, worse particularly at night
 - Recurrent wheeze
 - Recurrent difficulty in breathing
 - Recurrent chest tightness
- Symptoms occur or worsen in the presence of:
 - Exercise
 - Viral infection
 - Changes in weather
 - Animals with fur or hair, House-dust mites, Mold, Pollen
 - Smoke, Airborne chemicals or dusts
 - Strong emotional expression (laughing or crying hard)

- Symptoms occur or worsen at night, awakening the patient
- History of Eczema or hay fever
- Family history of asthma or atopic diseases
- Good response to asthma medications
- Features in history that suggests a diagnosis other than asthma:
 - Poor response to asthma medications
 - History of a congenital abnormality
 - Wheezing associated with feeding or vomiting more consistent with GERD or aspiration complication
 - History of choking or sudden onset of wheezing suggests foreign body aspiration, even if it does not immediately precede onset of wheezing symptoms
- Bronchiolitis:
 - Prodromal phase: few days of upper respiratory tract infection symptoms as nasal congestion and/or discharge, mild cough and low grade fever
 - Progressive phase: over 3-7 days; symptoms of lower respiratory tract infection; worsening cough, noisy- raspy breathing and audible wheeze.

Physical Examination Findings:

1. Asthma:

Findings of physical exam depend on severity of the asthma attack; mild, moderate, or severe, and include:

- a. Tachypnea,
- b. Tachycardia,
- c. Wheeze either inspiratory, expiratory or both,
- d. Retractions,
- e. Diminished air entry,
- f. Agitation,
- g. Inability to speak,
- h. Tripod sitting position,
- i. Paleness,
- j. Cyanosis,
- k. Pulsus paradoxus (decrease in blood pressure with inspiration >15 mm Hg)

2. Bronchiolitis:

- a. Inspection: Tachypnea, intercostal and subcostal retractions, grunting, and nasal flaring.
- b. Auscultation: Prolonged expiratory phase, expiratory wheezing and inspiratory crackles.
- c. Percussion: Hyperresonance of the chest.

Clinical Reasoning

1. How would you evaluate respiratory status?

Different clinical scoring systems exist to evaluate the severity of the respiratory distress and detect an impending or existing respiratory failure based on the signs and symptoms of airway obstruction, use of accessory respiratory muscles, oxygenation, and cerebral function. “Wood’s Scoring System” is the most commonly used in clinical practice, as shown in the following table:

Wood's Scoring System

Variables	0	1	2
PaO ₂ (mm Hg) OR O ₂ Saturation (%)	70-100 on RA OR ≥ 91% on RA	< 70 on RA OR < 91% on RA	< 70 on 40% FiO ₂ OR < 91% on 40% FiO ₂
Cyanosis	None	In Room Air	In 40% FiO ₂
Inspiratory Breath Sounds	Normal	Unequal	Decreased to Absent
Accessory Muscles Used	None	Moderate	Maximal
Expiratory Wheezing	None	Moderate	Marked
Cerebral Function	Normal	Depressed or Agitated	Coma

2. Features of impending respiratory failure include:
 - a. Respiratory distress score of five or greater
 - b. Hypercapnia with a Pco₂ greater than 40 mm Hg in the presence of dyspnea and wheezing
 - c. Metabolic acidosis
 - d. ECG abnormalities

3. How would you manage this child?
 - a. Assess Respiratory Distress Score and assign a severity level (follow a clinical Pathway when available).
 - b. Chest x-ray: is warranted in this patient, especially for a first time episode of wheezing, to rule out other etiology. A chest x-ray reading of generalized hyperinflation suggests diffuse air trapping and airway disease. Localized findings may suggest structural abnormalities or foreign body aspiration.
 - c. Spirometry: objective measurements of pulmonary function help establish the diagnosis and treatment of asthma. Bedside peak flow measures can be done in the emergency department in children five years and older.
 - d. Blood gas analysis: is usually unnecessary in the emergency room setting.

4. Asthma management:
 - a. First Line medications for acute asthma attack are:
 - Oxygen supplement: usually delivered to the patient by nasal cannula or a mask to keep the oxygen saturation >92%
 - Nebulized/inhaled Bronchodilators: Beta2-Adrenergic Agonists (Albuterol or Levalbuterol), or Anticholinergic (Ipratropium Bromide)
 - Bronchodilators can be given individually or in combination, and as single doses or as continuous nebulization depending on the severity of the respiratory distress
 - Systemic Corticosteroids: Prednisolone, Methylprednisolone, or Dexamethasone
 - A first loading dose of steroids can be given orally, intravenously, or intramuscularly
 - b. Second line medications are:
 - Intravenous Bronchodilators; such as Terbutaline
 - Magnesium Sulfate, can be used as airway smooth muscle relaxant
 - The patient should be assessed and re-evaluated with every intervention to determine the level of improvement, response, or deterioration.

5. Bronchiolitis management:
 - a. Supportive Therapy: respiratory monitoring, control of fever, good hydration, upper airway suctioning, and oxygen administration.
 - b. Bronchodilators; such as Albuterol and Racemic Epinephrine can be tried, if there is improvement, then it can be repeated as needed.
 - c. The use of 3% hypertonic saline nebulizer and/or systemic corticosteroids treatment is controversial.

