MEDICATION THERAPIES FOR ASTHMA AND COPD: SIMILARITIES & DIFFERENCES FOR THE PRIMARY CARE NURSE PRACTITIONER

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Disclosures
No financial relationship with any pharmaceutical manufacturer or medical device company

Objectives
• Explain the current guidelines for medication therapy for asthma and chronic obstructive pulmonary disease.
• Examine and compare the different medications for asthma and chronic obstructive pulmonary disease that are currently available in the United States.
• Categorize the different inhaled medications into their respective classes and how to formulate a plan for a patient with obstructive lung disease.

Goals of Therapy for Asthma
• Strive to achieve normal lung function
• Absence of symptoms
• Normal quality of life
• CONTROL

Goals of therapy for COPD
• Symptom relief
• Prevent disease progression
• Prevent and treat complications
• Prevent and treat exacerbations
• Improve or maintain health status
Quick Relief or Rescue Inhalers

- For both asthma and COPD, everyone should have a quick relief inhaler.
- Usually this is albuterol, but it may be ipratropium or a combination of both.
- For both diseases this should only be a PRN medication!

Rules of Two® for Asthma

- Have asthma symptoms or take a short acting beta_2_ agonist (quick-relief or rescue inhaler) such as albuterol more than two times a week
- Awaken at night with asthma symptoms more than two times a month
- Refill your rescue inhaler more than two times a year
- Measure your peak flow at least three times (20%) with asthma symptoms

* Baylor Health Care System

Monitor Use of Short Acting Beta_2_ Agonists

- Use Rules of Two
- Only prn use
- Use of correct inhaler
- Expiration date
- Writing a prescription

Metered Dose Inhalers

3 basic techniques:
1) Use with a spacer
2) Finger breadth method – open mouth
3) Directly in mouth – closed mouth method

MDI with Spacer (Holding Chamber)

**Advantages:**
- Coordination
- Increased deposition
- Improved particle size
- Reduction of side effects
Spacers for Financially Challenged

Albuterol
- Metered dose inhalers:
  - Albuterol – (ProAir, Proventil and Ventolin HFA) short acting beta-2 agonist – 200 doses
  - Levalbuterol – (Xopenex HFA) - short acting beta-2 agonist – 200 doses

RespiClick®
- ProAir RespiClick
- Breath activated inhaler
- Powdered albuterol
- 200 doses

Ipratropium
- Ipratropium (Atrovent HFA MDI) –
  - Anticholinergic with slower onset of action than albuterol
  - Some COPD patients respond better to this medication
  - Excellent choice for acute cough and asthmatics with acute cough
  - PRN medication
  - 200 doses

Albuterol & Ipratropium combined
- (Combivent Respimat®)
  - No longer in MDI form
  - Individual choice/benefit from the combination form
  - especially some COPD patients
  - 120 doses – use within 90 days
  - One inhalation up to QID

Exercise-induced Bronchospasm
- For patients who have normal pulmonary function but experience exercise-induced symptoms
  - 15-30 minutes before exercise: use albuterol
  - If exercise-induced symptoms persist: consider adding leukotriene antagonist
  - If pulmonary function tests are abnormal at baseline
    - It’s not just exercise-induced bronchospasm
    - Treat according to stepwise regimen
Controller Medications for Asthma

- Once the asthmatic has been diagnosed with persistent asthma the gold standard of care is inhaled corticosteroid therapy.
- Prudent to begin with low dose and progress to high dose inhaled corticosteroid therapy as necessary, but this depends on the clinical situation.
- If the patient has a combination of asthma and COPD, the medication therapy is dictated by the asthma guidelines.
- Goal for asthma therapy is always the lowest dose possible to maintain good control – use the Rules of Two.

