Chronic Cough... and a bit about COPD

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Clinical Associate Professor,
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DISCLOSURE

I have no financial relationships that might constitute a conflict of interest.
“The art of medicine is amusing the patient while nature cures the disease.”

- Voltaire
Classification

Acute cough
~ maximum of 3 weeks

Subacute cough
~ 3 to 8 weeks

Chronic Cough
~ more than 8 weeks

De Blasio et al. Cough 2011, 7:7
Why is cough important?... To society:

- Most common reason to consult a PCP
- Antitussive drug sales USA >$4 billion/yr
- Chronic cough (>8wk): 12% population
- 10-38% of out-patients referrals
HRQOL: The LCQ

Physical
- Chest pains
- Sputum
- Tired
- Paints/fumes
- Sleep
- Frequency
- Hoarse Voice
- Energy

Psychological
- Embarrassed
- Anxious
- In control
- Frustrated
- Fed up
- Serious illness
- Other people

Social
- Conversation
- Annoy family
- Job
- Enjoyment

Birring S et al, Thorax 2003; 58:339-343
Cough frequency & QOL

Cough frequency c/hr vs LCQ scores

More severe

$r = -0.6$

Birring et al, Resp Med 2006; 100:1105
Depressive symptoms in chronic cough

[Bar chart showing CES-D Score > 16 (%) for various conditions.]

Dicpinigaitis P et al, Chest 2006; 130:1839
Adverse impact of chronic cough

- Worried about serious illness: 77%
- Concerned something is wrong: 72%
- Frequent nausea: 56%
- Exhaustion: 54%
- Others think something is wrong with me: 53%
- Embarrassment: 49%
- Self-consciousness: 46%
- Difficulty speaking on the telephone: 39%
- Urine incontinence: 30%
- Absence from work: 11%

Cough Reflex: Afferent pathway

- **Major afferent pathways:**
- **Stimuli arise from:**
  - Nose (Trigeminal)
  - Larynx (Superior Laryngeal N)
  - Vagus:
    - Ear (Arnold’s nerve)
    - Tracheobronchial tree
    - Heart
    - Pericardium
    - Esophagus
ACE-Inhibitors: “Déjà vu all over again” (-Yogi Berra)

- Roughly 10% of individuals treated with ACE inhibitors
- May be more common in women and Asians (50%)
- Accumulation of bradykinins and Substance P.
- Maybe also accumulation of bronchoconstrictive thromboxane
- Onset usually 1-2 weeks, but **may be delayed** (6-12 months)
- Usually resolves in about a week, but **may take months**
"In immunocompetent patients with chronic cough and a normal CXR finding who are nonsmokers and are not receiving therapy with an ACE inhibitor,

the diagnostic approach should focus on the detection and treatment of UACS (formerly called PNDS), asthma, NAEB, or GERD, alone or in combination.

This approach is most likely to result in a high rate of success in achieving cough resolution."

ACCP Evidence-Based Clinical Practice Guidelines
Causes of Chronic Cough (90-95%)

- Upper airway cough syndrome (UACS)
- Asthma
- Gastroesophageal reflux (GERD)
- Nonasthmatic eosinophilic bronchitis (NEAB)

92-100% immunocompetent non-smokers with normal chest X-ray
Upper Airway Cough Syndrome

• Most common cause in adults
UACS:
Myriad of rhinosinus conditions

• PNDS

• Allergic rhinitis

• Nonallergic rhinitis
  • Vasomotor rhinitis
  • Nonallergic rhinitis with eosinophilia (NARES)
  • Occupational
  • Postinfectious
  • Pregnancy
  • Rhinitis medicamentosa (topical decongestant overuse)

• Sinusitis (bacterial and fungal)
Upper Airway Cough Syndrome

- **History:**
  - Need to frequently clear throat
  - Tickle in throat
  - Sensation of dripping into throat
  - Nasal symptoms

- **Physical Exam:**
  - Secretions in nose or oropharynx
  - Cobblestone of mucosa
Treatment

