

Pediatric Respiratory Disorders

Respiratory Assessment

- LOC
- Vital Signs (RR, HR,temp)
- Color...can get dusky pretty quick.
- Inspection (chest expansion, WOB). The chest wall is very soft and can see WOB very easily.
- Auscultation
- Pulse oximeter
- Transcutaneous CO2 monitoring...can use on kids < 2 to check CO2 levels through the skin.

Chest Retracts	Xiphoid Retracts	Nasal flaring	Grunting
None	None	None	None
Just visible	Just visible	Minimal	Steth only
Marked	Marked	Marked	Naked ear

Video

- RF = Inadequate elimination of CO2 and or inadequate oxygenation of blood. Can result form lung or airway disease or inadequate effort (head injury)
- RD = compensated clinical state of respiratory dysfunctin where pt has a increased rate and effort in breathing.
- Increased AP diameter seen in chronic lung disease
- Listen to lung sounds along midaxillary line and move gradually toward back...should hear soft tubular sound as air enters and minimal to no sound as air leaves.
- Stridor = inspiratory high-pitched sound heard with airway obstruction (of upper airway)
- Prolonged expiration usually with wheezing signifies obstruction of mid airway?
- Grunting is produced by premature closure of glottis during active expiration...usually a sign of a pt attempting to maintain volume of gas in lungs by increasing end expiratory pressure. Pulmonary edema, PNA, atelectasis, ARDS
- Inspiratory retractions indicted upper airway obstruction or any disease that affects compliance.
- Children are diaphragmatic breathers until about 7 years
- Infant has 20 million alveoli at age...at 8 years, will have 300 million (adult level).
- Infants have increased metabolic demand...and oxygen consumption (6-8 ml/kg/min vs adults at 3-4 ml/kg/min)
- Factors making infants more susceptible to respiratory distress
 - size of airway
 - pliability of ribs & sternum
 - position of ribs r/t sternum
 - fewer alveoli
 - high rate of oxygen consumption

Respiratory Distress vs. Failure

- Irritable vs. Lethargic
- Vital signs
- Pink vs. Pale vs. Cyanotic

Vital sign red flags...be concerned if you see these numbers!

- RR>60 in infant to school-age
- RR>40 in adolescent
- HR>180 in infant, toddler preschooler (crying infant may have high HR...don't freak out, you have to take things like that into account)

- HR>160 in school-age child
- HR>140 in adolescent

Respiratory Distress

- Late signs
 - skin color changes
 - apnea/irregular respirations (child is too tired to keep breathing...a reason to intubate!)
 - change in LOC
 - bradycardia

Adventitious sounds (links on WebCT to listen to sounds)

- Stridor
- Crackles (rales)...fluid
- Rhonchi...exudate
- Wheeze
 - Albuterol is a short-acting bronchodilator that is used for wheezing. If an asthma pt is really really tight there is no air exchange and you won't hear asthma. You give Albuterol and they get more wheezy b/c there is now some air exchange. Mom might think the med made it worse b/c they now hear wheezing...they are actually improving.

Respiratory Distress vs. Failure

- Respiratory distress: Increased work of breathing
- Respiratory failure: Inadequate oxygenation or ventilation
 - Most common pathway to cardiac arrest

Peds vs Adult Airway

- Narrowest point is at chricoid ring.

Pulse Ox Probe Placement

- Measures saturation of hgb...the waveform is good when it's pickup up the pulse (easier when child is holding still)
- Will still pick this up if the hbg is saturated with something else such as carbon monoxide (will say 100%-ish)
- This only tells you how "full the buses are"...not how many buses you have (bus = RBC)

Developmental Differences

- Smaller airway size (trachea=little finger diameter)
- Small amount swelling = large increase in resistance

H1N1

- In children, emergency warning signs that need urgent medical attention include:
 - Fast breathing or trouble breathing
 - Bluish or gray skin color
 - Not drinking enough fluids
 - Severe or persistent vomiting
 - Not waking up or not interacting
 - Being so irritable that the child does not want to be held
 - Flu-like symptoms improve but then return with fever and worse cough (CDC, 2009)

