COPD: UNDERSTANDING THE GUIDELINES
INTRODUCTION

- Worldwide medical problem.

- In 2020, projected fifth in terms of burden of disease and third in terms of mortality.

- In 1998: GLOBAL INITIATIVE FOR CHRONIC OBSTRUCTIVE LUNG DISEASE (GOLD).

- In 2001: GOLD program released as a consensus report.

- Revised in 2006 and now....
MAIN REVIEW:
1. TREATMENT OBJECTIVES:
   - Immediate relieve and reduction of impact of symptoms (short term impact of COPD).
   - Reduction of adverse events in the future (long term impact of COPD).

2. CHANGE FROM “STAGE” TO “GRADE” OF COPD, based not only in FEV1, but, other characteristics of each patient.

3. INDIVIDUALIZED SYMPTOM ASSESSMENT.
SUMMARY OF NEW RECOMMENDATIONS

- SECTION ONE: Definition and overview of COPD.
- SECTION TWO: Diagnosis and Assessment of COPD.
- SECTION THREE: Therapeutic options in COPD.
- SECTION FOUR: Management of Stable COPD.
- SECTION FIVE: Management of Exacerbations.
- SECTION SIX: Comorbidities and COPD.
COPD: UNDERSTANDING THE GUIDELINES

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COPD: UNDERSTANDING THE GUIDELINES
DEFINITION

- Common and preventable disease.
- Persistent airflow limitation, usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles and gases.
- Mixture of small airway disease (bronchiolitis) plus parenchymal destruction (emphysema).
Prevalence, morbidity and mortality vary across countries and among different groups and countries.

Mainly related with smoking, but, outdoor, occupational, and indoor air pollution.

Higher prevalence smokers, older than 40 and men.

COPD among never smokers: 3 – 11%.
COPD: UNDERSTANDING THE GUIDELINES
OTHER FACTORS RELATED

- Other types of tobacco.
- Passive exposure to cigarette smoking.
- Smoking during pregnancy.
- Occupational exposures.
- Genetic (Alpha-1-AT).
- Lung growth and development.
- Socioeconomic status.

Chest 2005; 128: 1239
AJRCCM 2010; 182: 693
Chest 2011; 139: 752
The prevalence and burden of COPD are projected to increase in the coming decades due to continued exposure to COPD risk factors and the aging of the world’s population.

COPD will be the seventh leading DISABILITY ADJUSTED LIFE YEAR (DALY) in 2030.
PATHOLOGY
- Compromise of airways, lung parenchyma and pulmonary vasculature.
- Chronic inflammation: persists after smoking cessation.

PATHOGENESIS
- Oxidative stress.
- Protease-Antiprotease imbalance

PATHOPHYSIOLOGY
- Airflow limitation/air trapping.
- Gas exchange abnormalities.
- Mucus hypersecretion.
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WHO?

- Dyspnea, cough, sputum production in a patient with positive exposures.

- SPIROMETRY: FEV1/FVC < 0.70.

- It is not necessary evaluate the degree of reversibility.
SYMPTOMS

- Chronic cough.
- Dyspnea.
- Wheezing.
- Development of airflow limitation.
MEDICAL HISTORY

- Exposure to risk factors.
- Past medical history.
- Family history of COPD or other respiratory diseases.
- Pattern of symptoms development.
- Prior hospitalizations for respiratory disorders.
- Presence of comorbidities.
- Impact of the disease on the patient’s life.
COPD: UNDERSTANDING THE GUIDELINES

ASSESSMENT

GOALS OF THE ASSESSMENT ARE TO DETERMINE:

- The impact in patient’s health status.
- Severity of airflow limitation.
- Risk for future events.
To achieve these goals, COPD assessment must consider:

- **Current level of patient’s symptoms.**
- **Severity of airflow limitation.**
- **Exacerbation risk.**
- **Presence of comorbidities.**
CURRENT LEVEL OF PATIENT’S SYMPTOMS

- Modified British Medical Research Council (mMRC) questionnaire on breathlessness.