Efficacy of Inhaled Corticosteroids in Asthma: All Populations

Over a decade of studies have demonstrated:
- Decrease asthma symptoms
- Improve lung function
- Reduce asthma morbidity/mortality
- Less need for oral corticosteroids
- Lower risk of hospitalization
- Protection against asthma death
- Reduce bronchial hyperresponsiveness

Flunisolide

- Flunisolide – (Aerospan HFA MDI)
  - 80 mcg
- Inhaled corticosteroid
- Built in spacer

Metered Dose Inhalers - Corticosteroids

- Mometasone – (Asmanex HFA) corticosteroid – 100 & 200 mcg
- Ciclesonide – (Alvesco HFA) corticosteroid – 80 & 160 mcg
- Fluticasone – (Flovent HFA) corticosteroid – 44, 110, 220 mcg
- Beclomethasone – (QVAR HFA) corticosteroid – 40 & 80 mcg

Corticosteroids in Other Devices

- Budesonide – (Pulmicort Flexhaler)
  - ONLY category B for pregnancy
  - 90 mcg (60 doses) or 180 mcg (120 doses)
  - Counter on side – count down by tens
- Mometasone furoate – (Asmanex Twisthaler)
  - 30, 60 or 120 doses - 110 or 220 mcg
Corticosteroids in Other Devices

• Fluticasone propionate – (Flovent Diskus)
  - 50, 100, or 250 mcg dosage
• Fluticasone furoate – (Arnuity Ellipta)
  - 100 & 200 mcg

Inhaled Corticosteroids & Oral Thrush

• Common occurrence – especially in elderly & patients with severe disease
• Exacerbated with additional use of antibiotics and/or oral corticosteroids
• Have patients use alcohol containing mouthwash & rinse after each use
• Pediatric patients – usually rinse with water and spit

Inhaled corticosteroids & COPD

• Treatment with inhaled corticosteroids if frequent exacerbations occur – severe to very severe obstruction
• Opposite of asthma guidelines!
• Inhaled corticosteroids have no direct effect on mortality or rate of decline of FEV₁ and increase the risk of pneumonia
• FLAME Study – Indacaterol & glycopyrronium versus fluticasone/salmeterol - decreased exacerbations by 11 %, longer to first exacerbation & increased health status

Long Acting Bronchodilators

• Two classes:
  • Beta-2 agonists (LABA)
  • Anticholinergics (muscarinic antagonists)
• For asthma – first add Beta-2 agonist (always with inhaled ICS, never LABA alone)
• For COPD – typically begin with an anticholinergic

Long Acting Beta₂ Agonists for Asthma

• Black box warning
• Do NOT use for monotherapy
• Do NOT use unless ICS alone does not control asthma
• Use as LABA/ICS combination to avoid inadvertently using LABA alone

Therapy: Asthma vs. COPD

<table>
<thead>
<tr>
<th></th>
<th>COPD</th>
<th>Asthma</th>
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<tbody>
<tr>
<td>Inhaled Corticosteroid</td>
<td>Group C &amp; D</td>
<td>Albuterol + 2x-week</td>
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<tr>
<td>Used Alone</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Long Acting Beta₂ Agonist</td>
<td>Group Bc D</td>
<td>Step 1-6</td>
</tr>
<tr>
<td>Used Alone</td>
<td>Yes</td>
<td>No</td>
</tr>
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</table>
Long Acting Beta-2 Agonists

- Salmeterol – (Serevent Diskus)
- One puff BID
- Indacaterol – (Arcapta Neohaler)
- Inhale one capsule once a day
- Olodaterol – (Striverdi Respimat)
- Two puffs once a day

Combination MDIs

- Fluticasone (inhaled corticosteroid) & salmeterol (long acting beta-2 agonist) – (Advair)
- Mometasone (inhaled corticosteroid) & formoterol (long acting beta-2 agonist) – (Dulera) - 100/5 mg or 200/5 mg
- Budesonide (inhaled corticosteroid) & formoterol (long acting beta-2 agonist) – (Symbicort) - 80/4.5 mg or 160/4.5 mg

Fluticasone & Salmeterol Combination

<table>
<thead>
<tr>
<th>Diskus</th>
<th>IFA MDI</th>
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<tbody>
<tr>
<td>1 inhalation BID</td>
<td>2 inhalations BID</td>
</tr>
<tr>
<td>100/50</td>
<td>45/21</td>
</tr>
<tr>
<td>250/50</td>
<td>115/21</td>
</tr>
<tr>
<td>500/50</td>
<td>230/21</td>
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Long Acting Anticholinergics

