PHARMACOLOGIC OVERVIEW IN COPD

FLAME LECTURE: 17

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LEARNING OBJECTIVES

- To briefly overview the pharmacologic modalities used in COPD
- Prerequisites:
  - NONE
- See also – for closely related topics
  - FLAMEs on COPD / Medications for treatment of COPD

OVERVIEW

- Choice of medication is dependent on severity of symptoms
- Goal of treatment is to:
  - Improve quality of life & exercise tolerance
  - Reduce dyspnea, exacerbations, and hospitalizations
- Main treatments include:
  - Short- and long-acting beta agonists
  - Short- and long- acting inhaled anticholinergics
  - Inhaled corticosteroids
- Supplemental oxygen should be used for patients with daytime hypoxia

OVERVIEW OF MEDS

- Beta 2 agonists: selectively stimulates β_2 adrenergic receptors → relaxation of airway smooth muscle
- Anticholinergics (muscarinics): antagonize acetylcholine receptors in the bronchial airways → bronchodilation
- Inhaled corticosteroids: Exact mechanism of action unknown, however, exhibits anti-inflammatory effects on neutrophils, eosinophils, macrophages, mast cells, lymphocytes, and mediators (histamine, leukotrienes, cytokines, eicosanoids)

INDICATIONS

- Beta 2 agonists – primarily used to improve breathlessness
  - Short-acting > long-acting
  - Long-acting used more in combination meds to reduce exacerbations
- Short-acting or long-acting anticholinergics – used to improve pulmonary function, symptom control, reduce exacerbations, reduce mortality
  - Short-acting – used more for rescue
  - Long-acting – has slightly greater benefit in improving pulmonary function
- Inhaled corticosteroids – reduce frequency of exacerbations but not symptom control
- Combination meds
  - Inhaled anticholinergic and beta 2 agonists – treat bronchospasm in patients who require more than one bronchodilator
  - Long-acting beta agonist with corticosteroid – reduces exacerbations, improves lung function, and quality of life

INDICATIONS (CONT'D)

Severity of COPD		Treatment
Mild	FEV_1/FVC <0.7 $FEV_1 \geq 80\%$	Short-acting bronchodilator PRN, reduce risk factors
Moderate	FEV_1/FVC <0.7 FEV_1 50-79%	Same as mild + one or more long-acting bronchodilators (anticholinergic OR β_2 agonist)
Severe	FEV_1/FVC <0.7 FEV_1 30-49%	Same as moderate + inhaled steroid
Very severe	FEV_1/FVC <0.7 FEV_1 <30% FEV_1 <50% + chronic resp. failure (SpO_2<88%)	Same as severe + long term O_2 therapy

ADVERSE EFFECTS

- β_2 Agonists
  - Angina, angioedema, arrhythmias, tremor, hypertension, hypokalemia, urticaria, palpitations
- Anticholinergics
  - Angioedema, anaphylaxis, glaucoma, hypersensitivity, abdominal pain, urticaria
- Inhaled Corticosteroids
  - Candidiasis, adrenal suppression, angioedema, glaucoma, osteoporosis, hyperglycemia, cataracts

CONTRAINDICATIONS

- β_2 Agonists
  - CI: hypersensitivity to drug class, severe sensitivity to milk protein, caution if above adverse effects notable
- Anticholinergics
  - CI: hypersensitivity to atropine, caution with adverse effects as above
- Inhaled Corticosteroids
  - CI : hypersensitivity to milk protein, avoid withdrawal, acute bronchospasm, avoid abrupt withdrawal

REFERENCES

- Management of stable chronic obstructive pulmonary disease https://www.uptodate.com/contents/management-of-stable-chronic-obstructive-pulmonary-disease)
- Medications for COPD: a review of effectiveness (https://www.aafp.org/afp/2007/1015/p1141.html)