- Oral (1st generation) antihistamine/decongestant x 3-5 weeks
- +/- Intranasal decongestant: e.g. oxymetazoline 2 sprays each nostril bid x 3 days only
- Antibiotics selectively, for sinusitis
- Can often convert to more standard/less expensive/more convenient/less sedating therapy (newer antihistamine alone, nasal CS, allergy shots) once better
Asthma

- **Second** most common cause of chronic cough
- Clues:
  - Episodic wheezing, dyspnea, cold or exercise induced
  - Reversible airflow obstruction
  - Bronchial hyperresponsiveness (test only if needed)
- “Confirmed” by resolution of cough with asthma treatment
Cough Variant Asthma

- 30% of patients presenting with chronic cough that was due to asthma had cough as their ONLY symptom

- Clues:
  - nocturnal cough, exercise induced, after allergen exposure

- Bronchoprovocation test (Methacholine challenge):
  - NEGATIVE PREDICTIVE VALUE EXCELLENT
    - Negative test excludes asthma
    - ...but does not rule out steroid-responsive cough (NAEB)
ASTHMA/Cough Variant Asthma

Treatment

- Inhaled corticosteroid
- ICS/LABA combination > 8 weeks
- Leukotriene receptor antagonist
GERD-associated cough = #3

Two mechanisms:

- Distal esophageal acid stimulates vagus nerve
- Laryngopharyngeal reflux (LPR)
  - Microaspiration of esophageal contents into the laryngopharynx and tracheobronchial tree
- **NEITHER** mechanism always associated with heartburn
GERD

- Suspect GERD when...
  - Heartburn or
  - Sour taste in mouth (Waterbrash)
  - Globus or tickle (LPR)

  - Reflux can be demonstrated by:
    - 24-hour pH-impedance monitoring
    - Barium x-ray

- Cough is only symptom in 40-75% of patients
GERD: Life-style modifications

- Stop smoking
- Avoid alcohol
- Lose weight
- Elevate HOB
- Small meals
- Avoid fatty/acidic foods
- Avoid caffeine
- Avoid - tight clothes, eating < 4 hrs pre-bed, recumbency < 3 hrs post meal
Treatment

- Antacid therapy ≥ 2 months:
  - Proton pump inhibitor (high dose)
  - H2 blockers less effective
- Motility therapy:
  - Metoclopramide

Surgery is last resort
Non-Asthmatic Eosinophilic Bronchitis (NAEB)

- Eosinophilic airway inflammation **WITHOUT** variable airflow obstruction or airway hyperresponsiveness

**Diagnostic tests:**
- Spirometry: normal
- Methacholine challenge: normal
- Sputum or BAL eosinophilia: >3% eosinophils

**Diagnostic/Therapeutic trial:**
- Characteristically resistant to bronchodilator but responds to ICS
- Confirmed diagnosis if responds to ICS, usually > 4 weeks
Other causes (5-10%)

- Bronchiectasis
- Bronchiolitis
- Bronchogenic carcinoma
- COPD
- Foreign body
- Interstitial Lung Disease
- Neuromuscular disease
- Pertussis
- Psychogenic cough (?)
- Sarcoidosis
- Tracheoesophageal fistula
- Tuberculosis
- Zenker diverticulum
- Chronic Cough Hypersensitivity syndrome
Chronic Cough

Investigate and Treat

A cause of cough is suggested

History, examination, Chest X-ray

Smoking
Angiotensin converting inhibitor

Discontinue

Upper Airway Cough Syndrome (UACS)
Empiric treatment

Asthma
Ideally evaluate (Spirometry, bronchodilator reversibility, bronchial provocation challenge) or empiric treatment

Non-asthmatic eosinophilic bronchitis (NAEB)
Ideally evaluate for sputum eosinophilia or empiric treatment

Gastroesophageal Reflux Disease (GERD)
Empiric treatment

For initial treatments see below

Further Investigations to consider:
- 24h esophageal pH monitoring
- Endoscopic or Videofluoroscopic Swallow Evaluation
- Barium esophagram
- Sinus imaging
- High Resolution Chest Tomography
- Bronchoscopy
- Environmental Assessment
- Consider other rare causes