- Tiotropium – (Spiriva)
  - Two forms of delivery: HandiHaler & Respimat
  - HandiHaler – inhale one capsule daily
  - Respimat – inhale two puffs once a day
  - Decreases exacerbations & hospitalizations
- Aclidinium bromide – (Tudorza Pressair)
  - One puff twice a day
- Glycopyrrolate – (Seebri Neohaler)

Long Acting Anticholinergics & Asthma

- Several new studies showing benefit but...
- Does not reduce hospitalizations
- Does not improve quality of life
- Use step like process: ICS, LABA, etc. Save anticholinergics for later
- First approved for asthma: Spiriva Respimat


Combination Inhalers

- Umeclidinium 62.5 mg and vilanterol 25 mcg – anticholinergic & ultra long acting beta-2 agonist – (Anoro Ellipta) - Indicated for COPD only
- Fluticasone furoate 100 or 200 mcg & vilanterol 25 mcg - corticosteroid & ultra long acting beta-2 agonist – (Broo Ellipta) - COPD & Asthma (≥ age 18) – 100 mcg dose for COPD
- Tiotropium & olodaterol – anticholinergic & long acting beta-2 agonist – (Stiolto Respimat) - COPD
Combination Inhalers

- Indacaterol (long acting beta-2 agonist) & glycopyrrholate (anticholinergic) – (Utfbron Neohaler)
- Inhale one capsule twice a day
- COPD indication only
- Formoterol (long acting beta-2 agonist) & glycopyrrholate (anticholinergic) – (Bevespi Aerosphere MDI)
- Two puffs BID

Compliance with Inhalers

- Proper technique!
- Confusion about need for multiple inhalers
- Hospital versus out-patient therapy
- Combination therapy when possible
- Daily maintenance inhaler versus rescue inhaler
- High cost of all inhalers
- EDUCATE the patient

Nebulizer Therapy

- Proven that inhaled short acting albuterol in a MDI is just as effective!
- Medicare Part B for DME and D for medications – but who is really paying?
- Need to be cleaned frequently – rarely performed
- Possible cause of superinfections
- Are medications in date?
- Save for end stage COPD & asthma

Nebulized Medications

- Albuterol 0.083 % - 2.5 mg/3mL
- Ipratropium 500 mcg
- Combination of albuterol & ipratropium (DuoNeb) – 3 mL
- Formoterol – (Perforomist) - 20 mcg BID
- Arformoterol – (Brovana) - 15 mcg BID
- Budesonide – (Pulmicort Respules) - 0.25, 0.5, & 1 mg/2mL – usually a BID dosage

Leukotriene Receptor Antagonists

- Time of dosing - irrelevant
- Triad asthma
- Obese asthmatics
- Asthmatics who smoke
- Asthmatics with elevated IgE
- Effective in – 15%; if no response is seen, discontinue LTRA
- Not indicated for COPD

Leukotriene Receptor Antagonists

- Zafirlukast – (Accolate) - 20 mg BID - 1 hour before or 2 hours after meals
- Montelukast – (Singular) - 10 mg daily
- Zileuton – (Zyflo) –
  - 600 mg QID or ER – 1200 mg BID
  - Monitor hepatic transaminases (ALT) prior to initiation & during therapy
Omalizumab Therapy

- *(Xolair)* - monoclonal antibody therapy for asthma
- Subcutaneous dose based on body weight
- Pretreatment total IgE serum levels (30 to 700 IU/mL)
- Age 12 or above
- Minimum of 12 weeks of therapy & usually at least 3-6 months
- Watch for severe hypersensitivity reaction or anaphylaxis
- Fever, arthralgias or rash – report and discontinue therapy

Mepolizumab Therapy

- *(Nucala)* - Monoclonal antibody to IL-5 (a pro-eosinophil cytokine)
- Reduce exacerbations in severe asthma who have blood eosinophil counts of 150/microL or greater
- Age 12 or older & have eosinophilic phenotype
- Subcutaneous injection & may be given IV
- Herpes zoster infections have occurred in small number of patients; insure immunized against shingles before using
- Decrease exacerbations and improve quality of life

