RESPIRATORY DISORDERS

Anatomy and Physiology: Pediatric Variations
- Small airways
- Fewer alveoli
- Increased chest compliance

Respiratory Assessment
- History
  - Family – some diseases are inherited; or environmental
  - Neonate – preemie–vent dependent–RDS–chronic bronchiolitis–asthma later
  - Hx of present illness
    - Cough–record onset, frequency, duration; is it intermittent, sporadic, recurrent?
    - Sputum–consistency, color, amount expectorated, odor
    - Respiratory pattern: audible wheezing, retractions, grunting, nasal flaring
Respiratory Assessment

- Physical Exam (differentiate between)
  1. Upper Airway Disease
  2. Lower Airway Disease
  3. Common Characteristics
     - Cyanosis
     - Thoracic shape – barrel chest for chronic problems r/t hyperinflation of lungs
     - Vital Signs – hypoxia, HR, BP, hypercapnia, assess respiration rate, depth, rhythm; describe adventitious BS

Respiratory Assessment

- Physical Exam Common characteristics (continued…)
  • ABO’s
     - Function-assess oxygenation of blood and pH of the body
     - Method of obtaining – radial artery
     - Normal Values
       » pH    7.35 – 7.45
       » PaO2  80 – 100%
       » PaCO2  35-45
       » O2 sat 95 or higher

Respiratory Assessment

- Physical Exam Common characteristics (continued…)
  4. Methods of administering O2
     - Hoods
     - Masks
     - Cannulas
     - Mist Tent

  5. Care of child in Mist Tent
Respiratory Assessment

Assessment
- Appearance
  - Restless, inactive, irritable, apprehensive
- Respiratory Status
  - Nutrition/Hydration – anorexia, vomiting
- Chest Examination
  - Respiratory rate
  - Breath sounds
  - Inspiratory/Expiratory phases

Nursing Care of the Child with Respiratory Dysfunction

1. Assess respiratory status, vs q 2-4 hrs
2. Evaluate BS before & after aerosol tx
3. Elevate HOB to ↓ compression of diaphragm (Semi-Fowlers position)
4. Promote rest by ↓ noise, lights, and extra handling; anxiety ↑s bronchospasm, rest → conserves energy

Nursing Care of the Child with Respiratory Dysfunction cont.

5. Monitor hydration PO or IV → small frequent feedings; control fever
6. Reassure parents: child may be on HR/Apnea monitor and pulse oximetry, may be receiving O2 via mask, N/C, tent ↓ hypoxia secondary to airway edema, mucous, and bronchospasm
7. Teach parents disease process and management: S & S of respiratory distress, use humidifier in child’s room, avoid smoking in child’s presence, sx mucous from child’s nose with bulb syringe.
Nursing Diagnoses

- Ineffective Airway Clearance
- Impaired Gas Exchange
- Ineffective Breathing Pattern
- Anxiety, child related

Upper Respiratory Tract

- This area is from the Nose to Larynx
  1. Nose,
  2. Sinuses
  3. Pharynx
  4. Epiglottis
  5. Glottis
  6. Larynx

Upper Respiratory Tract Disorders

- Nasopharyngitis
- Tonsillitis
- Pharyngitis
- Otitis Media
- Acute Epiglottis
Nasopharyngitis (URI) Upper Respiratory Infection

- Common Cold may be viral or bacterial
- Nursing Management
  - Assessment
    - Degree and duration of symptoms
    - Eating and drinking
    - Fever or cough
    - Hydration, nasal discharge, respiratory distress

Interventions –
- Antibiotics if cultures are positive for bacteria
- Home Management
  - Humidity, nose drops, fluids, fever control (acetaminophen), rest
  - Decongestants after 6 months of age
  - Antitussives (Dextromethorphan) Robitussin-used in children over 2 years

Planning: education of the family
- Hydration
- Complications
  - Otitis media, sepsis, meningitis
- Preventing spread
Tonsillitis and Pharyngitis

1. Tonsils act as a filter to protect from invading organisms
2. Viral or bacterial organisms can cause tonsillitis
3. Enlarges or infected tonsils can lead to breathing difficulty
4. Tonsillectomy & Adenoidectomy may be indicated with recurrent infection and or sleeping difficulties.