Important General Considerations
Optimize therapy for each diagnosis
Check compliance
Due to possibility of multiple causes maintain all partially effective treatments

Initial Treatments
UACS- Antihistamine/decongestant
Asthma- Inhaled corticosteroids, Bronchodilators, Leukotriene-receptor antagonist
NAEB- Inhaled corticosteroids
GERD- Proton pump inhibitor, diet/lifestyle changes
Chronic Cough Hypersensitivity Syndrome
- “psychogenic cough”
- “tic cough”

- Laryngeal Sensory Neuropathy
  - LN responsible for causing the sensation/urge to cough in affected patients

- SELSAP (Surface Evoked Laryngeal Sensory Action Potential)
  - testing of the Superior Laryngeal Nerve

Cough Suppression Physiotherapy

- **Education** (avoid triggers, no benefit of excessive cough)
- **Laryngeal hygiene** (reduce alcohol/caffeine, sips water, avoid mouth breathing, correct abnormal breathing pattern + VCD)
- **Cough control** (chew sweets, forced swallow, huff, distraction)
- **Counselling** (reinforcement of techniques, modify behaviour, address adverse symptoms such as incontinence)

Patel A et al; Chronic Resp Dis 2011;8:253-8
Gabapentin: randomised controlled trial

Unexplained Chronic Cough (UCC)

- Cough > 8 weeks persists unexplained despite investigation and treatment.
- Test for bronchial hyperresponsiveness and eosinophilic bronchitis, or a therapeutic corticosteroid trial (ungraded consensus-based statement).
- Therapeutic trial of multimodality speech pathology therapy (Grade 2C).
- If negative tests for bronchial hyperresponsiveness and eosinophilia (sputum eosinophils, exhaled nitric oxide), inhaled corticosteroids should not be prescribed (Grade 2B).
- Conduct a trial of gabapentin if risks < benefits. Reassess at 6 months (Grade 2C).
- If a negative symptoms and workup for GERD, the PPIs should not be prescribed (Grade 2C).

Unexplained chronic cough

Recommended Gabapentin dose:

300 mg qHS
To
900 mg BID

AND HOW FOR SOMETHING COMPLETELY DIFFERENT
Is this the making of a 21st Century physician?
TREATMENT OPTIONS FOR COPD

Self-Management Education and Smoking Cessation
Bronchodilators
Inhaled Corticosteroids
Pulmonary Rehabilitation
Oxygen
Surgery

INCREASING SEVERITY
COPD: Treatments that Improve Survival

- Quit smoking !!!!
- Use oxygen continuously if:
  - pO2 < 55
  - P02 55 - 59 if polycythemia or pulmonary hypertension
- Lung Transplantation
- Lung Volume Reduction
  - If predominantly upper lobe and low exercise capacity
- Lung Cancer Screening
BODE Index

Table. Variables and cutoff values for points 0 to 3 in the BODE index computation.

<table>
<thead>
<tr>
<th>Variable</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV₁ (% of predicted)</td>
<td>≥65</td>
<td>50–64</td>
<td>36–49</td>
<td>≤35</td>
</tr>
<tr>
<td>Distance walked in 6 minutes (m)</td>
<td>≥350</td>
<td>250–349</td>
<td>150–249</td>
<td>≤149</td>
</tr>
<tr>
<td>Dyspnea scale score</td>
<td>0–1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Body mass index measure</td>
<td>&gt;21</td>
<td>≤21</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*Values range from 0 (best) to 10 (worst)
Source: Adapted from the Body-mass Index, Airflow Obstruction, Dyspnea, and Exercise Capacity Index in Chronic Obstructive Pulmonary Disease®

- APPROXIMATE 4 YEAR SURVIVAL INTERPRETATION
  - 0-2 Points: 80%
  - 3-4 Points: 67%
  - 5-6 Points: 57%
  - 7-10 Points: 18%

Modified MRC Dyspnoea Scale (mMRC)

