Risk stratification in Management of COPD

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This is my working place
Facts:

- Chronic obstructive pulmonary disease (COPD) is a lung disease characterized by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible – WHO.
Facts:

- COPD in Bangladesh 13.4%.
  - Rural 16.8%, urban 10.1%.
  - Overall global incidence 15%.
- WHO estimates as 3rd leading cause of death by 2030.
- Life time risk of developing COPD – 27%.

IPCRG –n 13-1168
WHO burden of COPD
Facts:

• Loss of support of small airways, chronic inflammation or bronchiolitis and mucus in small airways – are main pathophysiology for 3 types of COPD: emphysema, ch. Bronchitis and small airway disease.

• Overlap syndrome -15-25%.
Facts:

- Considering etiology –
  - Smoking still primary cause
  - Exposure to wood flame cooking or biomass exposure
  - Cumulative exposure noxious agents
  - Genetic predisposition
  - Infectious agents
  - Airway hyperactivity
Facts:

- Half of overall cost of COPD treatment is exacerbation related.
- With each exacerbation mortality is high within 90 days.
- Exacerbation is mostly infection related.
- Frequent exacerbators have 2 or more exacerbation per year.
Facts:

- 22% of GOLD stage 2, 33% GOLD stage 3 & 45% GOLD stage 4 are frequent exacerbators.
- GERD & bronchiectasis correlates with AECOPD.

Facts:

- Associated co-morbidities with high risk are –
  - Myocardial infarction & angina
  - DM
  - Pulmonary HTN
  - Osteoporosis
  - Sleep disorder
  - CVD, PVD
  - Depression

Facts:

- Now the drugs used for COPD are –
  - SABA, LABA, LAMA, Steroids (ICS or oral), LTOT, Phosphodiesterase inhibitors
- FDA approves new drugs –
  - Roflumilast, Indicaterol, Glycopyrrinium
- Utilizations of nanoparticles are future hope
- Chinese medical herb – Redsage is new
Facts:

- Antibiotics –
  - Macrolide (resistant strains develop in nasopharyngs)
  - Moxifloxacin (pulse therapy 5 days every 8 wks – 48 wks)
  - Cl. difficile – surprising infection with GERD

- Vaccines - influenza ± pneumococcal vaccine
COPD Screening model

Former smoker

Age < 55

No screening

Age > 55

Screen for COPD

Never smoker

Age < 55

Breathlessness

No screening

Age > 55

Breathlessness

No screening

Current smoker

Age < 55

Breathlessness

Screen COPD

Age > 55

Breathlessness

No screening

Screen COPD

No screening
Stratification of COPD:

- Diagnosis & stratification of COPD is not simple for physician
- Aim is to relieve symptoms, reducing risk, improve exercise tolerance, preventing disease progression, preventing exacerbation & reducing mortality
- Overall to take suitable treatment option
GOLD guideline is excellent, unique initiative for stratification mainly based on spirometry – FEV$_1$ & FVC

GOLD 2011 stratifies COPD as –

*In patient with FEV1 / FVC <0.70:*

GOLD 1: Mild  \( FEV_{1} \geq 80\% \) predicted
GOLD 2: Moderate  \( 50\% \leq FEV_{1} < 80\% \) predicted
GOLD 3: Severe  \( 30\% \leq FEV_{1} < 50\% \) predicted
GOLD 3: Very severe \( FEV_{1} < 30\% \) predicted
### New GOLD classification of COPD

<table>
<thead>
<tr>
<th>Patient</th>
<th>Characteristic</th>
<th>Spirometric classification</th>
<th>Exacerbations per year</th>
<th>mMRC</th>
<th>CAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Low risk Less symptoms</td>
<td>GOLD 1-2</td>
<td>≤ 1</td>
<td>0-1</td>
<td>&lt;10</td>
</tr>
<tr>
<td>B</td>
<td>Low risk More symptoms</td>
<td>GOLD 1-2</td>
<td>≤ 1</td>
<td>≥ 2</td>
<td>≥ 10</td>
</tr>
<tr>
<td>C</td>
<td>High risk Less symptoms</td>
<td>GOLD 3-4</td>
<td>≥ 2</td>
<td>0-1</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>D</td>
<td>High risk More symptoms</td>
<td>GOLD 3-4</td>
<td>≥ 2</td>
<td>≥ 2</td>
<td>≥ 10</td>
</tr>
</tbody>
</table>
Is GOLD update is Platinum standard?

It can predict mortality –
  - A 3.8% in 3 years to C 8.2%
  - B 10.6% in 3 years to D 20.1%

Impact in grade D disease quality of life is impaired & AE are life threatening so utmost measures should be taken.

