Identifying the Sick Child

by:
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Ped 473 Course

Please read the provided handout

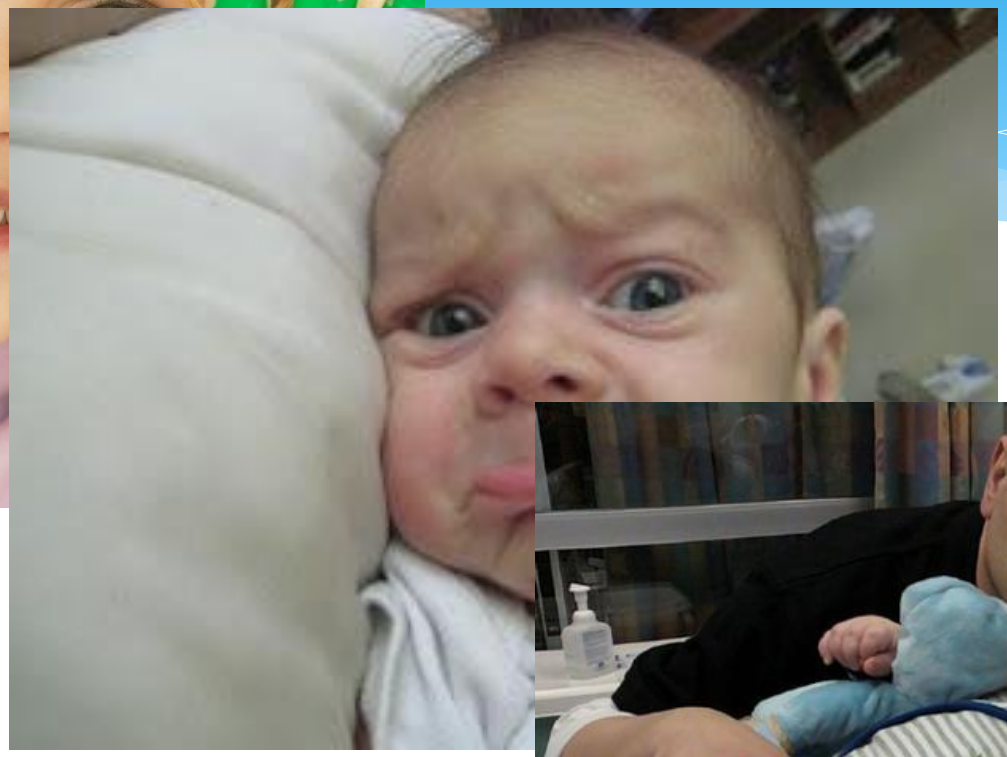
Starting at 9:30

Objectives

* To explain importance of early recognition of respiratory failure and shock.
* Identify which aspects of the physical exam should be included in the rapid assessment of the critically ill child.
* Describe the clinical features of the different types of shock.
* Discuss the early recognition of life threatening conditions & how to initiate management.

Importance: Why?