Oxygen Delivery

- Humidified!!
- What the child tolerates!
- Methods of Delivery
 - Blow-by (held near the baby's face...advantage is the child is not scared or claustrophobic...can put a sticker in the bottom of the cup so child's attention is directed toward it)
 - Face mask (very very rare...kids will not tolerate that)

- Nasal Cannula...this child has little things on his cheek to keep the cannula in place.
- Non/partial rebreather
- Blended O2/mist
- Possible to give too much oxygen...oxygen toxicity can cause problems! Signs are:
 - cough
 - stuffy nose
 - N/V

Acute Respiratory Conditions

- Upper Respiratory Infection
- Otitis Media
- Pharyngitis
- Tonsillitis
- Croup
- Bronchiolitis

The runny nose

- very common d/t colds, flu
- be careful of tissues and such...RSV can live for 6 hours outside the body.
- always gown up if child is on contact precautions...virus can live for a long time and you could carry it around.

Otitis Media

- Inflammatory disorder of the middle ear
- Common 6 - 36 months of age
- Assessment:
 - URI sx, fever, pain
 - Enlarged lymph nodes
 - Discharge from ear
 - Vomiting/diarrhea
 - May pull on ear, or hit on ear
- Tympanic membrane can burst d/t ear infection...child may "feel better" after this happens (hurts during the bursting though)

Prevention of Otitis Media

- Avoiding infection
- Avoid irritants
- Bottles in bed

Otitis Media: Treatment

- Antibiotics – yes or no?
 - A lot of MDs are not giving Abx if only a little bit red. Trying to decrease the amount of Abx being prescribed to help prevent superbugs.

- Antipyretics/analgesics
- Patient/parent education

Otitis Media Tx (cont'd)

- Follow up
- Hearing loss
- Prevention
- Myringotomy with PE tubes

Pharyngitis (see picture to right)

- 4-7year olds
- Viral vs. bacterial
- Throat culture/rapid strep screen...should be doing BOTH of these tests

Pharyngitis: Nursing management:

- Antibiotics (if bacterial)
- Symptomatic
 - Antipyretics
 - Analgesics
 - Fluids
 - Preventing spread
- Hydration a concern b/c they will not want to drink.

Pharyngitis: viral vs. bacterial

- Strep throat more likely to include
- more throat soreness
- tonsillar exudate
- more lymph node swelling
- higher fever
- abdominal pain

Why do we treat strep throat with antibiotics?

- Bc we don't want to worry about rheumatic heart disease or the glomerulonephritis

Tonsillitis

- Nursing assessment:
 - Sore throat
 - Fever
 - Enlarged tonsils
 - "kissing tonsils"...the tonsils are starting to touch.

Surgical management:

- Criteria for Tonsillectomy (with/without Adenoidectomy):
 - > 3episodes/year X 3 years
 - Obstructive sleep apnea
 - Nasal speech
 - > 3 years old

Post-operative nursing care

- Airway: Positioning, O2 sat monitoring, cool mist
- Monitor for bleeding: Earliest sign = frequent swallowing
- Fluids/nutrition: Clear liquids to soft diet, no red/brown fluids; po fluid minimum

Post-operative nursing care

- Pain management:
 - Proactive: start with IV narcotics, then po meds, around-the-clock for at least 1st 24 hrs...the pain is constant and we give them pain meds around-the-clock so they don't cry/scream and mess up the sutures.
- Complications:
 - Bleeding
 - Inadequate PO intake
 - Unrelieved pain

Laryngotracheobronchitis (LTB) = croup

- Viral invasion/inflammation of laryngotracheobronchial tree
- Tightness in upper part of airway
- "Barking" cough. Child will often wake up in the middle of the night with a barking cough d/t dry air at home. Sometimes kids get outside in the moist air and the cough gets better.