Grade 0: Breathless on strenuous exercise

Grade 1: Short of breath when hurrying or walking up a slight hill

Grade 2: Walk slower than others or stop when walking at own pace on level ground

Grade 3: Stop every 100m or after a few minutes

Grade 4: Too breathless to leave the house or breathless on washing/dressing

Am Rev Respir Dis;1987;135(6):1229-33
Lung Transplant Survival Rates

About 55% at 5 years

1 Month (96.85%)  
1 Year (87.47%)  
3 Years (68.23%)
Lung Transplantation for COPD: Candidacy

Usually 65 or younger, with progressive disease despite aggressive care, BODE 5-6 or above and:

- FEV1 < 25% of predicted (without reversibility)

- and/or
  - PaCO2 > 55 mmHg
  - Pulmonary Hypertension with progressive deterioration (cor pulmonale)

- Preference to patients with:
  - Elevated PaCO2, cor pulmonale and O2 dependence
Lung Cancer Screening

- National Lung Screening Trial (NLST)
- Low dose CT chest (LDCT)
- Roughly 1/5th radiation of conventional CT
  - 15 Chest X-rays
  - 50 cross country flights
  - 6 months of natural background radiation
Lung Cancer Screening: CMS approved

- **96% of (+) LDCT findings prove NOT to be cancer**

- Reduces lung cancer mortality by 20%
  - 3 fewer deaths/1000 people screened

- Reduces all cause mortality by 6.7%

- **Current recommendation = Yearly LDCT chest:**
  - Age 55-77
  - 30 pack-years or more
  - Smoking within the past 15 years
Lung Volume Reduction Surgery (LVRS)
- Upper lobe predominant
- Low exercise tolerance

- Overall: RR = 0.85, P = 0.02

- Non-High Risk: RR = 0.85, P = 0.02

Table 2. Efficacy of Different Approaches to Decreasing Risk for Exacerbations

<p>| Table 2. Efficacy of Different Approaches to Decreasing Risk for Exacerbations |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|</p>
<table>
<thead>
<tr>
<th><strong>Efficacy</strong></th>
<th><strong>Support</strong></th>
<th><strong>References</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-pharmacologic Interventions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking Cessation</td>
<td>Supported</td>
<td>Large-scale observational study</td>
<td>66</td>
</tr>
<tr>
<td>Pulmonary Rehabilitation</td>
<td>Supported</td>
<td>Small-scale clinical studies</td>
<td>68, 69</td>
</tr>
<tr>
<td>Vaccination Against Pneumococcal and Influenza Virus Infection</td>
<td>Very strongly supported</td>
<td>Multiple clinical trials and meta-analyses</td>
<td>70-74</td>
</tr>
<tr>
<td><strong>Pharmacotherapy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LABA</td>
<td>Very strongly supported</td>
<td>Meta-analyses and multiple clinical trials</td>
<td>13, 76</td>
</tr>
<tr>
<td>LAMA</td>
<td>Very strongly supported</td>
<td>Meta-analyses and multiple clinical trials</td>
<td>57, 79, 80, 82, 83</td>
</tr>
<tr>
<td>LABA + LAMA vs. Monotherapy</td>
<td>Supported for LABA + LAMA vs LAMA monotherapy</td>
<td>Clinical trial</td>
<td>132</td>
</tr>
<tr>
<td>ICS Monotherapy</td>
<td>Supported</td>
<td>Meta-analysis, benefit limited to patients with FEV$_1$ &lt;50%</td>
<td>91</td>
</tr>
<tr>
<td>ICS + LABA vs ICS or LABA monotherapy</td>
<td>Very strongly supported</td>
<td>Multiple clinical trials</td>
<td>56, 94</td>
</tr>
<tr>
<td>Triple Combination Therapy vs. Components</td>
<td>Variable results</td>
<td>Small-scale clinical trials provide conflicting results; meta-analysis indicates no significant benefit; large-scale observational study supports</td>
<td>102-105, 133</td>
</tr>
<tr>
<td><strong>Systemic Treatments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roflumilast</td>
<td>Very strongly supported as add-on treatment to bronchodilators</td>
<td>Multiple large-scale clinical trials and meta-analysis FEV$_1$ &lt; 50%, chronic bronchitis and &gt; 3 exacerbations/y</td>
<td>106-109</td>
</tr>
<tr>
<td>Macrolides/Quinolones</td>
<td>Strongly supported</td>
<td>Supported by large-scale clinical trials</td>
<td>116, 117</td>
</tr>
<tr>
<td>Statins</td>
<td>Supported</td>
<td>Supported by multiple observational studies, but no controlled trials to date</td>
<td>121, 122</td>
</tr>
</tbody>
</table>