6. Does this patient need to be hospitalized?
 - a. The determination of hospitalization will be made by the severity of respiratory distress and the response to interventions. Indications for hospitalization include:
 - Age < 6 months old
 - Moderate to severe respiratory distress
 - Hypoxemia (Pao₂ <60 mm Hg)
 - Oxygen Saturation <92% on room air
 - Apnea
 - Inability to tolerate oral feeding
 - Lack of appropriate care at home
 - b. Patients who have the following clinical signs and therapeutic requirements that suggest respiratory failure require admission to the ICU:
 - Impending or existing respiratory failure as assessed by an asthma score of five or greater
 - Intravenous bronchodilator infusion
 - Respiratory or cardiac arrest
 - Mechanical ventilation

Suggestions for Learning Activities:

- Review specific emergency asthma medications.
- Review signs and symptoms of respiratory distress.

Other Resources:

- Fakhoury, Khoulood. "Approach to Wheezing in Children." In: UpToDate, Basow, DS (Ed), UpToDate, Waltham, MA, 2011.
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- National Heart, Lung, and Blood Institute. National Asthma Education Program Expert Panel Report 3 (EPR-3). Guidelines for the Diagnosis and Management of Asthma. Bethesda, MD: National Institutes of Health; 2007. NIH Publication No. 08-58461
- Marcadante KJ. Bronchiolitis. *Nelson Essentials of Pediatrics*. 6th Ed (2011), Chapter 109, pp 397-398
- Marcadante KJ. Asthma. *Nelson Essentials of Pediatrics*. 6th Ed (2011), Chapter 78, pp 311-321

- 5 Sahhar SH. Status Asthmaticus Management Guidelines. Spartanburg Regional Children's Health. Copyright 2012
- 6 Light MJ et al. Pediatric Pulmonology. Policy of the American Academy of Pediatrics. 1st Ed. 2011

Pediatric Emergencies, Case #4

Written by Rebecca Kidd, M.D.

A previously healthy fourteen-month old presents to the Emergency Department following a 2-3 minutes of generalized, symmetric tonic-clonic movements. There is no prior history of seizures.

Discuss your approach for the following scenarios:

- The child was sleepy initially but is now awake, alert and easily consoled by her parents. Her temperature is 104 F. Her examination is normal.
- The child remains somnolent and appears to have nuchal rigidity.

Definition for Specific Terms:

Tonic-clonic movements- Classic seizure activity. The tonic phase is sustained contraction in flexion or extension which is interrupted by periods of clonic activity (rhythmic contractions of extremities and trunk).

Febrile seizure- A seizure that occurs between the age of 6 and 60 months with a temperature of 38°C or higher, that are not the result of central nervous system infection or any metabolic imbalance, and that occurs in the absence of a history of prior afebrile seizures. Febrile seizures occur in 2-5% of neurologically healthy infants and children, recur in 30% of those experiencing a first episode, and in 50% after 2 or more episodes.

Review of Important Concepts:

Historical Points

- History of present illness – It is important to ask the informant details about how the child was acting prior to the event. Also information should be gathered about oral intake, urine output, energy level and other indicators of possible intercurrent illness.
- Developmental history – has this child met milestones appropriately or does this child have a history concerning for an established central nervous system abnormality?
- Immunization history – Because of the concern for meningitis in a child with fever and seizure, it is important to obtain a clear immunization history. A lumbar puncture may be indicated in a patient 6-12 months old whose immunization status is either unknown or deficient.
- Family history – Children with family history of febrile seizures are at an increased risk of having a febrile seizure.

Physical Exam Findings

1. Signs of meningitis on PE:
 - a. Nuchal rigidity: Pain and resistance upon flexion of neck.
 - b. Kernig sign: flexion of the leg at the hip with subsequent pain on knee extension.
 - c. Brudzinski sign: involuntary leg flexion on passive neck flexion.
 - d. Note: Markers of meningeal irritation are not consistently present in those younger than 12-18 months of age.

2. Level of consciousness: The initial assessment of a patient should include a rapid assessment of their level of consciousness. If the patient's level of consciousness is decreased or other vital signs are non-reassuring, initial assessment for focus on the ABCs (airway, breathing, and circulation) prior to further examination.
3. Sources of infection: A thorough physical exam must be done to look for source of infection, i.e. acute otitis media, pneumonia.

