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Project ECHO

ED Management of a Child with Severe Respiratory Distress

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Introduction

Medical Emergencies require a systematic and priority based approach to enhance reliability and improve outcomes.

Emergency management involves 4 sequential steps (for all age groups)

- First observational Assessment or Quick Look
- Primary Physiological Assessment- ABCDE approach
- Secondary Clinical Assessment- detailed history and examination
- Tertiary Complementary Assessment- Labs, Imaging

First Observational Assessment or Quick Look

1. **B**ehaviour- describes muscle tone and mental status.

No spontaneous movement, unable to sit or stand, being less alert, weak cry

2. Breathing- describes child's respiratory status.

Abnormal breathing sounds, chest retractions, irregular breathing

3. **B**ody Colour- describes child's circulatory function.

Pallor, Mottling, Cyanosis

Primary Assessment: ABCDE Approach

A= Airway- Look, Listen, Feel

- Patent- normal speech, can feel air movement at child's nose and mouth, visible chest excursions.
- Not patent or at risk- reduced level of consciousness, stridor, gurgling sounds

Interventions

- Open airway- Head tilt/Chin lift, Jaw Thrust, Suctioning, Oropharyngeal airways, Nasopharyngeal airways

Primary Assessment: ABCDE Approach

B= Breathing- assess oxygenation and ventilation

- Respiratory rate (varies with age and other conditions)
- Work of breathing (intercostal/sternal/subcostal recessions, nasal flaring, head bobbing, wheezing)
- Tidal volume (chest expansion, auscultation for air entry)
- Oxygenation (Pulse Oxymetry)

Primary Assessment: ABCDE Approach

B= Breathing- assess Oxygenation and Ventilation

Interventions

- Supplemental oxygen: Nasal prongs, High flow nasal canulae, Bubble or Electric CPAP, Simple oxygen mask, Oxygen mask with reservior bag
- Ventilatory Support: Bag-mask ventilation (BMV), Tracheal intubation, Tracheostomy

NB: Always monitor Pulse Oxymetry (SPO2) +/- End tidal Carbon dioxide (ETCO2)

Primary Assessment: ABCDE Approach

C= Circulation- assess for shock +/- any arrhythmia

- Pulse Rate, Peripheral perfusion (Capillary refill time/Temp gradient), Pulse Volume, Preload (engorged neck veins, hepatomegaly), Blood pressure, Heart sounds

D= Disability- assess for neurological problems

- AVPU or GCS scale
- Pupils size and reaction to light
- RBS

Croup (Laryngotracheobronchitis)

Acute clinical syndrome of inspiratory stridor, barking cough, hoarseness and respiratory distress.

Airway Assessment

- At risk- marked swelling of larynx and trachea

Airway Intervention

- Conscious child- allow preferred position, avoid agitation
- Unconscious child- open airway, advanced airway management (intubation)
- Steroids- oral dexamethasone preferred (0.15-0.6mg/kg)
- Nebulised Adrenaline (0.5ml/kg of 1:1000, max 5mg)

Croup (Laryngotracheobronchitis)

Breathing Assessment

- Increased Respiratory Rate and Work of breathing
- Reduced Tidal volume
- Low SPO2

Breathing Intervention

- 100% supplemental oxygen
- BMV
- Mechanical ventilation

Croup (Laryngotracheobronchitis)

Disposition and Follow Up

- If clinically improved, observe for 2-4 hours before discharge.
- Admission for continued airway protection and breathing support.

Severe Pneumonia

WHO: Acute infection of lung parenchyma with alveolar inflammation and consolidation.

Airway Assessment

- Might be At Risk if there's reduced level of consciousness

Airway Intervention

- Conscious child- allow preferred position, avoid agitation
- Unconscious child- open airway, Suctioning, Oropharyngeal airways, Nasopharyngeal airways

Severe Pneumonia

Breathing Assessment

- Increased Respiratory Rate
- Increased Work of breathing- intercostal/sternal/subcostal recessions, nasal flaring, head bobbing,
- Reduced Tidal volume- inadequate/absent air entry, abnormal breath sounds
- Low SPO2

Breathing Intervention

- Supplemental oxygen- nasal prongs, face mask, CPAP, Non Rebreather Mask
- BMV
- Mechanical ventilation