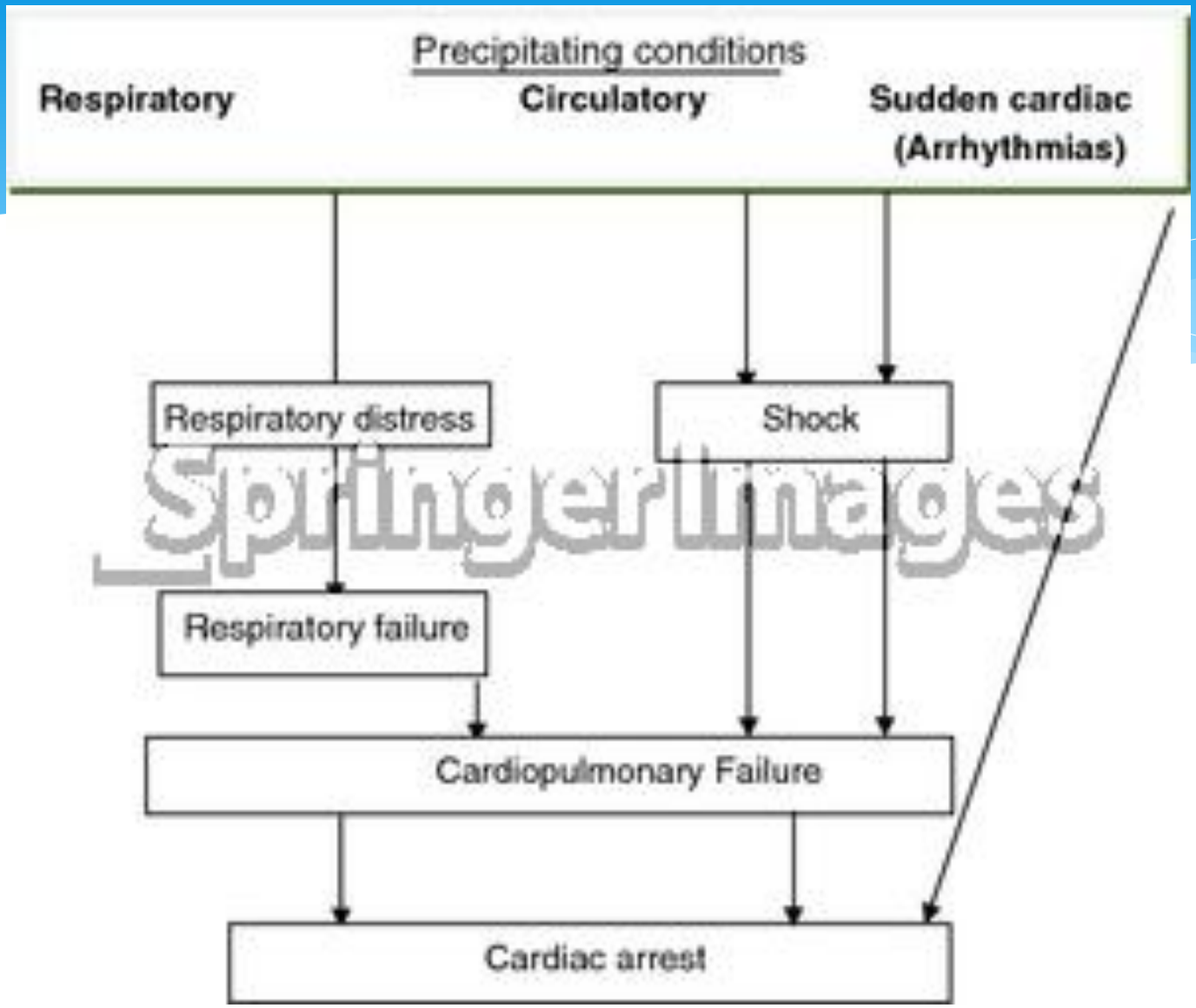
* **ومن أحياها** فكأنما أحيا الناس جميعا
* Can make a major difference on the outcome of patients when properly done!
* Touches the lives of each of us!
* Medico Legal issues!




HEALTHY
CHOICES
EARLY
RECOGNITION
EARLY
ACCESS
EARLY
CPR
EARLY
DEFIBRILLATION
EARLY
ADVANCED CARE
EARLY
REHABILITATION
TM

Care of the acutely ill or injured child

* **Requires rapid evaluation and management**
  * different than that used to assess the well child or the child with a chronic or minor illness.
* Centers on the **rapid identification of physiologic derangement** in organ-system function rather than the immediate development of a differential diagnosis.
* **The goal of this efficient assessment is *triage*, *or* identifying children at risk for critical illness or injury.**
* Because suspicion of critical illness warrants immediate management such as resuscitation, such action may need to be based on very limited information.