- COPD Assessment Test (CAT)
## MODIFIED BRITISH MEDICAL RESEARCH COUNCIL QUESTIONNAIRE OF DYSPNEA

<table>
<thead>
<tr>
<th>Grade</th>
<th>Patient's description of breathlessness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 0</td>
<td>I only get breathless with strenuous exercise</td>
</tr>
<tr>
<td>Grade 1</td>
<td>I get short of breath when hurrying on the level or walking up a slight hill</td>
</tr>
<tr>
<td>Grade 2</td>
<td>I walk slower than people of the same age on the level because of breathlessness or have to stop for breath when walking at my own pace on the level</td>
</tr>
<tr>
<td>Grade 3</td>
<td>I stop for breath after walking about 100 yards or after a few minutes on the level</td>
</tr>
<tr>
<td>Grade 4</td>
<td>I am too breathless to leave the house or I am breathless when dressing</td>
</tr>
</tbody>
</table>
COPD ASSESSMENT TEST (CAT)
## SEVERITY OF AIRFLOW LIMITATION (BASED ON POST BD FEV1)

<table>
<thead>
<tr>
<th>GOLD 1</th>
<th>MILD</th>
<th>FEV1 &gt; 80% predicted.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOLD 2</td>
<td>MODERATE</td>
<td>FEV1 50 – 80 % predicted.</td>
</tr>
<tr>
<td>GOLD 3</td>
<td>SEVERE</td>
<td>FEV1 30 – 50% predicted.</td>
</tr>
<tr>
<td>GOLD 4</td>
<td>VERY SEVERE</td>
<td>FEV1 &lt; 30% predicted.</td>
</tr>
</tbody>
</table>
EXACERBATION RISK

- The best predictor for it: history of previous treated events.

- TWO OR MORE EXACERBATIONS PER YEAR
PRESENCE OF COMORBIDITIES

- Cardiovascular disease.
- Skeletal muscle dysfunction.
- Metabolic syndrome.
- Depression.
- Lung cancer.
LOW RISK, LESS SYMPTOMS

- mMRC 0-1 or CAT < 10
- GOLD 1 – 2
- EXACERBATIONS < 2
LOW RISK, MORE SYMPTOMS

- mMRC $> 2$ or CAT $> 10$
- GOLD 1 – 2
- EXACERBATIONS $< 2$
UNDERSTANDING THE GUIDELINES
COMBINED COPD ASSESSMENT

HIGH RISK, LESS SYMPTOMS

- mMRC 0-1 or CAT < 10
- GOLD 3 - 4
- EXACERBATIONS ≥ 2
UNDERSTANDING THE GUIDELINES
COMBINED COPD ASSESSMENT

HIGH RISK, MORE SYMPTOMS

- mMRC $> 2$ or CAT $> 10$
- GOLD 3 - 4
- EXACERBATIONS $> 2$
ADDITIONAL INVESTIGATION

- CXR / CHEST CT
- LUNG VOLUMES / DLCO
- PULSE OXIMETRY – ABG
- EXERCISE OXIMETRY
- ALPHA 1 AT LEVEL
COPD: UNDERSTANDING THE GUIDELINES

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SMOKING CESSATION

- Counseling (Evidence A).
- Nicotine replacement.
- Pharmacologic options.
GOALS:
- Reduce symptoms.
- Reduce frequency and severity of exacerbations.
- Improve health status and exercise tolerance.

IMPORTANT FACTS:
- None of the medications modify the long term decline in lung function.
- Education about how to use it (inhaler, nebulizer) is very important.
BRONCHODILATORS

- Effect in airway smooth muscle tone.
- Reduce dynamic hyperinflation and improve exercise performance.
B2-AGONISTS

- Relax airway smooth muscle stimulating B2 adrenergic receptors (cAMP)

- SHORT ACTING B2 AGONISTS: used as needed or by schedule improve FEV1 and symptoms (EVIDENCE B).

- LONG ACTING B2 AGONISTS (Formoterol – Salmeterol – Indacaterol): improve FEV1, lung volumes, dyspnea and quality of life (EVIDENCE A).