Reslizumab Therapy

- *(Cinqair)*
- Humanized anti-interleukin-5 monoclonal antibody for eosinophilic asthma
- Ages 12-75 years
- Improve lung function, control asthma symptoms & improved quality of life
- Eosinophils ≥ 400 cells/µL

Oral Agents for COPD

- Roflumilast – *(Daliresp)* - phosphodiesterase-4 enzyme inhibitor
- 500 mcg once a day
- Watch for weight loss & nausea
- Theophylline – may use once or twice a day
- Cheap, add on therapy
- Use low dosage, check serum level in 7 – 14 days, goal – 10 µg/ml
- Multiple possible drug interactions, especially quinolones

Treatment of Exacerbations of COPD

- Prednisone 40 mg daily for five days versus 14 days – five day course not inferior with regard to re-exacerbations during next six months.
- No differences in recovery of lung function or disease related symptoms

Therapy for Asthma & COPD

- Influenza vaccination – high dose if age 65 or older
- Consider Tdap vaccination – one booster for pertussis – otherwise Td
- Pneumococcal 23 vaccination
- Number needed to treat:
  - 20,000 to avoid one infection
  - 50,000 to avoid death

Pneumococcal vaccines

- **Prevnar 13** works better than Pneumovax 23 to induce an immune response in older adults
- Pneumovax 23 covers 11 serotypes that aren’t in Prevnar 13
- Prevnar 13 has one serotype that isn’t in Pneumovax 23
- Medicare will pay for both vaccines

**Medication Abbreviations**

- **SABA** = Short-acting beta-2 agonist
- **LABA** = Long-acting beta-2 agonist
- **SAMA** = Short-acting muscarinic antagonist (anticholinergic)
- **LAMA** = Long-acting muscarinic antagonist (anticholinergic)
- **ICS** = Inhaled corticosteroid
- **PDE-4 inh** = Phosphodiesterase-4 inhibitor

**GOLD GROUPINGS**

- **GROUP A**: Low risk, less symptoms
  - GOLD 1-Mild or 2-Moderate airflow limitation
  - 0-1 exacerbations/year
  - mMRC grade 0-1
  - CAT score < 10
- **GROUP B**: Low risk, more symptoms
  - GOLD 1-Mild or 2-Moderate airflow limitation
  - 0-1 exacerbations/year
  - mMRC grade ≥ 2
  - CAT score ≥ 10
GOLD GROUPINGS

- **GROUP C**: High risk, less symptoms
  - GOLD 3: Severe or 4: Very Severe airflow limitation
  - ≥ 2 exacerbations/year
  - mMRC grade 0-1
  - CAT score < 10

- **GROUP D**: High risk, more symptoms
  - GOLD 3: Severe or 4: Very Severe airflow limitation
  - ≥ 2 exacerbations/year
  - mMRC grade ≥ 2
  - CAT score ≥ 10

Pharmacologic Management of COPD

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>First Choice</th>
<th>Second Choice</th>
<th>Alternative Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SABA prn or SAMA prn</td>
<td>LAMA or LABA, or OR &amp; SAMA</td>
<td>Theophylline</td>
</tr>
<tr>
<td>B</td>
<td>LAMA or LABA</td>
<td>LAMA &amp; LABA</td>
<td>SABA or SAMA, Theophylline</td>
</tr>
<tr>
<td>C</td>
<td>ICS/LABA or LABA</td>
<td>LAMA &amp; LABA</td>
<td>PDE 3-4 inh or SABA &amp;/or SAMA, Theophylline</td>
</tr>
<tr>
<td>D</td>
<td>ICS/LABA or LABA</td>
<td>ICS/LAMA or ICS/LABA &amp; LABA &amp; PDE 3-4 inh</td>
<td>LAMA &amp; LABA or LABA &amp; PDE 3-4 inh</td>
</tr>
</tbody>
</table>

References

- http://use-inhalers.com/

I have had a horribly busy day converting oxygen to carbon dioxide.

Thank You!

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