Clinical Reasoning

1. What are the classic symptoms of meningitis? Classic symptoms include nausea, vomiting, headache, lethargy and stiff neck. However symptoms can also present as mental status or behavior changes, seizure and focal neurologic signs.
2. What differentiates a simple vs. complex febrile seizure?
 - a. Simple: primary generalized seizure, usually tonic-clonic, that lasts for less than 15 minutes and does not recur within 24 hours.
 - b. Complex: focal, prolonged, and/or recurs within 24 hours
3. What would be your next step and how would it differ with these two patients?
 - a. The patient in scenario "A" most likely had a simple febrile seizure unless the seizure lasted longer than 15 minutes or recurred within 24 hours. It would be important to counsel parents to watch for recurrence of seizure activity prior to discharge from the Emergency Department. In general, a simple febrile seizure does not need further evaluation (i.e. neuroimaging or EEG) other than thorough evaluation for source of fever. However if there is any doubt of the source of fever, and the possibility of meningitis exists, a lumbar puncture is indicated.
 - b. For scenario "B", this case is much more concerning for meningitis and further management will be guided by the initial results of your work-up. Initially this patient should be placed on a monitor and have intravenous access established. It will be important to obtain a peripheral blood culture and, once the patient is deemed stable enough, a lumbar puncture should be completed to evaluate for meningitis.
4. Who needs to be admitted to the hospital?

Any child with a febrile seizure needs to be watched in the emergency room for several hours. If the cause of fever is identified and treated appropriately and the child has returned to baseline, as in scenario "A", the child may be discharged home. However, if child is still unstable and if there is any concern for meningitis, the child should be hospitalized.
5. Topics to counsel parents on:

Parents need to be counseled on fever management, including how to take their child's temperature and correct dosing of antipyretics. Because approximately 30-50% of children have recurrent seizures with later episodes of fever, it is important to stress correct and rapid management of fever to parents.

Suggestions for Learning Activities:

- Discuss causes of meningitis in this age patient
- Discuss CSF results for bacterial vs. viral meningitis

- Practice giving advice to parents on fever management, including doses of acetaminophen and ibuprofen. Practice writing prescriptions for both.
- Review and demonstrate the Kernig and Brudzinski signs

Other Resources:

- AAP Clinical Practice Guideline -- Febrile Seizure
- Pediatrics in Review, Febrile Seizures
- Febrile Seizures Fact Sheet
http://www.ninds.nih.gov/disorders/febrile_seizures/detail_febrile_seizures.htm

Pediatric Emergencies, Case #5

Written by Branson Bolden, M.D.

A four-year-old boy presents with brief loss of consciousness and vomiting after falling off a six-foot high slide. How would you evaluate him and what are your concerns?

Review of Important Concepts:

Historical Points

- **Epidemiology:** Head injury is a leading cause of morbidity and mortality in children. In the U.S., there are more than 1.5 million head injuries annually and approximately 300,000 pediatric hospitalizations. Males are twice as likely as females to sustain head injuries. Motor vehicle accidents are the most common cause of head injury in children, followed by falls. Most children sustaining a blunt head impact have minor traumatic brain injury, resulting in a brief change in mental status or consciousness (1).
- **Informant:** With any childhood injury presenting for medical evaluation, it is important to obtain a reliable history from a first-hand observer. Depending on age, developmental level and degree of injury, the patient may or may not be able to help provide this information. In nonambulatory patients, you must always consider nonaccidental trauma (child abuse) as the etiology of a traumatic event.
- **History of Present Illness/Event:** In obtaining the history of a child presenting from a fall, it is important to gain a good understanding of the events surrounding the incident. Time of injury, mechanism of injury, height of fall, ground/surface composition, bodily area of impact/injury, loss of consciousness and mental status are a few factors to consider.
- **Review of Systems:** A thorough neurologic and musculoskeletal review should be performed. Things to consider include behavioral changes, headache, vomiting, lethargy, confusion, coordination/gait disturbances, swelling, bleeding, bruising, and skeletal deformities to name a few.
- **Past Medical History/Previous Episodes:** Knowledge of a child's past medical history and underlying medical condition(s) is imperative in appropriately evaluating and treating a patient presenting from a fall. Considerations should include developmental level, risk of bleeding complication (e.g. hemophilia), underlying neurologic conditions (e.g. hydrocephalus status post ventriculoperitoneal shunt placement) and other risks of injury complication.

Physical Exam Findings

1. Modified Pediatric Glasgow Coma Scale (GCS) is used to assess neurologic status in children.
 - a. GCS 15 (highest score) = normal neurologic status
 - b. GCS <9 = consider intubation to protect airway
 - c. GCS 3 (lowest score) = no neurologic response
 - d. Minor head trauma - GCS 13-15
 - e. Moderate head trauma - GCS 9-12
 - f. Severe head trauma - GCS 3-8 (1)

Table 3. Modified Pediatric Glasgow Coma Scale*

Eye Opening	
4	Spontaneously
3	To voice
2	To pain
1	No response
Motor Response	
6	Obeys
5	Localizes pain
4	Flexion withdrawal
3	Flexion abnormal (decorticate posturing)
2	Extension (decerebrate posturing)
1	No response
Verbal Response	
5	Appropriate words, spontaneous cooing
4	Inappropriate words
3	Cries
2	Incomprehensible sounds, grunts
1	No response

*The Glasgow Coma Scale score is the sum of the best scores obtained from each column.
Data from American College of Emergency Physicians and American Academy of Pediatrics. *Advanced Pediatric Life Support-The Pediatric Emergency Medicine Course*. 1998.