ICS = inhaled corticosteroid, LABA = long-acting β2 agonist LAMA = long-acting muscarinic antagonist
<table>
<thead>
<tr>
<th><strong>Combination Inhalers</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAMA</strong> (Short-Acting Muscarinic Antagonist)</td>
</tr>
<tr>
<td><strong>SABA</strong> (Short-Acting Beta2-Agonist)</td>
</tr>
<tr>
<td><strong>LAMA</strong> (Long-Acting Muscarinic Antagonist)</td>
</tr>
<tr>
<td><strong>LABA</strong> (Long-Acting Beta2-Agonist)</td>
</tr>
</tbody>
</table>

- **Corticosteroid and LABA**
- **SAMA and SABA**
- **LAMA and LABA**

MDI = Metered Dose Inhaler

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Currently FDA approved for COPD

<table>
<thead>
<tr>
<th></th>
<th>Mechanism of action</th>
<th>Dosing</th>
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</thead>
<tbody>
<tr>
<td>Tiotropium</td>
<td>LAMA</td>
<td>Daily</td>
</tr>
<tr>
<td>Aclidinium</td>
<td>LAMA</td>
<td>Twice daily</td>
</tr>
<tr>
<td>Umeclidinium</td>
<td>LAMA</td>
<td>Daily</td>
</tr>
<tr>
<td>Salmeterol</td>
<td>LABA</td>
<td>Twice daily</td>
</tr>
<tr>
<td>Formoterol</td>
<td>LABA</td>
<td>Twice daily</td>
</tr>
<tr>
<td>Indacaterol</td>
<td>LABA</td>
<td>Daily</td>
</tr>
<tr>
<td>Olodaterol</td>
<td>LABA</td>
<td>Daily</td>
</tr>
<tr>
<td>Umeclidinium/ vilanterol</td>
<td>LAMA/LABA</td>
<td>Daily</td>
</tr>
<tr>
<td>Salmeterol/ fluticasone</td>
<td>ICS/LABA</td>
<td>Twice daily</td>
</tr>
<tr>
<td>Budesonide/ formoterol</td>
<td>ICS/LABA</td>
<td>Twice daily</td>
</tr>
<tr>
<td>Fluticasone furoate/ vilanterol</td>
<td>ICS/LABA</td>
<td>Daily</td>
</tr>
</tbody>
</table>

Tiotropium/olodaterol | LAMA/LABA | Daily
Global Initiative for Chronic Obstructive Lung Disease

PROGETTO MONDIALE BPCO
STRATEGIA GLOBALE PER LA DIAGNOSI,
IL TRATTAMENTO E LA PREVENZIONE DELLA
BRONCOPNEUMOPATIA CRONICA
OSTRUTTIVA

Revisione 2014
# GOLD staging of COPD

<table>
<thead>
<tr>
<th>Stage</th>
<th>COPD Severity</th>
<th>FEV₁ (\text{L}) Relative to Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Mild COPD</td>
<td>FEV₁ at least 80% of normal</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Moderate COPD</td>
<td>FEV₁ between 50% and 80% of normal</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Severe COPD</td>
<td>FEV₁ between 30% and 50% of normal</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Very Severe COPD</td>
<td>FEV₁ below 30% of normal</td>
</tr>
</tbody>
</table>
### Assessment of COPD