Tonsillitis and Pharyngitis

- Usually viral
  - Symptomatic treatment
- Bacterial: group A beta-hemolytic strep
  - Fluids, bland diet, pain & fever medications, antibiotics
- Surgical Intervention
  - Tonsillectomy
    - Restores impaired functioning of nose and throat
  - Adenoidectomy
    - Indication for recurrent ear infection or mouth breathing
Nursing Care for Tonsillectomy

Pre-operatively
- Hemoglobin and Hematocrit
- Coagulation (Fibrinogen, Prothrombin) studies – Normal time is 6 – 17 minutes
- Clotting Time

Post-operatively
- Frequently assess for bleeding (frequent swallowing), throat clearing, restlessness, bright red emesis, pallor, tachycardia
- Prevent bleeding – no hard objects or gargles
- Monitor hydration
- Diet – cool (NO RED) clear liquids to soft foods after gag reflex returns
- Position on side to facilitate drainage
- Assess airways frequently
- VS frequently
Nursing Care for Tonsillectomy

Post-operatively (continued…)

• Discourage cough, throat clearing, nose blowing (protect surgical site)
• Ice collar
• Analgesics – Acetaminophen with or without Codeine
• Mouth care
• Emotional support

Nursing Care for Tonsillectomy

Discharge Teaching

• Sore throat for 10 days
• Danger signs – bleeding, infection
• Soft diet – no hard foods or acidic liquids

Nursing Care for Tonsillectomy

Complications

1. Otitis, difficulty hearing
2. Airway obstruction
3. Sleep Apnea
4. Poor concentration and/or school performance (from obstructive apnea & sleep deprivation)
5. Post op-hemorrhage
6. Dehydration
7. Wound infection
Otitis Media

- Upper Respiratory Tract Infection
- Most common childhood disease
- Peak incidence 6 to 36 months
- An infection or blockage of the ME
- Most common pathogens causing OM:
  - Streptococcus pneumoniae
  - Hemophilus influenzae
- Complication of other infection or allergy
Otitis Media

Risk Factors:
- Exposure to illness in other children in day care
- Household smoking
- Bottle feeding R/T supine position during feeding
- Some congenital conditions

Factors for frequency:
- Frequent URIs
- Eustachian tubes short and lay on a horizontal plane
- Lying down – pooling
- Lymphoid tissue – obstruction

Pathophysiology:
- Eustachian tube obstruction - Ineffective drainage and ventilation of the ME
- Air in the ME is absorbed by blood - resulting in a negative pressure.
- Fluid accumulates in the ME - medium for bacterial growth
- If fluid remains for a prolonged period becomes thick and dark in color.
- Permanent hearing loss can result from COM r/t mobility of the ossicles and TM.
Otitis Media

- Types of Otitis Media
  1. **Acute Otitis Media**
     - Infection of the ME with sudden onset and short duration
  2. **Otitis Media with Effusion**
     - Presence of fluid (effusion) behind the TM with no signs of infection; effusions can be serous, mucoid, or purulent
  3. **Chronic Otitis Media**
     - Chronic disease of the ME with or without ear drainage > 3 months
Otitis Media

**Symptoms**
- Earache *(Pain)* = infants may pull/rub their ears or roll their heads
- Irritability, sleep disturbances, persistent crying in infants
- Anorexia = pain with swallowing
- Fever
- Lymph Nodes
- URI
- Vomiting/Diarrhea
- TM appears bulging, usually red with ε-mobility
- Drainage usually yellowish-greenish, purulent and foul smelling

**Diagnosis**
- History findings
- Direct visualization of the TM

**Interventions**
- **Prevention**
  - *NO* bottle propping
  - *NO* exposure to tobacco smoke
- **Pain**
  - Local heat, analgesics, ear drops
  - Myringotomy tubes
Otitis Media

Interventions

- Early Treatment
  - Antibiotics – compliance
    - 1st Amoxicillin – Pedazole, Bactrim, Cestor, Suprax; antibiotics given for 10-14 days
    - Persistent ear infections > 3 mos a myringotomy is performed (insertion of tubes).
    - During surgery mucoid material is removed from the ME and a tube is inserted into the TM.
    - It equalizes pressure on both sides of the TM and keeps the ear aerated.
    - The tube usually falls out spontaneously in 6 to 12 months.
    - Complications: hearing loss, meningitis, mastoiditis

Nursing Management

1. Instruct parents re: importance of giving antibiotics on time and for the prescribed number of days
2. Tylenol can be given for discomfort
3. Stress importance of follow-up visits to ensure no infection
4. If tubes are inserted:
   a. Check for ear drainage-report any heavy bleeding after 3 days
   b. No blowing of nose for 7-10 days
   c. No swimming in the lake (bacterial contamination) or pool (chlorinated water irritating to TM) without ear plugs; no diving or swimming underwater
   d. Use cotton balls/ear plugs during baths or shampoos