2. Cranium exam for abrasion, laceration, hematoma, fracture, skull depression
 - a. Signs of basilar skull fracture:
 - ‘Raccoon eyes’ – periorbital ecchymoses
 - Battle sign – posterior auricular ecchymoses
 - Hemotympanum – presence of blood in the middle ear
 - CSF rhinorrhea or otorrhea
 - b. Neurologic exam:
 - Sensorium
 - Pupil size and reactivity
 - Gross visual exam
 - Fundoscopic exam
 - Cranial nerves
 - Strength
 - Sensory
 - Reflexes
 - Gait

3. Bodily or extremity trauma could include:
 - a. Bruising,
 - b. Abrasion,
 - c. Laceration,
 - d. Extremity deformity

Clinical Reasoning

How would you manage a patient with minor, moderate, or severe head trauma?

1. Minor head trauma (GCS 13-15): May be associated with loss of consciousness (<1min), seizure immediately following injury, headache, vomiting, lethargy or other neurologic symptoms.
 Recommendations for CT scan in children <2 yrs and >2 yrs (2)
 CT recommended: <2 years of age
 GCS <15
 Signs of AMS (agitation, somnolence, repetitive questioning, slow response to verbal communication)
 - a. Palpable skull fracture
 - CT recommended: >2 years of age
 - GCS <15
 - Signs of AMS (as above)
 - b. Basilar skull fracture
 - CT or observation: <2 years of age
 - Occipital/parietal/temporal scalp hematoma
 - LOC >5 seconds
 - c. Severe mechanism of injury (MVA with death or ejection of passenger or rollover, fall > 3ft, head struck by high impact object, pedestrian or bicyclist without helmet struck by a motor vehicle)
 - d. Not acting normally according to parent/guardian
 - CT or observation: >2 years of age

- LOC >5 seconds
 - e. Severe mechanism of injury (as above, with exception - fall > 5ft)
 - History of vomiting
 - Severe headache
 - f. Note: “CT should be more strongly considered for children with multiple findings, worsening symptoms or signs, and for infants younger than 3 months. Clinician experience and parental preference should also be taken into account in CT decision making for this intermediate-risk group.” A child in the minor head trauma category, presenting without any of the above CT recommendations and a normal physical/neurologic exam likely requires no further immediate evaluation. He/she should be observed 4-6 hours for evidence of neurologic deterioration. This may be done in a physician’s clinic or at home after appropriate instruction is given to caretakers regarding reasons for return.
2. Moderate (GCS 9-12) / Severe head trauma (GCS 3-8):
- a. Initial resuscitation should focus on attention to the ABC’s (airway, breathing, circulation) of emergency medicine. Patients with cardiopulmonary arrest, hypoventilation, apnea, GCS <9 or other severe injury causing respiratory compromise should be intubated and placed on mechanical ventilation. Initial efforts should focus on minimizing secondary brain injury. Maintenance of adequate oxygenation and hemodynamics are vitally important.
 - b. After initial resuscitation and stabilization, all patients with moderate or severe head injury should receive a CT scan of the head. Significant epidural or subdural hemorrhage may require emergent evacuation to prevent further injury.
 - c. Note: It is imperative that the clinician consider the possibility of a spinal cord injury in all patients with significant head injury. Spinal cord immobilization should be performed pending spine evaluation (3).
 - d. Special Considerations: Nonaccidental trauma must be suspected if the clinical presentation does not coincide with the history of injury. In this situation, a thorough evaluation should be performed and a report submitted to authorities of concern for child maltreatment.
3. Diagnoses to consider in fall injuries:
- a. Concussion:
 - Caused by traumatic forces applied directly or transmitted to the head
 - Generally associated with self-limited minor impairment of mental status without focal neurologic deficits
 - No evidence of intracranial injury on CT or MRI scan
 - An estimated 25% of patients suffering minor head trauma develop a concussion
 - b. Skull Fracture:
 - Linear
 - Most require no specific intervention; exception is frontal bone fractures if frontal sinus is involved
 - Exclude nonaccidental trauma
 - Depressed
 - Significant depressions may be associated with contusions or lacerations of brain parenchyma
 - Basilar
 - Fracture through the skull base

- Increased risk of infection if CSF otorrhea or rhinorrhea on exam
 - May be associated with facial nerve or carotid artery injury
- c. Intracranial hemorrhage:
- Epidural hemorrhage
 - Caused by tears of the meningeal arteries or veins
 - Often associated with temporal bone fracture
 - Convex shape of hematoma on imaging
 - Subdural hemorrhage
 - Caused by tears of the parasagittal bridging veins
 - Commonly sustained from motor vehicle collisions, child abuse, and falls from significant heights
 - Often associated with skull fractures and other intracranial lesions
 - Concave/crescent shape of hematoma on imaging
 - Subarachnoid hemorrhage
 - Caused by tears of small cerebral vessels
 - Often associated with high impact injury or significant shear forces
 - Blood seen layering along sulci and fissures, or filling cisterns on imaging
- d. Cerebral contusion:
- General bruising of cortical brain matter
 - Often caused by blunt head trauma
 - May be accompanied by cerebral edema and elevated intracranial pressure
 - Frequently associated with intracranial hematomas or skull fractures
- e. Diffuse axonal injury:
- Caused by rapid acceleration/deceleration injuries of the head
 - Injury causes widespread shearing injury of the cerebral white matter
 - Suspected in patients with diffuse subarachnoid bleeding and cerebral edema

Suggestions for Learning Activities:

- Practice giving anticipatory guidance to parents regarding injury prevention (e.g. falls, bicycle helmets, car seats, etc.)
- Practice assigning a GCS score to patients presenting with varied clinical presentations.
- Review CT scan finding of intracranial hemorrhage and determine epidural/subdural/subarachnoid location and associated injuries.