In grade A no hospitalization no ED visits

In grade B & C ED visits, find co morbidity
BODE index looks for 4 factors –
- BMI > 21 (0), ≤ 21 (1)
- Dyspnoea 0-3 points
- FEV\(_1\) 0-3 points
- 6 minutes walk performance on MRC scale 0-3
  Total = 0-10 points

Approximate 4 years survival calculation is –
- 0-2 (80%), 3-4 (67%), 5-6 (57%), 7-10 (18%)
mMRC scale –
- Comprise 5 grades based on simple questionnaire to patients about breathlessness
- This scale is widely used –
- Co related with GOLD update for stratification of COPD
CAT (COPD assessment tool)
- Better stratifies COPD independent of FEV$_1$
- Consist of 8 domains with 6 scales (0-5), total (0-40)
- Good validity and acceptable test
<table>
<thead>
<tr>
<th>CAT Score</th>
<th>Impact level</th>
<th>Clinical picture</th>
<th>Possible management consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 30</td>
<td>Very high</td>
<td>Bed bound, invalid</td>
<td>Referral to specialist care Additional pharmacological treatments, rehabilitations &amp; approach to manage AE</td>
</tr>
<tr>
<td>&gt; 20</td>
<td>High</td>
<td>Breathless with sleep disturbance not feel in control of chest problem</td>
<td></td>
</tr>
<tr>
<td>10-20</td>
<td>Medium</td>
<td></td>
<td>Optimize management, review maintenance therapy, rehabilitation, manage AE &amp; review aggravating factors</td>
</tr>
<tr>
<td>&lt; 10</td>
<td>Low</td>
<td>Few problems, easily exhausted, no AE</td>
<td>Smoking cessation, influenza vaccine, therapy as clinical assessment, reduce risk factors</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Upper limit of normal in non smoker</td>
<td></td>
</tr>
</tbody>
</table>
Exacerbation

Mild
1 of 3 cardinal symptoms: Increased dyspnea, sputum volume & purulence
- No antibiotics
- Increase Bronchodilators
- Symptomatic therapy

Moderate or Severe
2-3 cardinal symptoms: dyspnea, sputum volume, sputum purulence

Simple COPD
No risk factors
Age <65yrs, FEV₁ >50% predicted
<3 exacerbations/yr

Complicated COPD
1 or more risk factors, Age >65yrs
FEV₁ <50% predicted
≥3 exacerbations/yr
Cardiac disease

- Advanced macrolide, Cephalosporin, Ketolide, Doxycycline, Cotrimoxazole,
  * If recent (<3 months) antibiotic exposure, use alternative class

- Fluoroquinolone, Amoxicillin / clavunate
  - If Pseudomonas, consider ciprofloxacin and sputum culture
  * If recent (<3 months) antibiotic exposure, use alternative class

Worsening clinical status or inadequate response in 72 hrs
Re-evaluate, Consider sputum culture

MOSAIC & GLOBE study

International Journal of COPD 2008:3(1)
Canadian thoracic society recommendation for management of COPD – 2007 update

Stages as –
- Mild
- Moderate
- Severe &
- Very severe

Considering mMRC & FEV$_1$ as parameter

Can Respir J vol. 14; suppl B September 2007
## AE COPD exacerbation stratification

<table>
<thead>
<tr>
<th>Clinical history</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co morbid conditions</td>
<td>Unlikely</td>
<td>Likely</td>
<td>Very likely</td>
</tr>
<tr>
<td>Frequent exacerbations</td>
<td>Unlikely</td>
<td>Likely</td>
<td>Very likely</td>
</tr>
<tr>
<td>Baseline COPD severity</td>
<td>Mild-moderate</td>
<td>Mod-severe</td>
<td>Severe</td>
</tr>
<tr>
<td>Physical findings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemodynamic evaluation</td>
<td>Stable</td>
<td>Stable</td>
<td>Unstable</td>
</tr>
<tr>
<td>Tachypnea, use of accessory respiratory muscles</td>
<td>None</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Persistent symptoms after initial therapy</td>
<td>None</td>
<td>Present</td>
<td>Present</td>
</tr>
</tbody>
</table>
Contd...

- Level 1: Mild to moderate COPD exacerbation
- Level 2: Moderate to severe COPD exacerbation
- Level 3: Severe COPD exacerbation

**Ventilatory support**

- Patient education
- Bronchodilator
- Corticosteroids
- Antibiotics*

**Supplemental oxygen**
Contd…

- UPLIFT study –
  - Tiotropium can reduce exacerbation.
  - Multiple drugs act less on symptoms but reduce exacerbation – as Roflumilast
Conclusion

- COPD is a global disease that interferes with breathing and is not fully reversible.
- A simple, multi-dimensional stratification of COPD is required to combat COPD and its complications.
- It appears complex but is feasible to have a good stratification for the management of COPD.
- Proper stratification will improve management quality and reduce treatment cost.
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