- Side effects: tachycardia, tremor.
ANTICHOLINERGICS

- Blockage of acetylcholine’s effect on muscarinic receptors.

- Tiotropium reduce exacerbations and hospitalizations (EVIDENCE A).

- Side effects: mouth dryness, prostatic symptoms.
METHYLXANTHINES (THEOPHYLLINE).
- No recommended if other therapies are affordable.

INHALED CORTICOSTEROIDS
- Regular treatment with it improves symptoms, lung function and quality of life and reduce frequency of exacerbations, in patients with FEV1 <60% predicted (EVIDENCE A).
- Side effects: oral candidiasis, voice change, skin bruising.
COMBINED INHALED CORTICOSTEROIDS AND LONG ACTING BRONCHODILATORS AND ANTICHOLINERGICS.

- This combination is more effective than individual components in improving lung function and frequency of exacerbations in patients with moderate to severe COPD (EVIDENCE B).

ORAL CORTICOSTEROID

- No clear evidence of its benefit in stable COPD.
PHOSPHODIESTERASE-4-INHIBITOR (ROFLUMILAST).

- Reduce inflammation by inhibition of the breakdown on intracellular cAMP.
- Decrease exacerbations in patients with severe to very severe COPD (EVIDENCE A).
- Should be used in addition to long acting bronchodilators.
- Side effects: nausea, diarrhea, sleep disturbance.
OTHER PHARMA COLOGIC THERAPY:

- Vaccination

- Antibiotics: recommended only if evidence of infection.

- Vasodilators in case of associated Pulmonary Hypertension.
NO PHARMACOLOGIC THERAPY
PULMONARY REHABILITATION
- Reduce symptoms and improve quality of life.
- Six week-program.

O2 THERAPY
- Long term administration increase survival in patients with resting hypoxemia.

- $pO_2 < 55$ mmHg or $SO_2 < 88\%$
- $pO_2$ 55-60 mmHg with $SO_2$ 88% if there is CHF, PH, polycitemia.
COPD: UNDERSTANDING THE GUIDELINES
THERAPEUTIC OPTIONS

LUNG VOLUME REDUCTION SURGERY (LVRS)

- Improved survival in severe COPD with upper lobe emphysema and low post rehabilitation exercise capacity.

- Higher mortality than with medical management in severe emphysema with FEV1 or DLCO < 20% predicted.

Ann Thorac Surg 2006; 82: 431-443
NEJM 2001; 345: 1075-83
## COPD: UNDERSTANDING THE GUIDELINES

### THERAPEUTIC OPTIONS

#### LUNG TRANSPLANTATION
- BODE INDEX 7 to 10
- Resting hypercapnia
- Pulmonary Hypertension
- FEV1 / DLCO < 20% predicted

#### OTHERS
- BULLECTOMY
- PALLIATIVE CARE, END OF LIFE CARE, HOSPICE
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## COPD: UNDERSTANDING THE GUIDELINES

### GOALS OF THERAPY

<table>
<thead>
<tr>
<th>REDUCE SYMPTOMS</th>
<th>REDUCE RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Relieve symptoms</td>
<td>▪ Prevent disease progression</td>
</tr>
<tr>
<td>▪ Improve exercise tolerance</td>
<td>▪ Prevent and treat exacerbations</td>
</tr>
<tr>
<td>▪ Improve health status</td>
<td>▪ Reduce mortality</td>
</tr>
</tbody>
</table>
IDENTIFY AND REDUCE EXPOSURE TO RISK FACTORS

- Smoking
- Occupational exposures
- Indoor and outdoor pollution
IMPORTANT FACTS:

- Almost all evidence for the use of bronchodilators in COPD is based on trials included patients GOLD 3 or 4.

- FEV1 is a poor descriptor of disease status and for this reason the treatment strategy for stable COPD should consider and individual patient’s symptoms and risk for exacerbation.

- Acute reversibility is not a reliable measurement and in general, poor predictor of treatment’s benefit for FEV1 after one year.