Precipitating conditions
Respiratory
Circulatory
Sudden cardiac (Arrhythmias)
Respiratory distress
Shock
Respiratory failure
Cardiopulmonary Failure
Cardiac arrest

Cardiopulmonary failure

* Rarely a spontaneous event in children!
* It is typically the **end result of progressively deteriorating respiratory or circulatory function.**
* **Once cardiopulmonary arrest has occurred, the outcome is generally poor**

  75 % dying

  75 % of the survivors sustaining permanent disability

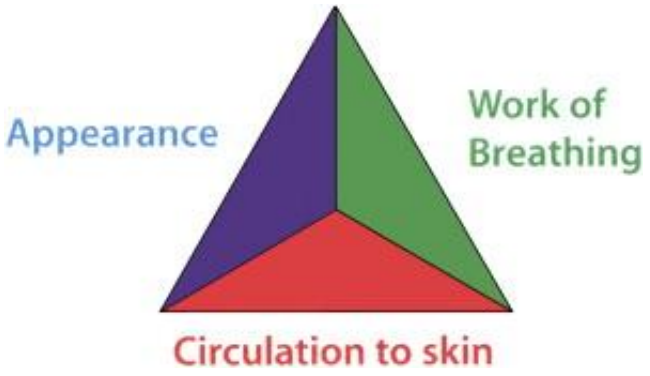
Prevention Better than Cure!

* A successful pediatric resuscitation relies on the **recognition of a pre-arrest state, such as impending respiratory failure or shock.**

* **This recognition depends on your ability to identify the symptoms or signs of those conditions or to determine which children are at special risk for these life-threatening events.**

How to Categorize Patients

* The initial evaluation of the acutely ill child requires rapid cardiopulmonary assessment.
* Takes less than 60 seconds to complete
* Follow the “PAT” “ABCDE” approach



PAT

* http://youtu.be/ssqwGjwSI_8
* http://nursingclass.wikispaces.com/Pediatric+Assessment

Triage

* integrate pertinent physical findings and physiologic data into one of the following clinical impressions:

1. Stable
2. Impending respiratory failure or shock
3. Definite respiratory failure or shock
4. Cardiopulmonary failure
5. Cardiopulmonary arrest

Canadian Association of Emergency Physicians
Association canadienne des médecins d'urgence
Canadian Paediatric Society
Société canadienne de pédiatrie
NENA National Emergency Nurses Affiliation Inc.
L'Affiliation nationale des infirmiers/infirmières d'urgence incorporée
L'ASSOCIATION DES MÉDECINS D'URGENCE DU QUÉBEC

The Canadian Paediatric E.D. Triage and Acuity Scale

Patients should have an initial triage assessment within 10 minutes of arrival

First Impression or EMS Assessment

Presenting Condition Assessment
see below
PAEDIATRIC PRESENTING CONDITIONS

Physiologic Assessment
Appearance - Neurologic
Respiratory Rate + Effort
Heart Rate + Perfusion

	TRIAGE LEVEL I RESUSCITATION	TRIAGE LEVEL II EMERGENT	TRIAGE LEVEL III URGENT	TRIAGE LEVEL IV LESS URGENT	TRIAGE LEVEL V NON URGENT
TIME TO REASSESSMENT, DELEGATED PROTOCOL OR MEDICAL CARE	0	15 MINUTES*	30 MINUTES*	60 MINUTES*	120 MINUTES*
PHYSIOLOGIC ASSESSMENT					
	unresponsive	altered conciousness lethargic	infant - unconsolable not feeding atypical behaviour	infant - consolable history of atypical behaviour	no history of recent behaviour or vital sign change
Respiratory Symptoms	RR <> NR +/- 2 SD inadequate breathing severe distress	RR <> NR +/- 1 SD marked stridor moderate distress	RR outside NR for age stridor mild distress	RR - normal for age	RR - normal for age
Cardiovascular	HR <> NR +/- 2 SD cardiac arrest shock cyanosis (NR = Normal Range)	HR <> NR +/- 1 SD capillary refill > 4 sec	HR outside NR for age capillary refill > 2 sec	HR - normal for age	HR - normal for age