- Most common cause: parainfluenza
- Swelling, increased tenacious secretions

LTB

- Diagnostic tests
 - X-ray will show the soft tissue swelling
 - CBC
 - Differential Diagnosis
- Care:
 - Airway/oxygen (and mist)...parents can turn shower on for home care...usually works pretty fast.
 - Hydration
 - Racemic epinephrine will help right away to reduce swelling...it doesn't last long, so the swelling will come back (need to be admitted...wouldn't send someone home after just giving an epi dose)
 - Corticosteroids (you might see this as a tx for swelling)
 - Rest/comfort

Laryngotracheobronchitis ("aka" croup)

- Clinical manifestations:
 - 3 months- 4 years
 - URI symptoms
 - High fever
 - Seal-like, barking cough
 - Inspiratory stridor
 - Variable degree of respiratory distress

Epiglottitis

- 2- 6 years old
- Acute bacterial infection of epiglottitis...gets inflamed and blocks the airway
 - *h. influenzae B* (*vaccine has nearly gotten rid of this disease*)
- Diagnosis: 4 D's
 - Dysphonia
 - Dysphagia
 - Drooling
 - Distressed

Epiglottitis

- DO NOT PLACE ANYTHING IN THE AIRWAY!!! No tongue depressors in the mouth!
- Treatment plan
 - Airway management
 - Antibiotic therapy

Interventions

- Allow any position that maintains airway
- Emergency airway management team ready
- Pay close attention to child: do not leave alone, allow parents to stay
- Oxygen any way tolerated (usually blow-by)
- Avoid upsetting situations, keep lights down, noise down

Bronchiolitis

- 80% of cases d/t Respiratory Syncytial Virus (RSV)
 - RSV gets into cell, kills it, causes a lot of swelling and mucus in the airway
 - Contact precautions b/c child has a LOT of mucus

Bronchiolitis cont'd

- Pandemic yearly

- High risk (ex-premies, young infants, congenital heart disease)
 - High-risk kids will get Synagis before season starts (prophylactic)
- Exposure risks: April-Sept births, older siblings, day care, bottle fed

Bronchiolitis Symptoms:

- URI, nasal secretions
- Cough
- Increased WOB
- Crackles/wheezes
- Apnea (20%)...can't breathe past the mucus

Bronchiolitis Pathophysiology:

- URI – bronchioles
- Inflammation & necrosis of epithelium
- Increased mucus
- Variable airway obstruction

Bronchiolitis Diagnosis:

- WBC
- X-ray
- Nasal wash...put saline in the nose and try to get out some cells from the nasal wall.

Bronchiolitis: Nursing Care

- Airway: Suction, Suction, Suction!!!
 - Want to suction before they eat so they can breathe and eat at the same time.
 - They take a 3cc saline pillow, squeeze one into the nose while you suction out through the other side. Repeat.
- Oxygenation/Ventilation
- Hydration/Nutrition
- Positioning/Rest/Comfort

Chronic Respiratory Conditions

- Asthma (signs of increasing respiratory distress in picture to right)
 - restricted airway d/t inflammation
 - mucus
- Cystic fibrosis
- Bronchopulmonary dysplasia

Acute Asthma: Assessment

- Family history: asthma, allergy
- Triggers: antigens, foods, infection, meds, GERD, stress, exercise, aspirin
- Tight cough
- Breath sounds:Exp. wheeze, crackles
- Increased WOB: prolonged expiratory phase

Asthma

- Increasing incidence
- Pathophysiology
 - Inflammation
 - Bronchial hyperresponsiveness
 - Bronchoconstriction

Medications used to treat asthma (ATI has good info about order of meds for patient teaching)

- Beta-2 agonists (opens the airway)

- Short-acting: Albuterol (proventil, ventolin). Take the Albuterol FIRST to open the airway before taking other asthma meds!
- Systemic: Epinephrine, Terbutaline (brethine)
- Anticholinergics (increase effectiveness of beta-2 agonists)
 - Ipratropium bromide (atrovent)
 - combi-vent (in combo w/ albuterol)
- Long-acting bronchodilators:
 - Salmeterol (serevent)
 - Theophylline (theo-dur, slo-bid)
- Inhaled non-steroidal anti-inflammatory (inhaled anti-asthmatic agents)
 - Cromolyn sodium (intal)
 - Nedocromil (tilade)
- Antileukotrienes (oral anti-asthmatic agents)
 - Zafirlukast (accolate)
 - Montelukast (singulair)
 - Zileuton (zyflo)
- *Systemic Corticosteroids*: Prednisolone, Methylprednisolone, prednisone
- Inhaled Corticosteroids (decreases immunity in the mouth...may get mouth sores, so wash mouth after every time you use it):
 - Beclomethasone (vanceril, beclovent)
 - Budesonide (Rhinocort)
 - Flunisolide (Aerobid, Nasalide)
 - Fluticasone (Flonase)

Inhaled Medications in children

- Metered Dose Inhaler: Use a spacer with mask or mouthpiece
- Nebulizer for those unable to use inhaler or for continuous administration
- Patient/Family Education!!! Make sure they know which one to use, how to use PFM and how to use spacer.