Other Resources:

- AAP: Pediatrics in Review. Pediatric Head Injury. 2007; 28; 215-224.
- Kuppermann, N., Holmes, J.F., Dayan, P.S., Hoyle, J.D., Atabaki, S.M. and et al. (2009). Identification of children at very low risk of clinically-important brain injuries after head trauma: a prospective cohort study. *Lancet*, 374, 1160-1170.
- AAP: Pediatrics in Review. Head Injury. 2001; 22; 118-124.
- UpToDate: Schutzman, S. Minor head trauma in infants and children. Nov. 2010.
- Additional Resource - CDC – Playground Injuries: Fact Sheet.
<http://www.cdc.gov/HomeandRecreationalSafety/Playground-injuries>

Pediatric Emergencies, Case #6

Written by Branson Bolden, M.D.

The mother of an eighteen-month old calls to say her child has pulled hot tea off the stove and splattered it across his face and chest. How would you counsel her?

Review of Important Concepts:

Historical Points

- Epidemiology: More than 120,000 children annually receive care in emergency departments for burn injuries. Scald burns account for 60-80% of burn injuries for children <5 years of age. For children, 6 months to 2 years of age, spillage of hot liquids such as coffee, tea or other item is the most common scenario for scald burns.
- Older children are more likely to receive burn injuries from fire. Inhalational injuries of children involved in fires contribute significantly to morbidity and mortality.
- Burn injuries are the 3rd leading cause of accidental death among children in the U.S.
- History of Present Illness/Event: It is important to obtain an adequate history of the events leading to and involving the burn injury. Source and situation of burn injury - scald, fire, chemical, electrical, etc - is important to determine. Time of event, length of exposure, risk of inhalation and other potential injuries should also be elucidated.

Physical Exam Findings

Important in the evaluation of burn injuries is determination of depth and percentage of body surface involved.

1. Burn depth classification and characteristics:
 - a. 1st degree (involving only epidermis)
 - b. 2nd degree (involves epidermis and into the dermis)
 - c. 3rd degree (destruction of entire dermis)

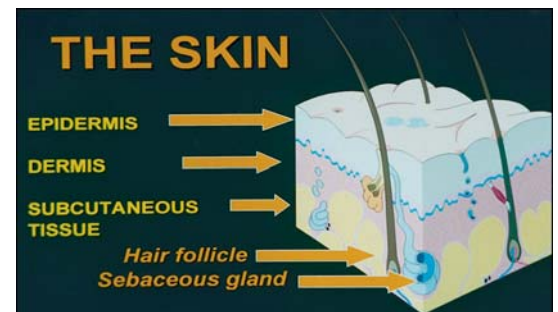
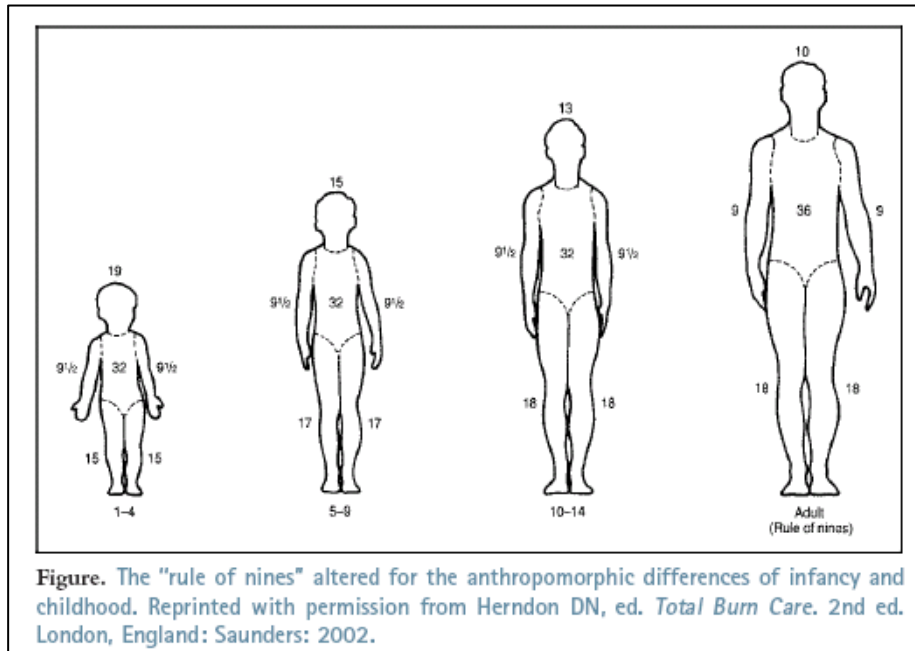