Age	RESPIRATORY RATE (RR) +/- 2 SD	+/- 1 SD	Normal Range (NR)	HEART RATE (HR) +/- 2 SD	+/- 1 SD	Normal Range (NR)
Birth - 3 months	10 - 80	20 - 70	30 - 60	40 - 230	65 - 205	90 - 180
3 months - 6 months	10 - 80	20 - 70	30 - 60	40 - 210	63 - 180	80 - 160
6 months - 1 year	10 - 60	17 - 55	25 - 45	40 - 180	60 - 160	80 - 140
1 year - 3 years	10 - 40	15 - 35	20 - 30	40 - 165	58 - 145	75 - 130
6 years	8 - 32	12 - 28	16 - 24	40 - 140	55 - 125	70 - 110
10 years	8 - 26	10 - 24	14 - 20	30 - 120	45 - 105	60 - 90

*TIMES TO ASSESSMENT are operating objectives, not established standards of care.
Assessment objectives may be met using delegated protocols and remote communication.

A Health Canada Santé Canada

Medic Alert

Figure 1.3 A Canadian Pediatric Triage and Acuity Scale. 1.3A. Triage level and rapid pediatric assessment.

First: Focus on the **physiologic derangement**

* **Initial treatment is directed toward the physiologic derangement (e.g., shock)** rather than what might be the underlying cause (e.g., sepsis).

* **After the initial evaluation & stabilization,** objective data are used both to assess the response to stabilization procedures and to make the ultimate diagnosis.

* This requires **ongoing *monitoring*** *of vital organ functions*.

Respiratory failure

* *The most common cause of* cardiopulmonary arrest in children.
* **Inadequate oxygenation and/or ventilation**
* **May be caused** by intrinsic lung or airway disease, airway obstruction, or poor respiratory effort resulting from central nervous system dysfunction.
* **Usually** preceded by respiratory distress, a compensated state characterized by signs of increased work of breathing (e.g., tachypnea, nasal flaring, intercostal muscle retraction, grunting, and accessory respiratory muscle use)

Shock

* ***A physiologic state with insufficient* delivery of oxygen and metabolic substrates to meet the metabolic needs of tissues.**
* Inadequate tissue perfusion (e.g., pallor, cool skin, poor pulses, delayed capillary refill, oliguria, and abnormal mentation)
* Classified on the basis of the presence of a **normal (compensated) or low (uncompensated) BP.**

Compensated versus Hypotensive Shock

* The minimum systolic blood pressures for age are:

Newborns to 1 month old: >60 mmHg

1 month old-1 year old: >70 mmHg

> 1-10 years old: (Age X 2) + 70 mmHg

> 10 years: 90 mmHg

Shock Type	Primary Circulatory Derangement	Common Causes
Hypovolemic		
Distributive		
Cardiogenic		
Obstructive		

Clinical signs of respiratory failure and shock

* Caused by tissue hypoxia and the resulting metabolic or mixed (metabolic and respiratory) acidosis.

* Irregular respiration, bradycardia, and hypotension are ominous findings in acutely ill children, suggestive of impending cardiopulmonaryarrest.

Practice Scenarios

Please go to:

http://m.socrative.com

And Join Room #

473473

Scenario 1

A 6-month-old girl with a history of prematurity is brought to the ER following a 1-week history of nasal congestion, cough, wheezing, posttussive vomiting, tachypnea, and fever.

On arrival to ER: vital signs: heart rate 182/min, respiratory rate 72/min, pulse oximetry 87% in room air, and temperature 38.7^{O}C. She is tachypneic, grunting, retracting, and cyanotic.

What is this child's physiologic status?

A. Stable
B. Impending respiratory failure
C. Impending shock
D. Cardiopulmonary failure
E. Cardiopulmonary arrest

Scenario 1: Respiratory

A 6-month-old girl with a history of prematurity is brought to the ER following a 1-week history of nasal congestion, cough, wheezing, posttussive vomiting, tachypnea, and fever.