Chest 2003: 123: 1441-9
COPD: UNDERSTANDING THE GUIDELINES
MANAGEMENT OF STABLE COPD
COPD: UNDERSTANDING THE GUIDELINES
MANAGEMENT OF STABLE COPD

1. 58 y/o woman. Productive cough. Mild SOB. FEV1 46%. Two hospitalizations in the prior year. \[\rightarrow C\]

2. 62 y/o man. Dyspnea only with strong exercise. FEV1 52% predicted. No exacerbations. \[\rightarrow A\]

3. 74 y/o man. Dyspnea at rest. FEV1 25% predicted. Three exacerbations. \[\rightarrow D\]

4. 70 y/o woman. Dyspnea with minimal activity. Not at rest. FEV1 63% predicted. No history of exacerbations. \[\rightarrow B\]
<table>
<thead>
<tr>
<th>PATIENT GROUP</th>
<th>FIRST CHOICE</th>
<th>ALTERNATIVE</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SABA or SA Anticholinergic prn</td>
<td>LABA or LA Anticholinergic or combination of both.</td>
<td>Theophylline</td>
</tr>
<tr>
<td>B</td>
<td>LABA or LA Anticholinergic</td>
<td>Combination of LABA and LA anticholinergic</td>
<td>SABA and/or SA anticholinergic and/or Theophylline.</td>
</tr>
<tr>
<td>C</td>
<td>ICS and LABA or LA anticholinergic</td>
<td>LA anticholinergic and LABA</td>
<td>PDH-4 inhibitor and/or SABA and/or SA anticholinergic and/or Theophylline.</td>
</tr>
<tr>
<td>D</td>
<td>ICS and LABA or LA anticholinergic</td>
<td>ICS, LABA, and LA anticholinergic or ICS, LABA and PDH-4 inhibitor or LA anticholinergic and PDH-4 inhibitor.</td>
<td></td>
</tr>
</tbody>
</table>
## NONPHARMACOLOGIC TREATMENT

<table>
<thead>
<tr>
<th>PATIENT GROUP</th>
<th>ESSENTIAL</th>
<th>RECOMMENDED</th>
<th>OTHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Smoking cessation</td>
<td>Physical Activity</td>
<td>Vaccination</td>
</tr>
<tr>
<td>B-D</td>
<td>Smoking cessation Pulmonary</td>
<td>Physical Activity</td>
<td>Vaccination</td>
</tr>
<tr>
<td></td>
<td>Rehabilitation</td>
<td></td>
<td></td>
</tr>
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</table>
Routine follow up is essential in COPD. Evaluate:

- SYMPTOMS. CAT questionnaire every 2-3 months.
- SMOKING STATUS.
- LUNG FUNCTION: Spirometry every year.
- PHARMACOTHERAPY AND OTHER MEDICAL THERAPY.
- EXACERBATION HISTORY.
- COMORBIDITIES.
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Acute event characterized by a worsening of the patient’s respiratory symptoms, which leads to a change in medication.

- Negatively affect quality of life.

- Accelerate the rate of decline of lung function.

- Associated with increased mortality.
Main reason, viral infections.

In up to one third of cases, etiology can not be identified.

It is very important rule out other pathologies which can mimic or aggravate the exacerbation (heart failure, PE, Pneumonia).

Diagnosis is based on clinical symptoms: worsening dyspnea, cough, sputum production.
COPD: UNDERSTANDING THE GUIDELINES
MANAGEMENT OF EXACERBATIONS

ASSESSMENT
- Pulse Oximetry.
- Chest Radiographs.
- ECG.
- CBC.
- Sputum sample.
- General Blood tests.
GOALS:
- Minimize the impact of the current exacerbation and prevent the development of subsequent exacerbations.
- Eighty percent of the cases are treated in the outpatient setting.
POTENTIAL INDICATIONS FOR HOSPITAL ASSESSMENT OR ADMISSION

- Marked increase in intensity of symptoms.
- Severe underlying COPD.
- Onset of new physical signs (cyanosis, peripheral edema).
- Failure to respond to initial therapy.
- Presence of serious comorbidities.
- Frequent exacerbations.
- Older age.
- Insufficient home support.
COPD: UNDERSTANDING THE GUIDELINES
MANAGEMENT OF EXACERBATIONS

PHARMACOLOGIC TREATMENT
- SHORT ACTING BRONCHODILATORS / ANTICHOLINERGICS.

