Adherence to Guideline Recommended Treatment of COPD in Discharged Patients Following an Acute Exacerbation

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Background and Objective
Chronic obstructive pulmonary disease (COPD) is the third leading cause of death in the United States, affecting more than 10 million Americans. Worldwide, COPD is a disease of increasing public health importance as estimates suggest that COPD will rise from the fourth to the third most common cause of death by 2020. Increased exposure to risk factors and an aging population will attribute to even more patients with COPD. Adherence to guideline-recommended treatment regimens may decrease healthcare costs and improve patient outcomes.

According to the GOLD guidelines, COPD pharmacotherapy recommendations are derived from the “ABCD” assessment tool, which takes into consideration a patient’s symptoms and their history of exacerbations (including prior hospitalizations). Symptom assessment is completed using either the Modified British Medical Research Council (mMRC) Questionnaire or the COPD patient’s symptoms and their history of exacerbations (including prior exacerbation history) for determining treatment step.

The purpose of this study was to determine how hospitalizations for COPD exacerbation were managed in discharged patients following an acute exacerbation. Demographic data was collected from the electronic medical record (EMR) on patients admitted to Parkview Hospital with a primary diagnosis of COPD exacerbation. The 2017 GOLD Guidelines also place dual bronchodilators earlier than inhaled corticosteroids (ICS) in the stepwise progression of therapy based on symptoms (COPD assessment test score) and rates of exacerbations. These changes were primarily made based on a few breakthrough studies including the FLAME and LANTERN trials which showed decreased exacerbations, improved quality of life measures, and decreased rates of pneumonia in patients on dual bronchodilators compared to LABA/ICS combinations.

The primary outcome was the appropriateness of maintenance inhaler therapy at hospital discharge and in the 6-month follow-up period. The secondary outcome was hospital readmission at hospital discharge and at the first follow-up appointment considering guideline recommendations. The primary outcome was hospital readmission rates within 6 months of the initial COPD exacerbation. The following table was used to define appropriateness:

<table>
<thead>
<tr>
<th>Medication at Hospital Discharge</th>
<th>Appropriate Medication at Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>LAMA, LAMA+LABA</td>
</tr>
<tr>
<td>LAMA</td>
<td>LAMA+LABA</td>
</tr>
<tr>
<td>LAMA+LABA</td>
<td>LAMA+LABA+ICS</td>
</tr>
<tr>
<td>LABA+ICS</td>
<td>LAMA+LABA+ICS</td>
</tr>
<tr>
<td>LABA+LABA+ICS (optimal dosing)</td>
<td></td>
</tr>
</tbody>
</table>

A COPD exacerbation in the 6-month follow-up period included any hospitalization in which the primary diagnosis was COPD exacerbation or any outpatient receipt of oral corticosteroid therapy for COPD exacerbation. The time to COPD exacerbation was also collected. Descriptive statistics were used to describe the appropriateness of therapy at hospital discharge and in the 6-month follow-up period.

Design and Methods
The Parkview Health institutional review board approved this retrospective chart review study. Demographic data was collected from the electronic medical record (EMR) on patients admitted to Parkview Hospital with a primary diagnosis of COPD exacerbation from March 2017 to March 2018. Adult patients, 18 years or older, who were discharged from the hospital with a primary diagnosis of COPD exacerbation were included in this study. Patients were excluded if they had asthma in addition to COPD or were receiving chronic oral steroid treatment at baseline. Baseline characteristics collected included age, gender, BMI, smoking history (pack year), current smoking status, COPD medication names, COPD exacerbation history (number of exacerbation requiring hospitalization in the 12 months prior to index admission), and pneumonia diagnosis within 6 months of admission.

The primary outcome was the appropriateness of maintenance inhaler therapy at hospital discharge and in the 6-month follow-up period. The secondary outcome was hospital readmission at hospital discharge and at the first follow-up appointment considering guideline recommendations. The primary outcome was hospital readmission rates within 6 months of the initial COPD exacerbation. The following table was used to define appropriateness:

<table>
<thead>
<tr>
<th>Baseline Characteristics</th>
<th>Total Population (n=75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, median (IQR)</td>
<td>68.1 (56.5 – 77.8)</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>38 (48.0%)</td>
</tr>
<tr>
<td>Currently Smoke, n (%)</td>
<td>23 (30.7%)</td>
</tr>
<tr>
<td>Peak Flow Rate, median (L/min)</td>
<td>38 (27.8 – 50.0)</td>
</tr>
<tr>
<td>Exhaled Ventilation, L (%)</td>
<td>7.9 (3.3%)</td>
</tr>
<tr>
<td>FEV1, mean (SD)</td>
<td>46% (34.6%)</td>
</tr>
</tbody>
</table>

The primary outcome was the appropriateness of maintenance inhaler therapy at hospital discharge and at the first follow-up appointment considering guideline recommendations. The secondary outcome was hospital readmission rates within 6 months of the initial COPD exacerbation. The following table was used to define appropriateness:

<table>
<thead>
<tr>
<th>Medication at Hospital Admission</th>
<th>Appropriate Medication at Discharge/Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>LAMA, LAMA+LABA</td>
</tr>
<tr>
<td>LAMA</td>
<td>LAMA+LABA</td>
</tr>
<tr>
<td>LAMA+LABA</td>
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</table>

DISCUSSION
• Hospitalization for COPD exacerbation may provide opportunities for pharmacists to help ensure patients receive appropriate therapy.
• Quality transitions of care is needed in this population as they are at a high risk of readmission.
• Further studies should investigate whether patients with different disease severity are at different risks for exacerbation based on how therapy is adjusted following COPD exacerbation.
• A larger cohort of patients would be needed to determine if therapy adjustment around the time of COPD exacerbation is associated with a higher number of subsequent exacerbations.

CONCLUSION
In patients admitted for a COPD exacerbation, maintenance inhaler therapy is infrequently modified upon discharge and is modified in less than half of patients within a 3-month follow-up period. Patients not on appropriate therapy are more likely to experience another COPD exacerbation within 6 months.

REFERENCES
4. Manchester University College of Pharmacy, Natural Health Sciences. Fort Wayne, IN.
Group A
- Continue, stop, or try alternative class of bronchodilator
- Evaluate Effect
- A Bronchodilator

Group B
- LAMA + LABA
- Persistent Symptoms
- LAMA + LABA

Group C
- LAMA + LABA
- LABA + ICS
- Further Exacerbation(s)
- LAMA

Group D
- LAMA + LABA + ICS
- Further Exacerbation(s)
- LAMA + LABA
- LAMA + ICS
- Consider Roflumilast if FEV1<50% pred. and patient has chronic bronchitis
- Consider Macrolide in former smokers
- Persistent Symptoms/Further Exacerbation(s)

Symptoms
- mMRC 0-1
- CAT < 10
- mMRC ≥ 2
- CAT ≥ 10

Exacerbation History
- ≥2 or ≥ 1 leading to hospital admission
- 0 or 1 (not leading to hospital admission)