Fig. 32-6 A & B: A: Normal larynx, B: Obstruction and narrowing resulting from obliterative stenosis. Copyright © 2001, Mosby, Inc.
Acute Epiglottitis

- **Age** – 3 to 7 years
- **Agent** – Bacterial (usually Haemophilus Influenza)
  - Usually follows URI
  - *Medical emergency due to the speed with which it develops and progresses. Major concern is for blockage of the airway.*

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**Acute Epiglottitis**

- **Clinical Symptoms** - *Abrupt onset*
  - Sore throat, difficulty swallowing, drooling
  - Barking cough, hoarseness
  - SEVERE respiratory distress; inspiratory stridor, dyspnea, retractions
  - Elevated pulse and respiration, restlessness, irritability, tongue protrusions
  - Bright red, edematous epiglottis
  - High Fever
Acute Epiglottitis

■ Diagnostics
  • Lateral neck film

■ Complications
  • Respiratory distress
  • Airway obstruction

Acute Epiglottitis

■ Treatment / Interventions
  • An examination with a tongue blade or a throat culture is CONTRAINDICATED
  • NEVER use a tongue blade to check the throat!
    - Can occlude throat entirely from spasm
  • For severe cases have intubation equipment or tracheostomy tray and emergency personnel available
  • IV antibiotics for 7 – 10 days

Acute Epiglottitis

■ Treatment / Interventions - continued…
  • Monitor IV site for S&S of infiltration
  • Maintain an upright position of pt. – comfort and to ease breathing
  • Encourage fluids if they can safely swallow
  • PICU care
Lower Respiratory Tract Disorders

From Trachea to Alveoli
Includes the:
- Trachea
- Mainstem Bronchi
- Bronchioles
- Alveolar Ducts
- Alveoli
- Lungs

Lower Respiratory Tract Disorders

- Bronchiolitis
- Croup Syndrome
- Acute Laryngotracheobronchitis
- Acute Spasmodic Laryngitis
- Acute Trachitis

Bronchiolitis

- Pulmonary viral infection characterized by wheezing (classic manifestation)
- Usually caused by respiratory syncytial virus (RSV)
- Typical age: 2-12 months
- 3rd cause of death in infants
- Increased incidence of asthma as child grows older
Bronchiolitis

Diagnosis
– Based on clinical presentation of child and culturing RSV virus (nasal swab)

Virus invades epithelial cells of the nasopharynx and spreads to lower respiratory tract, causing increased mucus production, decreased diameter of bronchi, hyperinflation, and possible atelectasis

Assessment
– Difficulty feeding
  • decreased or lack of appetite,
– Fever
  • 102°F or above
– Wheezing, in some cases
– Rhonchi
– Coughing
– Fine crackles
– Tachypnea
– Nasal flaring
– Retractions
Assessment
- Rhinorrhea
- Symptoms of URI
- Cyanosis
- Diagnostics
  - WBC normal
  - Chest X-Ray reveals hyperaeration
  - Pulse oximetry
  - Immunofluorescence analysis of nasal swab - RSV

Interventions
- Treatment is supportive
- Cool oxygenated mist (for severely ill)
- Oxygen if necessary
- Small, frequent feedings
- NPO if respiratory rate ≥ 60
**Interventions**

- Bronchodilators (Steroids as a last resort)
- Provide high humidity environment
- Wash hands and do it consistently
- If serious illness ~ ribaviran (antiviral drug) via aerosol tx.
- Certain criteria must be met, very expensive

**Interventions**

- IV hydration
- Tube feeding if child is unable to eat
- Prop the head of the infant/child
- Observe and maintain airway patency
- Limit tx. disturbance, to insure rest

**Interventions**

- Comfort measures to ↓ crying and restlessness
- Lubricate oral mucosa and lips to ↓ irritation from mouth breathing and suctioning
- Private room or room with other RSV infected children
- Antipyretics (usually acetaminophen)
Croup – Laryngotracheobronchitis (LTB)
- Age – Common in infants and toddlers
- Agent – Virus
- LTB is the most common Croup syndrome that requires hospitalization. It may not be severe enough to require hospitalization, but does so more commonly than the other Croup Syndrome.