Asthma Nursing Care: Patient/Family Education

- Signs/symptoms
- Action plan
- Medications
- Need for further intervention
- Peak flow meter, MDI or nebulizer

Pertussis

- Harsh cough (see picture of baby to right)
- Baby coughs so hard they can't get their breath...heart rate drops and they turn dusky.
- Will be covered in the immune lecture

The allergic salute

A white line on nose from continually pressing on it d/t allergy? This didn't make a ton of sense.

Bronchopulmonary Dysplasia (BPD)

- Chronic lung disease related to respiratory interventions in neonatal period (premies)...scarring of the lungs d/t the treatments provided.
- Incidence inversely proportional to birth weight
- Risk factors: > 60% oxygen, Positive pressure Ventilation, Pulmonary infection, Patent Ductus Arteriosus (PDA)
- Pathophysiology:
 - Chronic airway inflammation
 - Hyperactive airways
 - Increased secretion of mucous
 - Decreased ciliary clearance

BPD: Clinical manifestations

- Reactive Airway Disease (RAD)
- Poor growth, increased caloric needs
- Activity intolerance

Cystic Fibrosis (CF)

- Autosomal recessive disease that causes dysfunction of the exocrine glands
- Diagnosis: sweat chloride test chromosome testing
- Sequelae due to tenacious mucus production

Cystic Fibrosis (cont'd)

- Could be in hospital for respiratory problems or GI problems
- Will have really bulky stools, bowel obstructions, distended abd
- Child won't grow well
- Frequent respiratory infections
- Parents may say "When I kiss baby, they taste salty." This is b/c of the large amounts of sodium in the sweat...and is why they do that sweat test as a dx.

Exocrine dysfunction:

- Lung insufficiency (chronic pneumonia, obstructive lung disease)
- Pancreatic insufficiency (malabsorption). Mucus plugs ducts of pancreas which affects digestion. Pt will get pancreatic enzymes prior to meals.
- Pts do not like to eat....want them to have high calorie, high protein meals...but pretty much get them whatever they want so they will eat. May be on tube food at night.
- Increased loss of sodium & chloride

CF: Nursing Care

- Gas exchange
- Airway clearance
- Alterations in nutrition: less than
- Patient / Family Education
- Anticipatory Guidance
- Coping
- The child to the right is wearing a vest that shakes them to loosen up mucus (Thera-Vest?)

General Care Principles

- Treat fever
- Fluids & Nutrition
- Promote rest
- Prevent nosocomial transmission

Foreign Body Aspiration (move this below asthma)

- # 1 cause accidental death < 1 year old
- Presentation dependent upon location of foreign body
- Tx: Bronchoscopy, admit for observation
- Nursing: monitoring for respiratory distress

Acute Life Threatening Event (ALTE)

- Apnea: cessation of respirations >20 seconds
- Color change, limp, choking/gagging
- Etiology: 50% unknown
- Management:
- Admit for observation, diagnostic tests, safety and discharge teaching

SIDS...Sudden Infant Death Syndrome

- Sudden death of an infant under age 1 that remains unexplained after autopsy
- Premies and infants with apnea, CNS disorders, or respiratory disorders with higher incidence
- Risk factors: low birth weight, multiple births
- Peak age for SIDS is 2 to 4 months

Hockenberry, Marilyn J.. *Wong's Essentials of Pediatric Nursing*. Seventh Edition ed. St. Louis: Mosby, 2005. Print.

Parsh, B. (2010, February 11). Respiratory Disorders. Pediatric Nursing. Lecture conducted from CSU Sacramento, Sacramento

Sampson, J (2010, February 11). Respiratory Disorders. Pediatric Nursing. Lecture conducted from CSU Sacramento, Sacramento.

Tobar, K. (2010, February 11). Respiratory Disorders. Pediatric Nursing. Lecture conducted from CSU Sacramento, Sacramento.