Severe Pneumonia

Disposition and Follow Up

- Laboratory
  - CBC with differential, CRP/Procalcitonin (where available)
  - Blood culture if severe or treatment failure
  - Viral PCR panels in tertiary settings
- Chest radiograph: lobar vs interstitial patterns
- Ultrasound or Chest CT: pleural effusion, consolidation, empyema

- Non severe- Home care with Oral Amoxycillin
- Severe- Admission plus IV antibiotics

Severe Pneumonia

Disposition and Follow Up

- Review in 48 - 72hrs
- If no improvement after 48 hours, switch to second-line as per local resistance patterns.
- Re-evaluate for complications (empyema, bronchiectasis) if there's no improvement or child is worsening.

Acute Asthma Exacerbation

Heterogenous disease characterized by chronic airway inflammation, airway hyper-responsiveness and airflow limitation.

Exacerbations can be mild, moderate, severe or life threatening.

Airway Assessment

- Might be At Risk if there's reduced level of consciousness

Airway Intervention

- Conscious child- allow preferred position, avoid agitation
- Unconscious child- open airway, +/- suctioning, Oropharyngeal airways, Nasopharyngeal airways

Acute Asthma Exacerbation

Breathing Assessment

- Increased Respiratory Rate
- Increased Work of breathing- use of accessory muscles, nasal flaring, head bobbing, poor respiratory effort if life-threatening
- Reduced Tidal volume- reduced air entry, absent (silent chest) if life-threatening, wheeze
- Low SPO2

Breathing Intervention

- Nebulize with Short acting B2 agonists (SABA); oxygen or air-driven.

Less than 5yrs: 2.5mg of Salbutamol in 5mls of NS
Older Children: 5mg of Salbutamol in 5-10ml of NS
Metered dose inhaler: 4-10 puffs in 15-20min, X 3 doses

Acute Asthma Exacerbation

Breathing Intervention

- Supplemental oxygen- nasal prongs, face mask, Non Rebreather Mask
- Steroids- Oral Prednisolone (1-2mg/kg/d, max 40mg/d) or IV Hydrocortisone 5mg/kg/6hrs if unable to take orally.
- Add Ipratropium Bromide if there's inadequate response (every 20min for 1 hr then every 4-6hrs then wean off)
- ICU therapies: IV Salbutamol 15mcg/kg over 15min then 1-2mcg/kg/min
- ICU therapies: IV Magnesium sulphate 25-50mg/kg/dose, Once, Max 2g

Acute Asthma Exacerbation

Disposition and Follow Up

- Laboratory
  - CBC with differential- if there's evidence of Bacterial infection
- Radiography: not often needed in management of exacerbations

- Asthma education for patient and caregiver (triggers, medication, inhaler technique)
- Review in 7-14 days

Foreign Body Airway Obstruction

Needs a high index of suspicion. Presentation depends on anatomical level and degree of obstruction

Airway Assessment

- Effective or ineffective cough, stridor, gagging

Airway Intervention

- Effective cough- encourage cough, check for deterioration
- Ineffective cough, conscious victim
  - Infant: 5 back blows alternate with 5 chest thrusts
  - Child: 5 back blows alternate with 5 abdominal thrusts

Foreign Body Airway Obstruction

Airway Intervention

- Ineffective cough, unconscious victim
  - Open airway and try 5 rescue breaths
  - Start chest compressions (30 compressions to 2 breaths)
  - Visible FB require removal. NB- Do Not attempt blind finger sweeps
  - Direct Laryngoscopy- Remove foreign body with Magil forceps or suction.
  - Endotracheal Intubation- advance FB into one main bronchus and allow ventilation of other lung
  - Bronchoscopy

Foreign Body Airway Obstruction

Breathing Assessment

If FB is in lower respiratory tract

- Increased Respiratory Rate
- Increased Work of breathing- intercostal/sternal/subcostal recessions, nasal flaring
- Reduced Tidal volume- decreased breath sounds, unilateral wheezing

Breathing Intervention

- Supplemental oxygen: nasal prongs, face mask, Non Rebreather Mask
- If unconscious: BMV +/- Mechanical ventilation and Bronchoscopy

Foreign Body Airway Obstruction

Disposition and Follow Up

Chest Xrays: unilateral hyperinfalation, atelectasis, mediastinal shift. It might also appear normal in some cases

NB-

Thank you

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