TABLE. General Characteristics of Burn Wounds

TYPE OF BURN	PHYSICAL CHARACTERISTICS	SUBJECTIVE FINDINGS
First-degree	<ul style="list-style-type: none"> • Red • Dry • No epidermal sloughing or blisters • Blanches with pressure • Sensate 	<ul style="list-style-type: none"> • Painful
Second-degree (partial-thickness)	<ul style="list-style-type: none"> • Epidermal sloughing or blisters • Pink-pale pink • Moist • Sensate • Blanches with pressure 	<ul style="list-style-type: none"> • Painful
Third-degree (full-thickness)	<ul style="list-style-type: none"> • White/mottled/charred • Dry • May be firm/leathery • Insensate • No blanching 	<ul style="list-style-type: none"> • Relatively nonpainful

2. Calculating total body surface area (TBSA) percentage of burn:
 - a. 'Rule of nines' – most accurate for adults; child's head is relatively large and legs relatively smaller; see Figure below
 - b. Palm of patient's hand (including area of digits) roughly equals 1% of burn
 - c. Areas of 1st degree burn are not included in TBSA of burn



Clinical Reasoning

1. What is to be considered first in your initial resuscitation of a burn patient?

Initial resuscitation should focus attention to the ABC's (Airway, Breathing, Circulation) of emergency medicine.

 - A. Airway – look for soot in or around patient's mouth or nose, facial burn, other burns to signify possible inhalation injury. Patients may or may not have stridor, hoarseness, drooling or difficulty swallowing. Patients with airway involvement should be intubated early to secure a patent airway prior to compromise from edematous swelling.
 - B. Breathing - toxins potentially associated with burns, e.g. cyanide and carbon monoxide, may cause a decrease in level of consciousness and interfere with oxygenation and/or ventilation.
 - C. Circulation – may be compromised by associated injuries or a condition called burn shock.
2. How would you fluid resuscitate a burn patient?
 - a. Parkland Formula:
 - Used to calculate fluids for the 1st 24 hours following a burn injury.
 - 4ml/kg per %TBSA. Add maintenance fluids for children <5 yrs old.
 - Give 1/2 of total fluids in the first 8 hours; remaining 1/2 over the next 16 hours.
 - Lactated Ringers is the fluid of choice at most burn centers.

3. What burn patients do you admit to the hospital?
 - a. Patients with superficial burns of <10% TBSA can usually be treated on an outpatient basis.
 - b. Exceptions include concern for child abuse, unreliable caregivers, parental concern or additional injuries necessitating hospitalization.

4. What special considerations need to be considered?

Non-accidental injury must be suspected if the clinical presentation does not coincide with the history of injury. It is estimated that 10-30% of burns in young children are associated with child abuse. In this situation, a report to authorities of concern for child maltreatment must be made and a thorough evaluation performed.

Suggestions for Learning Activities:

- Practice calculating TBSA percentage of burn by marking a burn on a human model or sketching.
- Practice calculating the initial 24 hour fluid resuscitation of a child with:
 - 20% TBSA involvement of a 2 year old.
 - 50% TBSA involvement of a 7 year old.
 - 75% TBSA involvement of a 13 year old.

Note: 24hr maintenance fluids calculation – 100ml/kg initial 10kg; 50ml/kg next 10kg; 20ml/kg thereafter.

Other Resources:

- UpToDate: Joffe, M.D. Emergency care of moderate and severe thermal burns in children. Jan 2011.
- Pediatrics in Review. Klein, G.L. & Herndon, D.N. Burns. 2004; 25; 411-417.
- Pediatrics in Review. Hansbrough, J.F. & Hansbrough W. Pediatric Burns. 1999; 20; 117-124.

Pediatric Emergencies, Case #7

Written by Matt Neal, M.D.

A four-year-old girl is brought to the Emergency Department following the acute onset of cough, increased work of breathing and tachypnea while at a friend's birthday party. What is your differential diagnosis? How would you evaluate and manage this patient?

Definition for Specific Terms:

Tachypnea- The general trend in pediatrics for normal respiratory rates is that as age increases, respiratory rates decrease. Newborns have higher respiratory rates and these rates decrease as one ages. Adolescents have respiratory rates close to adult ranges. The four year old in question should have a resting respiratory rate of between 20-30 bpm

Increased work of breathing- Increased work of breathing occurs when children are in respiratory distress. There is a large continuum of respiratory distress. Signs of increased work of breathing include nasal flaring, head bobbing, retractions, tracheal tugging, tripod positioning.

Review of Important Concepts:

Historical Points

- Has the patient ever experienced similar symptoms?
- Does the patient have any known allergies?
- Is there a history of reactive airway disease?
- Were symptoms preceded by the choking spell?
- Did any witnesses see the patient with objects that could be a choking hazard?
- Are there any associated symptoms? e.g. fever, upper respiratory symptoms, sick contacts, etc.