On arrival to ER: vital signs: heart rate 182/min, respiratory rate 72/min, pulse oximetry 87% in room air, and temperature 38.7°C. **She is tachypneic, grunting, retracting, and cyanotic.**

* What is this child's physiologic status?
* How should this patient be positioned during your exam?
* Does this patient exhibit signs of impending respiratory arrest?
* How will you manage this child?

Scenario 2

Bader is 5 year-old boy, known to have asthma, on Steroids inhalers prophylaxis & Ventolin inhalers as needed. He was brought to ER with 3 days history of cough & URTI. Today he developed shortness of breath and so he was given Ventolin inhalers & brought to ER.

His vital signs upon arrival: Pulse: 110/min, Respiratory Rate: 35/min, Temp: 36.5, Pulse Oxymeter 93% on room air. Chest exam reveals good air entry bilaterally with scattered wheezing.

What's your impression about his physiological status?

A. Stable
B. Respiratory distress
C. Impending respiratory failure
D. Impending shock
E. Cardiopulmonary failure

Scenario 2: Respiratory

Bader is 5 year-old boy, known to have asthma, on Steroids inhalers prophylaxis & Ventolin inhalers as needed. He was brought to ER with 3 days history of cough & URTI. Today he developed shortness of breath and so he was given Ventolin inhalers & brought to ER.

His vital signs upon arrival: Pulse: 110/min, Respiratory Rate: 35/min, Temp: 36.5, Pulse Oxymeter 93% on room air. Chest exam reveals good air entry bilaterally with scattered wheezing.

* What's your impression about his physiological status?
* How will you manage him in ER?
* What may indicate need for admission in his case?
* What advices will you give parents if he is sent home?

Scenario 3

A previously healthy 4-month-old girl presents to ER with a 4-day history of vomiting, loose watery stools, and low-grade fever.

She became lethargic 24 hours earlier and has refused to drink water or milk.

What is the likely etiology of shock in this scenario?

A. Cardiogenic
B. Obstructive
C. Hypovolemic
D. Distributive

Scenario 3: Shock

A previously healthy 4-month-old girl presents to ER with a 4-day history of vomiting, loose watery stools, and low-grade fever.

She became lethargic 24 hours earlier and has refused to drink water or milk.

* What is the possible etiology of shock in this scenario?
* Why is she lethargic?
* What are other signs of shock that you might expect to find?
* How will you manage this child?
* If her initial serum Sodium level came to you as 170, how will you modify the Rx?

Scenario 4

* A 2 year-old is brought to the ER 2 hours following ingestion of his grandmother medications. He is lethargic and drowsy. The parents do not know the medication name.

Regarding gastric lavage, a true statement is:

A. it is used frequently in poisonings
B. to be done in the first 6 hours of ingestion
C. should be considered if the amount of poison ingested is potentially life-threatening
D. It is indicated in corrosive ingestion

Scenario 4: Poisoning

* A 2 year-old is brought to the ER 2 hours following ingestion of his grandmother medications. **He is lethargic and drowsy.** The parents do not know the medication name.

* What are your first priorities?
* Will you do gastric lavage for him?
* How you will manage him?
* What advice you will give to the parents in the future?

Scenario 5

* A 3-month-old girl with a history of a Ventricular Septal Defect is sent from the clinic to the radiology Dept for a CXR.

  She presented with a 1-week history of progressive tachypnea, diaphoresis, weight loss, and decreased urine output. Her mother indicates that she had run out of medication. Examination reveals that the child is grunting, tachypneic, tachycardic (HR 180) and diaphoretic. She has a loud precordial murmur and an enlarged liver.