CORTICOSTEROIDS
- Shorten recovery and improve arterial hypoxemia. EVIDENCE A.
- Prednisone 40 mgm daily for five days. EVIDENCE B.

Lancet 1999; 354: 456-460
AJRCCM 1996; 154: 407-412
ANTIBIOTICS

- Indicated if increased dyspnea, sputum production and purulence. EVIDENCE B.

- If two of three of above symptoms are present. EVIDENCE C.

- In case of need for Mechanical ventilation. EVIDENCE B.

Cochrane Databas Systemic Review 2006: CD004403
Chest 2008; 133: 756-766
OTHERS

- O2 THERAPY
- VENTILATORY SUPPORT

INDICATIONS FOR ICU ADMISSION:
- Severe dyspnea, which does not improve with initial therapy.
- Mental status changes.
- Worsening hypoxemia and/or acidosis (pH<7.25), despite NIMV.
- Hemodynamic instability.
INDICATIONS FOR NO INVASIVE MV SUPPORT

- Respiratory Acidosis.
- Severe dyspnea with signs of respiratory muscle fatigue, increase work of breathing or both.

INDICATIONS FOR INVASIVE MV SUPPORT

- No tolerance to NIMV.
- Respiratory or cardiac arrest.
- Massive aspiration.
- Inability to remove secretions.
HOSPITAL DISCHARGE AND FOLLOW UP

- Able to use Long Acting Bronchodilators.
- Need for Short acting Bronchodilators no more frequently than every 4 hours.
- Able to sleep and eat without interruption because of dyspnea.
- Able to walk across the room.
- Patient stable during the prior 12 – 24 hours.
- Stable ABG in the prior 12 – 24 hours.
PREVENTION OF COPD EXACERBATIONS

- Smoking cessation.
- Vaccination.
- Use of Long acting Bronchodilators with or without inhaled corticosteroids.
- Phosphodiesterase 4 inhibitors.
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COPD: UNDERSTANDING THE GUIDELINES COMORBIDITIES AND COPD

- Comorbidities may have a significant impact on prognosis.
- Differential diagnosis may be difficult.
CARDIOVASCULAR DISEASES

Ischemic heart disease
- Its prevalence is increased among COPD patients.
- Treatment should be based in current guidelines.
- Selective B1-blockers.

Heart Failure
- Thirty percent of patients with COPD have heart failure.
- FEV1 is strong predictor of mortality in heart failure.
- Treatment according with heart failure guidelines.
COPD: UNDERSTANDING THE GUIDELINES

- CARDIOVASCULAR DISEASES
- ATRIAL FIBRILLATION
  - Following current guidelines.
  - Selective B-1 blockers.

- HYPERTENSION
  - The more common comorbidity associated with COPD.
  - Regular treatment should be offered.
COPD: UNDERSTANDING THE GUIDELINES
COMORBIDITIES AND COPD

OTHERS

- OSTEOPOROSIS
- LUNG CANCER
- ANXIETY AND DEPRESSION
COPD is a common and preventable disease.
It is an important cause of morbidity and mortality worldwide.
Diagnosis is based on CLINICAL SYMPTOMS plus evidence of obstruction in Spirometry (FEV1/FVC < 0.70).
NEW CLASSIFICATION IS BASED ON PATIENT’S CHARACTERISTICAS: FOUR DIFFERENTS GRADERS.
Treatment is adapted to the grade of COPD (PERSONALIZED EACH CASE).
It is necessary to have a good follow up
Comorbidities must be recognized and treated.
COPD: UNDERSTANDING THE GUIDELINES
THANKS!!