Physical Exam Findings

1. General:
 - a. Presence and degree of respiratory distress
 - b. Is the patient able to speak/cough?
 - c. Is the patient well appearing or anxious?
 - d. Is there any altered mental status?
2. Respiratory:
 - a. Look for tachypnea, subcostal or intercostal retractions, nasal flaring, head bobbing, tracheal tug.
 - b. Observe how freely the patient is able to speak. It is more worrisome if the patient is only able to speak in 1-2 word phrases.
 - c. Listen for inspiratory vs expiratory timing. Asthma exacerbations will have prolonged expiratory phase
 - d. Listen for generalized wheezing as seen in asthma or focal monophasic wheezing as heard in foreign body aspiration
 - e. Listen for even air movements in all lung fields. Focally decreased air entry in this patient is likely to represent foreign body aspiration

3. HEENT:

Is there evidence of upper respiratory tract infection that could be contributing to a potential asthma exacerbation?

4. Skin:

- a. Is there peripheral or central cyanosis?
- b. Is there an urticarial rash that could suggest an allergic reaction?
- c. Is swelling of the face or extremities present?

Clinical Reasoning

1. What is the differential in this patient?

a. Given the information above, three things must be considered:

- Exacerbation of reactive airway disease
- Foreign body aspiration (FBA)
- An allergic reaction

b. Given the age of the child and if we assume that she hasn't displayed a history of reactive airway disease before, FBA and allergic reaction become most likely. If there are no systemic symptoms such as edema or urticaria, FBA becomes the most likely diagnosis in this 4 year old patient.

2. FBA is a common cause of mortality in children less than 5 years old. Death by suffocation following FBA is the fifth most common cause of unintentional injury mortality in the U.S. Peak incidence is between 1-2 years old. Toy balloons are the most common cause of fatal FBA, with balls, peanuts, marbles, and pieces of toys being commonly involved.

3. Presentation typically depends on the degree of airway obstruction.

- a. Patients with true respiratory distress, cyanosis, and altered mental status require life support and rigid bronchoscopy to remove the obstruction.
- b. More commonly however, patients have cough, generalized wheezing, tachypnea or focal findings like monophasic wheezing or decreased air entry. A history of choking has a sensitivity of 76-92% for FBA.
- c. The most common area for FBA is right mainstem bronchus. Chest x-rays can be helpful if the foreign body is radioopaque, but the diagnosis of FBA should not be discounted based on normal chest x-rays as many objects, particularly foods, may be radiolucent. Definitive treatment for FBA is rigid bronchoscopy.

4. If the child in this presentation had also had physical exam findings of urticarial rash, swelling of the hands or face, itchiness, sense of choking an allergic reaction to a food at the party, what would be the most likely etiology? IgE food mediated allergic reaction can lead to anaphylaxis. In the U.S., peanuts and tree nuts are responsible for most food induced anaphylaxis, followed by shellfish. Treatment always begins with assessment of airway, breathing and circulation and should be followed with epinephrine, H1 and H2 blockers, B2 agonists and glucocorticoids.

5. If the child in question had a known history of reactive airway disease, would an exacerbation be more likely?

a. Factors that can lead to a reactive airway disease exacerbation include:

- Seasonal allergies
 - Upper respiratory tract infection
 - Cold exposure, exercise
 - Increased pollutant/smoke exposure
- b. Evaluation must begin with patient's level of respiratory distress. A root cause of the exacerbation should be sought, but the patient's respiratory distress must be treated first. Treatment involves inhaled Beta 2 agonists and ipratropium, systemic glucocorticoids and when necessary, supplemental oxygen.

Diagnosis:

Allergic reaction vs. Foreign body aspiration vs. Reactive Airway exacerbation

Suggestions for Learning Activities:

- Develop a list from history and physical exam findings that would support and detract from each of the above differential diagnosis
- Review chest x-rays in patients with asthma vs. patients with FBA, specifically looking for areas of hyperlucency in the ipsilaterally affected lung of a patient with known FBA
- Review appropriate anticipatory guidance for young children regarding FBA prevention
- Familiarize oneself with epinephrine injection devices and their proper use

Other Resources:

- Wells et. al. Arch Dis Child. 2005 Nov 90 (11) 1117-1121. Age related reference ranges of respiratory rate and heart rate in ages 4-16 years old.
- Airway foreign bodies in children. Ruiz et. al. Uptodate. Jan, 2011
- Anaphylaxis: Rapid recognition and treatment. Simmons et al. Uptodate Jan, 2011

Pediatric Emergencies, Case #8

Written by Quang-Tuyen Nguyen, M.D.

During a routine health care visit a fifteen year old girl with a history of depression confides to you that she would like to end her life. What should you do?

Definition of Specific Terms:

Depressive episode- DSM criteria, primarily applicable for adults – and currently requires 5/9 symptoms (depressed mood, decreased interest/pleasure, weight changes, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or energy loss, worthlessness or guilt, inability to concentrate or think, recurrent thoughts about death). Diagnosis by the DSM varies however, as it gets revised regularly.

Gestures- Cutting, ingestion of extra pills, episodes of self-inflicted harm. These must be taken seriously because the child/adolescent may have believed that the “gesture” could have caused death.

Cluster- Three or more suicides in the same community with temporal relationship to one another.

