Respiratory Care Quality Assurance

Nebulizer Therapy
What is a nebulizer?

• A nebulizer changes liquid medicine into fine droplets (in aerosol or mist form) that are inhaled through a mouthpiece or mask.

• Can be used to deliver bronchodilator (airway-opening) medicines such as albuterol/salbutamol 5 mg (Ventolin, Proventil, Airet), terbutaline 10 mg (Bricanyl) or ipratropium bromide 0.5 mg (Atrovent)

• A nebulizer may be used instead of a metered dose inhaler (MDI). It is powered by a compressed air machine and plugs into a electrical outlet.
• Babies and young children have trouble coordinating inspiratory effort by using inhalers and dry powder devices require a high minimum inspiratory flow rate

• Thus for children under age 3 preferably use nebulizers or space-inhalers

• Indicators for nebulizer therapy:
  – tightness in chest in allergy - bronchitis
  – increased or thick secretions - bronchiolitis
  – pneumonia - asthma
  – atelectasis - bronchus spasm
  – COPD - emphysema
• Benefits of the nebulizer therapy:

– direct effect on the desired place on bronchial branches
– large absorbing space in the lungs
– absorbing is quick
– the cell permeability in the lungs is better for many drugs than in the intestines or other mucous areas
– the dose needed for desired effect is often smaller than oral dose
– can be administered drugs which are not absorbed taken orally or they disperse during the first round metabolism
• Disadvantages

- in spite of the careful teaching and instructions the use of aerosol-inhalers can be difficult
  – dosing needs complicated inhalation devices
  – medicine to reach down to the lungs is not easy
  – the mucus of the lungs can prevent the absorption
  – the mucocilliarc clearance decreases medicines to stay upon the lungs so that medicines could be absorbed
  – inhaled medicine can stratify inside mouth and throat causing side effects
Asthma medicines

1. Anti-inflammatory agents

- A) Corticosteroids: basic asthma care beclomethasone, budenosidi, fluticasone,
  - B) System corticosteroids orally and intravenously

2. Bronchodilators

- A) Short-acting beta2-agonists – quick-relief “rescue” medicines: salbutamol, terbutaline
  - B) Long-acting beta2-agonists: formoterol, salmetorol if needed used together with corticosteroids
  - C) Combination inhalers: ipratropium-salbutamol

3. Cromolyn medicines: inhaled natriumcromolygate and nedocromolyn

4. Anticolinergics: inhaled ipratropium, oksitropium

5. Leukotrienes: orally taken leukotrienes montelucast, zafirlucast
6. Theophylline:

- Theophylline / aminophylline are oldest used preparations for asthma care but now considered third or second-line agent.
- Narrow margin between therapeutic and toxic effects.
- Relaxes bronchial smooth muscles.
- Usually now used to relieve nocturnal and morning wheezing e.g. theophylline 200–300 mg evening dose.
- Side-effects: gastrointestinal irritation, restlessness, anxiety, tremor, palpitations, headache, dizziness, convulsions, arrhythmias, hypotension, cardiac arrest.

7. Magnesium sulfate iv.
• Management of asthma
• if temporary intermittent symptoms short-acting beta2-agonist inhaler is enough such as salbutamol
• basic medicine for mild, moderate and severe persistent asthma is inhaled anti-inflammatory corticosteroid such as beclomethasone or budenosidi 400–800 ug x 2 and fluticasone 250–500 ug x 2, (for school age children e.g. fluticasone 100 ug x 2, beclomethasone or budenosidi 200 ug x 2)
• if needed then long-acting beta2-agonist such as salmeterol, formoterol
• anticolinergics: inhaled ipratropium, oksitropine are short-acting bronchodrialtors, adjunct to inhaled beta2-agonists in patients who have severe asthma
Oxygen