- Assess symptoms: CAT, mMRC
- Assess degree of airflow limitation using spirometry
- Assess risk of exacerbations
- Assess comorbidities
Combined Assessment of COPD

Patient is now in one of four categories:

A: Less symptoms, low risk
B: More symptoms, low risk
C: Less symptoms, high risk
D: More symptoms, high risk

2014 Global Initiative for Chronic Obstructive Lung Disease
<table>
<thead>
<tr>
<th>Post-bronchodilator FEV₁</th>
<th>&gt;50% of predicted AND &lt;2 per year</th>
<th>&lt;50% of predicted AND/OR ≥2 per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exacerbations</td>
<td>LOW RISK</td>
<td>HIGH RISK</td>
</tr>
<tr>
<td>Symptoms*</td>
<td>Moderate</td>
<td>Severe</td>
</tr>
</tbody>
</table>
Pharmacologic Therapy
RECOMMENDED FIRST CHOICE

Exacerbations per year

GOLD 4
GOLD 3
GOLD 2
GOLD 1

mMRC 0-1
CAT < 10

mMRC > 2
CAT > 10

SAMA prn
or
SABA prn

LABA
or
LAMA

ICS + LABA
or
LAMA

ICS + LABA
and/or
LAMA

A
B
C
D
<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Group D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-acting β-agonist PRN</td>
<td>Long-acting β-agonist</td>
<td>Inhaled corticosteroid + long-acting β-agonist</td>
<td>Inhaled corticosteroid</td>
</tr>
<tr>
<td>OR</td>
<td>OR</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td>Short-acting anticholinergic PRN</td>
<td>Long-acting anticholinergic</td>
<td>Long-acting anticholinergic</td>
<td>Inhaled corticosteroid + long-acting β-agonist + long-acting anticholinergic</td>
</tr>
</tbody>
</table>

Add short-acting bronchodilators as rescue medication as needed.

Optional alternative therapies:
- **Group A**: [Short-acting β-agonist + short-acting anticholinergic] or [long-acting β-agonist] or [long-acting anticholinergic]
- **Group B**: [Long-acting β-agonist + long-acting anticholinergic]
- **Group C**: [Inhaled corticosteroid + long-acting anticholinergic] or [long-acting β-agonist + long-acting anticholinergic] or [long-acting β-agonist/long-acting anticholinergic + PDE4 inhibitor for chronic bronchitis]
- **Group D**: [PDE4 Inhibitor added to first line therapy for chronic bronchitis]
Group A: Smoking cessation, Reduce occupational and environmental exposures, Exercise/physical therapy, Good nutrition, Influenza and pneumococcal vaccines

Group B: Pulmonary rehabilitation

Group C: Pulmonologist referral, Address end of life decision making

Group D: Consider surgery in selected patients
On the horizon.....
Endobronchial LVRS

- Valves
- Coils
- Biologics (thrombin/fibrin/polymers)
- Thermal ablation
Endobronchial Valves are delivered to the target airway via a delivery catheter placed through the working channel of the bronchoscope (Panel 1). Multiple valves are placed to completely isolate the diseased, hyperinflated target lobe.

Upon inspiration, the unidirectional valve at the center of the device blocks air from entering the target lobe (Panel 2).

Upon exhalation, air and fluids escape through the valve (Panel 3).

Art courtesy of the New England Journal of Medicine
Regenerative therapy for COPD?

- Inducing endogenous stem cells to proliferate and differentiate in situ
  - Retinoids (all-trans-retinoic acid)
  - Others...

- Adding differentiated stem cells
  - Stem cells differentiated to Type II pneumocytes in vitro
    - Embryonic stem cells
    - Autologous (mesenchymal) stem cells
      - Adverse effects: Sarcomas and Fibrosis
CALL TOLL FREE
(888) 494-5910

Stem Cell Therapy for Lung Disease

Breathe easier Arizona. The Lung Institute is here!

Use your own stem cells to promote healing from lung disease.

Stem cells can promote healing in the lungs and slow the progression of chronic lung disease. The procedure has no chance of rejection and is minimally invasive.