Croup - Laryngotracheobronchitis
- Clinical Symptoms
  - Low-grade fever, irritability, restlessness, pallor or cyanosis, URI symptoms, respiratory distress
  - Rales or rhonchi, inspiratory stridor, retractions
  - Barking cough, hoarseness

Croup - Laryngotracheobronchitis
- Interventions – usually can be treated at home
  - Initial: Hot, steamy shower for relief at home
  - Cool mist, encourage fluids if Ø respiratory distress
  - IV fluids if clients unable to tolerate PO
  - Dexamethasone (Decadron) - Systemic or nebulized corticosteroids and intra-nasal spray
  - Nebulized epinephrine (in more severe cases)
Croup Nursing Alert

- The child with increasing signs of respiratory distress will need hospitalization.
- The child who starts excessive drooling is in trouble.

Croup Nursing Alert

- Observe the child continuously for inability to swallow, absence of voice sounds.
- Severe degree of respiratory distress and acute onset of drooling (an ominous sign supraglottic obstruction).
- Get medical assistance immediately.
- The quieter the child, the greater the cause for concern.

Box 42-12
Changes with croup

There are two important changes in the upper airway: the epiglottis swells, thereby occluding the airway, and the trachea swells against the cricoid cartilage causing obstruction.

London / Ladewig / Ball / Bindler
Maternal-Newborn and Child Nursing: Family-Centered Care
Respiratory Syncytial Virus (RSV)

- **Etiology**
  - Children at risk
    - Premature infants, no passive immunity from last trimester
    - Children with bronchopulmonary dysplasia or chronic lung disease
    - Children with Cerebral Palsy or congenital heart defects
    - Children who are immunosuppressed, or on long term corticosteroids.

- **Pathophysiology**
  - Transmitted through direct contact with respiratory secretions
  - Hand-eye, hand-nose. Lives on surface for up to one hour, lives on skin for up 30 minutes.
  - Infection occurs 4 –6 days after exposure.
  - Once infection has occurred, child is contagious for 1 week.

- **Treatment**
  - Ribovirin
  - Respi-gam
Respiratory Syncytial Virus (RSV)

- Nursing Management
  - Prevent transmission to others
  - Handwashing
    - Clean hard surfaces every eight hours
  - Contact isolation
    - Limit visitors and travel
  - Maintain oxygenation and humidity
  - Provide for adequate hydration
  - Provide for adequate rest

HYPERACTIVE AIRWAY DISEASE - ASTHMA

- Onset: 3-8 years
- May have infant history of allergy
- Allergic hypersensitivity to foreign substances
- Inheritable tendency
- Chronic disorder

Asthma

- Types of Asthma
  - Spasmodic – intermittent attacks
  - Continuous – daily wheezing
  - Exercise-induced
  - Status Asthmaticus
    - no response to medications
    - respiratory function compromised
    - hospitalized
Asthma

**Pathophysiology**
- Edema and inflammation of the mucus membranes
- Tenacious secretions
- Smooth muscle spasms of the bronchi

**Triggers (initiator of an attack)**
- Environmental substances
- Temperature changes
- Psychological stress
- Physical stress
- Respiratory tract infections

**Clinical Symptoms**
- Dry hacking cough and wheezing
- Cough becomes productive
- Prolonged expiration
- Restlessness, fatigue and tachypnea
- Chronic use of accessory muscles causes a barrel chest
Asthma

- Diagnostics
  - Chest x-ray reveals hyperinflation of airways
  - Pulmonary function tests reveal reduced peak expiratory flow rate

Asthma - Interventions

- Assess for cyanosis/respiratory distress
  - Administer oxygen, monitor SaO2
- Maintain IV access
  - Ensure fluid intake & med administration
- High-Fowler’s position
  - Cluster nursing care to conserve child’s energy

Asthma - Interventions

- Medications
  - Bronchodilators (acute and daily use)
    - Parental, inhaled and oral routes
  - Corticosteroids
    - Reduces inflammatory response during or to prevent an attack
      - Oral, inhaled, parenteral routes
  - NSAIDs
    - Used as prophylaxis/treatment
      - Oral, nasal, inhaled routes
Asthma

- Aminophylline Drip
  - 1:1 concentration
  - Must be delivered on an infusion device
  - Nurse must be aware of the signs of toxicity
  - Discontinue drip if toxic

Cystic Fibrosis

- Inherited disorder affecting the exocrine glands
- Inherited as an autosomal recessive trait
- Usually diagnosed in infancy and early childhood
- Life expectancy increased to 30 years
- Disease is terminal

Cystic Fibrosis (cont.)