Suicide- Is the 3rd leading cause of death in US among ages 10-24 years of age. Among girls, the most common method is by hanging. Among boys, it is the use of firearms.

Review of Important Concepts:

Historical Points

- Adolescent social and psychiatric history: can have a range of mild depressed mood to all the way to pervasive depression with decreased function and suicidality. The prevalence of depression will go up from 1-2% prepubertal to 3-8% among adolescents. Girls are especially at 3:1 risk for unipolar disease and early onset of puberty increases this risk. Assessment is particularly challenged by normal developmental changes during adolescence which includes: intense moodiness, impulsivity, and erratic behavior. Adolescents also undergo a number of different stresses as they approach adulthood: developmental stress (identity crisis, boundaries, accepting limitations, planning for the future), body changes and self-image, peer pressure (group acceptance, dating, romantic involvement, peer competition), school pressure (academics, need to succeed, parental expectations), family pressure (expectations, parental impairment, marital conflict/divorce, financial or job related crisis), societal influences (romanticizing of violence and suicide), and adolescent depression (physiologic vulnerability, situational stress, sexual identity)
- Symptoms can be sadness, irritability, anger, school or behavior problems, somatic complaints (headache, stomachache, and muscle weakness), appetite changes, sleep changes, fatigue, self-injurious behavior, suicide ideation with plan and intent. Psychosis can also happen.
- Risk factors: early puberty, abuse/neglect by parents, parental substance abuse, parental marital problems, parental depression (or being emotionally unavailable), low socioeconomic status or education level, loss of parent/sibling/friend, stress related to development, early puberty, issues of sexuality (especially homosexuality). Genetic factors include parental depression. Other risk factors: certain medications (steroids, immunosuppressive agents, isotretinoin, antivirals),

chronic illnesses (diabetes, seizure disorder, cystic fibrosis, IBD, sickle cell anemia, organ transplant, cancer).

- Risk factors for suicide: mood disorder, substance abuse, loss of a loved one, family discord, social isolation, family history of suicidal behavior, previous attempt, and availability of firearms.
- History from the patient, but also must obtain history from the parent, teachers, and coaches, as well.
- Intention versus plan

Physical Exam Findings

1. Check for organic or iatrogenic causes for mood changes including thyroid nodules or goiter, nystagmus, proptosis, fingernail bed changes, track marks, and cutting or other self immolation.
2. Check also for signs of somatic changes i.e. weight change, unruly or unkempt appearance, signs of poor sleep such as circles under the eyes, and slow movements.
3. Mental status examination
Standardized tests available: CDI (Children's Depression Inventory), Beck Depression Inventory (BDI), Reynolds Adolescent Depression Scale, Mood and Feelings Questionnaire

Clinical Reasoning

1. What would be the medical workup?
Consider testing for thyroid dysfunction, urine toxicology, lupus, inflammatory disorders, and chronic illnesses.
2. What co-morbidities or other psychiatric diagnoses should you consider?
 - a. Adjustment disorders
 - b. Anxiety can also be present and predate depression symptoms
 - c. Attention deficit hyperactivity disorder, substance abuse
 - d. Behavioral problems from oppositional defiance to conduct disorder should all be considered
3. Should you disclose information with the guardians in life threatening situations?
Patient confidentiality is not maintained in these situations and the appropriate guardians must be informed. "No suicide contracts," have not been shown to be protective. Clinical evidence does not show that questioning or interviewing patients about risk behaviors with regards to suicide or suicidal intentions, predisposes the patient to carrying out harmful acts.
4. What are treatment options for mild depression?
 - a. Supportive counseling
 - b. Problem solving discussions
 - c. Education of family members
5. What are treatment options for moderate/severe depression?
 - a. Medication
 - b. Interpersonal therapies
 - c. Cognitive behavioral therapies

6. When should you consider a psychiatry referral or use of the 24 hour hotline?

Children who fail to respond within 6-8 weeks of treatment, have severe mood disorders, impairment in psychosocial functioning, have coexisting substance abuse, psychosis, suicidal ideation, plan, or intent should be referred to a child psychiatrist or mental health specialist. Those who are actively suicidal, homicidal, or psychotic should be institutionalized.

Differential Diagnosis:

1. Bullying
2. Learning disabilities
3. Drug use
4. Home environment or abuse
5. Home or school stressors
6. Depression
7. Bipolar disorder
8. Other mood NOS
9. Chronic illness
10. Thyroid dysfunction
11. Look at co-morbidities above

Suggestions for Learning Activities:

- Discussion of different kinds of pharmacologic agents. Fluoxetine is the most commonly used agent and best studied at this time, also the only agent to be approved by the FDA though other medications are used: bupropion, duloxetine, venlafaxine, mirtazapine.
- Act out role playing with sensitive questions so that students can get used to asking sensitive questions to teenagers.

Other Resources:

- Prager, L. Pediatrics in Review Vol. 30 No. 6 June 1, 2009 pp. 199 -206
- Fleisher, Ludwig. Textbook of pediatric emergency medicine. Lippincott Williams and Wilkins. 2010 pp. 1710-1716