Your next step in management:

A. Wait to see the CXR
B. Send the child to the cardiology clinic
C. Give 20 ml/kg rapid bolus of Normal Saline
D. Give 10 ml/kg IV of Normal Saline over 20-30 minutes

Scenario 5: Shock

* A 3-month-old girl with a history of a Ventricular Septal Defect is sent from the pediatrician's clinic to the radiology Dept for a chest radiograph. **She presented with a 1-week history of progressive tachypnea, diaphoresis, weight loss, and decreased urine output.** Her mother indicates that she had run out of medication. **Examination reveals that the child is grunting, tachypneic, tachycardic (HR 180) and diaphoretic. She has a loud precordial murmur and an enlarged liver.**

* Is sending her to do X-ray suitable?
* What other studies you may perform to confirm your diagnosis?
* How will you manage this child?
* What clinical signs would indicate a response to therapy?

Scenario 6

* Huda is a 2 year-old girl, previously healthy, brought with 2 days history of vomiting & diarrhea. The vomiting subsided, but she still has watery diarrhea, no blood, 6-8 times/day. The child is conscious and her vital signs upon arrival: Pulse: 90/min, Respiratory Rate: 26/min, Temp: 36.5, Pulse Oxymeter 96% on room air. Capillary refill time is 2 seconds and she has good peripheral pulses & warm extremities.

What's your impression about her physiological status?

A. Stable
B. Impending respiratory failure
C. Impending shock
D. Cardiopulmonary failure
E. Cardiopulmonary arrest

Scenario 6: Shock

* Huda is a 2 year-old girl, previously healthy, brought with 2 days history of vomiting & diarrhea. The vomiting subsided, but she still has watery diarrhea, no blood, 6-8 times/day. **The child is conscious and her vital signs upon arrival: Pulse: 90/min, Respiratory Rate: 26/min, Temp: 36.5, Pulse Oxymeter 96% on room air.** Capillary refill time is 2 seconds and she has good peripheral pulses & warm extremities.
* What's your impression about her physiological status?
* How will you manage her in ER?
* What may indicate need for admission in her case?
* What advices will you give parents if she is sent home?

Scenario 7

* A 5-year-old boy is brought into the PICU from a referring hospital where he presented 5 days ago with fever, swelling of the left knee, and redness. He was treated with ceftriaxone and acetaminophen.

  He became oliguric, tachycardiac, and hypothermic, and received 500 ml of normal saline prior to transfer. On arrival to the PICU he is found to be lethargic, hypothermic, hypotensive, and tachycardiac.

What is the likely etiology of shock in this boy?

A. Cardiogenic
B. Obstructive
C. Hypovolemic
D. Septic

Scenario 7: Shock

* A 5-year-old boy is brought into the PICU from a referring hospital where he presented 5 days ago with fever, swelling of the left knee, and redness. He was treated with ceftriaxone and acetaminophen. **He became oliguric, tachycardiac, and hypothermic, and received 500 ml of normal saline prior to transfer. On arrival to the PICU he is found to be lethargic, hypothermic, hypotensive, and tachycardiac.**

* What type of shock is this?
* How can you determine end organ perfusion?
* How will you manage him?

Scenario 8

* A 2-week-old girl arrives by ambulance to the ER from her home, where she was found to be apneic by her father. She was intubated at the scene. On arrival, her heart rate is 200/min and her blood pressure is 40/20 mm Hg in her right arm. She is pale and hypothermic with no palpable pulses in her lower extremities.

What is the hemodynamic status of this neonate?

A. Normal
B. Compensated Shock
C. Hypotensive Shock
D. Hypertensive

Scenario 8: Shock

* A 2-week-old girl arrives by ambulance to the ER from her home, where she was found to be apneic by her father. She was intubated at the scene. **On arrival, her heart rate is 200/min and her blood pressure is 40/20 mm Hg in her right arm. She is pale and hypothermic with no palpable pulses in her lower extremities.**

* What is the etiology of shock in this scenario?
* What other investigations would you perform?
* What medication should you immediately consider?