- Alterations in sweat electrolytes and mucus production lead to multisystem damage
  - Lung problems most serious threat to life
    - Chronic infection and airway obstruction lead to bronchiectasis, pneumothorax, and or cor pulmonale
  - Pancreatic ducts become clogged and prevent pancreatic enzymes from reaching the duodenum
    - Impairs digestion and absorption
  - Small intestines, in the absence of pancreatic enzymes are unable to absorb fats and protein
    - Growth and puberty are retarded
Cystic Fibrosis

A diagnosis of CF is based:
- Family history
- Amniocentesis
- Sweat tests
  • 2 positives
- Absence of pancreatic enzymes
- Increase in electrolyte concentration of sweat
- Chronic pulmonary function.

Cystic Fibrosis — Clinical Manifestations

• Respiratory Tract
  • Non productive dry cough which becomes progressively worse
  • Dyspnea
  • Cyanosis
  • Clubbing of fingers and toes
  • Recurring pulmonary infections r/t purulent and copious sputum

Cystic Fibrosis — Clinical Manifestations

• GI Tract
  • Meconium ileus in the newborn r/t blockage of small intestine with thick tenacious meconium
  • *Earliest manifestation in the newborn*
  • Decrease absorption of nutrients r/t failure of pancreas to produce digestive enzymes
  • Stools are the 4 F’s
    • Frothy, Fatty (steatorrhea), Foul smelling and Float
Cystic Fibrosis — Clinical Manifestations

- Integumentary System (Skin)
  - Abnormally high concentration of Na and Cl in sweat

- Reproductive System
  - Average of 2 years delay in development of secondary sex characteristics
  - Difficulty in becoming pregnant b/c of thick cervical mucus
  - Increased incidence of fetal loss and pre-term birth
  - Sterility in 95% of male patients with CF

Cystic Fibrosis

- Diagnostics
  - Sweat test
    - Analyzes sodium and chloride content in sweat
    - Chloride concentration >60 meq/L is positive (normal is 40mEq/L)
  - 72 hour fecal fat
  - Chest x-ray
  - DNA analysis of amniotic fluid

Figure 42-10
This 6-month-old girl is being evaluated for cystic fibrosis using the sweat test.
Nursing Management and Treatment

Maximizing lung functioning
- Promote removal of secretion from lungs – postural drainage and percussion
- Inhalation therapy with bronchodilators
- Breathing exercises
- Exercise training
- Prevent and treat lung infections
- Manage pulmonary complication

Nursing Management and Treatment

Medications
- Inhaled recombinant human deoxyribonucleae (Pulmozyme)
- Antibiotics (prophalactic)
  - Gentamycin IV
  - Tobramycin IV
- Pancreatic enzymes and vitamins A,D,E,K in water miscible form

Nursing Management and Treatment

Maintain optimal nutrition
- Pancreatic enzymes 1-5 capsules with meals and snacks
- Well balanced diet,
  - high in calories,
  - protein,
  - low in fat
- If malnourished nighttime feedings of
  - Ensure, Vironex, Resources
Nursing Management and Treatment

- Pulmonary hygiene
- Supplemental oxygen as needed
- High calorie, high protein diet
- Dietary supplements

CF – Nursing Diagnosis

- Ineffective airway clearance
- Impaired gas exchange
- Risk for infection
- Altered in nutrition
- Risk for ineffective family coping
- Fear/anxiety
- Activity intolerance

Cystic Fibrosis

- Prognosis
  - Progressive, incurable disease

Footnote: Small children that have Cystic Fibrosis cannot say Cystic Fibrosis, so they say they have "65 Roses".
Foreign Body Aspiration

- Inhalation of an object into the respiratory tract, intentional or otherwise
- Peak age is in children under 3 years
  - Leading cause of death in children under 1 year
- Usually lodge in the right main stem bronchus
Foreign Body Aspiration

- **Assessment**
  - Sudden coughing and gagging
  - Partial obstruction may cause respiratory infection for days or weeks
  - If complete obstruction, child will have stridor, cyanosis, difficulty swallowing and speaking
  - **Avoid:** hot dogs, candy, grapes, nuts
FB - Interventions

- Respiratory assessment to determine severity of problem and degree of obstruction
- Total airway obstruction
  - Back blows and chest thrusts for infants
  - Heimlich in children over 1 year
  - NPO

FB – Nursing Interventions

- Ineffective airway clearance
- Ineffective breathing pattern
- Fear/anxiety
- Knowledge deficit related to child safety