Scenario 9

* A 3-month-old girl with history of colic is brought into the ER by a relative with a history that the infant apparently fell from her crib to the floor. On physical examination, she is unresponsive to stimulation. She has multiple bruises to the head, chest, and abdomen.

A true statement about this baby:

A. the clinical findings are consistent with the history provided.
B. Multiple bruises on the body of infants are normal for hyperactive babies with colic
C. Falling from the cribs is common for this age, especially if the side rails are left down
D. The most important diagnosis to consider is non-accidental injuries

Scenario 9: Unresponsive child

* A 3-month-old girl with history of colic is brought into the ER by a relative with a history that the infant apparently fell from her crib to the floor. **On physical examination, she is unresponsive to stimulation. She has multiple bruises to the head, chest, and abdomen.**

* Are the clinical findings consistent with the history provided?
* How would you describe this child's neurological status?
* How will you manage this case?

Scenario 10

* You are interviewing a mother of 6 month old baby, who both just survived a car accident, while the mother was carrying her baby in her arms in the front car seat.

In counseling the parents about children safety in the cars, you will explain that the best place for the infant is :

A. to be carried by the mother in the front car seat
B. to be carried by the mother in the back car seat
C. to be placed in the infant seat in the front car seat opposite the air bag
D. to be placed in the infant seat in the back car seat

Scenario 10: Trauma

* You are interviewing a mother of 6 month old baby, who both just survived a car accident, while the mother was carrying her baby in her arms in the front car seat.

  The baby's vitals are: HR: 100, RR: 30, BP 80/50, T 37

* What do you think about his vital signs?
* How will you monitor this child?
* What is the importance of pediatric injury prevention?

Scenario 11

* A 15-month-old boy was brought into ER with sudden-onset acute respiratory distress after a choking episode. The patient was noted to be wheezing on auscultation.
* A chest radiograph reveals hyperinflation of the right lung. The patient is taken to the operating room for bronchoscopy. A large peanut fragment is removed from the right main-stem bronchus.

Regarding foreign body aspiration in children, the best statement is:

A. Parents will give history of choking in about 90% of cases
B. child may present with persistent or recurrent cough
C. Balloons are safe for infants due to their shapes
D. Infants can eat nuts once upper & lower teeth erupt

Scenario 11: Respiratory

* A 15-month-old boy was brought into ER with sudden-onset acute respiratory distress after a choking episode. The patient was noted to be wheezing on auscultation.
* A chest radiograph reveals hyperinflation of the right lung. The patient is taken to the operating room for bronchoscopy. A large peanut fragment is removed from the right main-stem bronchus.

* Why is this patient wheezing?
* How will you manage this child post-op?
* Any advices for the family in the future?

Scenario 12

A 4-year-old boy has been admitted to the ward with a diagnosis of uncomplicated pneumonia.

10 minutes after receiving the first dose of IV antibiotic, he starts complaining of tightness of his chest and not feeling well. Upon arrival to his bedside, he is unresponsive with labored breathing and audible wheezing. He appears flushed, has an urticarial rash, and swollen eyes. He is warm, tachycardic, and has bounding pulses. His blood pressure is 80/20 mm Hg.

What is your first treatment of choice?

A. Corticosteroids IV
B. Antihistamie IV
C. Epinephrine IM
D. IV Bolus of 20 ml/kg of Dextrose 10%

Scenario 12: Shock

A 4-year-old boy has been admitted to the ward with a diagnosis of uncomplicated pneumonia.

10 minutes after receiving the first dose of IV antibiotic, he starts complaining of tightness of his chest and not feeling well. Upon arrival to his bedside, he is unresponsive with labored breathing and audible wheezing. He appears flushed, has an urticarial rash, and swollen eyes. He is warm, tachycardic, and has bounding pulses. His blood pressure is 80/20 mm Hg.

* What is the etiology of shock in this scenario?
* What would be your immediate response?
* How will you manage this patient?

Thank You!

Comments? Suggestions? Questions?

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