At the Lung Institute, we provide treatment for the following diseases:

- Chronic Obstructive Pulmonary Disease (COPD)
- Lung Diseases

See if you qualify!

First Name
Last Name
Email
Phone
Select Disease

I would like to receive the Lung Institute email newsletter.

Find Out More

By submitting this form, I am agreeing to the LI Internet Privacy Disclosure.
THANK YOU

Robert.Aaronson@tmcaz.com
### In Patients with FEV1/FVC < 0.70:

| Gold 1: | Mild | FEV₁ ≥ 80% predicted |
| Gold 2: | Moderate | 50% ≤ FEV₁ < 80% predicted |
| Gold 3: | Severe | 30% ≤ FEV₁ < 50% predicted |
| Gold 4: | Very Severe | FEV₁ < 30% predicted |

<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</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</td>
<td>GOLD 1-2</td>
<td>≤ 1</td>
<td>≥ 2</td>
<td>≥ 10</td>
</tr>
<tr>
<td>C</td>
<td>High Risk</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</td>
<td>GOLD 3-4</td>
<td>≥ 2</td>
<td>≥ 2</td>
<td>≥ 10</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Patient Group</th>
<th>RECOMMENDED FIRST CHANCE</th>
<th>ALTERNATIVE CHOICE</th>
<th>OTHER POSSIBLE TREATMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SA anticholinergic prn or SA beta₂-agonist prn</td>
<td>LA anticholinergic or LA beta₂-agonist or SA anticholinergic and SA beta₂-agonist</td>
<td>Theophylline</td>
</tr>
<tr>
<td>B</td>
<td>LA anticholinergic or LA beta₂-agonist</td>
<td>LA anticholinergic and LA beta₂-agonist</td>
<td>SA beta₂-agonist and/or SA anticholinergic</td>
</tr>
<tr>
<td>C</td>
<td>LA anticholinergic or ICS + LA beta₂-agonist</td>
<td>LA anticholinergic and LA beta₂-agonist or LA anticholinergic and PDE-4 Inhibitor or LA beta₂-agonist and PDE-4 Inhibitor</td>
<td>SA beta₂-agonist and/or SA anticholinergic</td>
</tr>
<tr>
<td>D</td>
<td>LA anticholinergic and/or ICS + LA beta₂-agonist</td>
<td>LA anticholinergic and ICS + LA beta₂-agonist or ICS + LA beta₂-agonist and PDE-4 Inhibitor or LA anticholinergic and LA beta₂-agonist or LA anticholinergic and PDE-4 Inhibitor</td>
<td>Carbocystine</td>
</tr>
</tbody>
</table>

SA anticholinergic, ICS = inhaled corticosteroids.
How is your COPD? Take the COPD Assessment Test™ (CAT)

This questionnaire will help you and your healthcare professional measure the impact COPD (Chronic Obstructive Pulmonary Disease) is having on your wellbeing and daily life. Your answers, and test score, can be used by you and your healthcare professional to help improve the management of your COPD and get the greatest benefit from treatment.

For each item below, place a mark (X) in the box that best describes you currently. Be sure to only select one response for each question.

Example: I am very happy [X] I am very sad

<table>
<thead>
<tr>
<th>Item</th>
<th>Score Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>I never cough</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>I cough all the time</td>
<td></td>
</tr>
<tr>
<td>I have no phlegm (mucus) in my chest at all</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>My chest is completely full of phlegm (mucus)</td>
<td></td>
</tr>
<tr>
<td>My chest does not feel tight at all</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>My chest feels very tight</td>
<td></td>
</tr>
<tr>
<td>When I walk up a hill or one flight of stairs I am not breathless</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>When I walk up a hill or one flight of stairs I am very breathless</td>
<td></td>
</tr>
<tr>
<td>I am not limited doing any activities at home</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>I am very limited doing activities at home</td>
<td></td>
</tr>
<tr>
<td>I am confident leaving my home despite my lung condition</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>I am not at all confident leaving my home because of my lung condition</td>
<td></td>
</tr>
<tr>
<td>I sleep soundly</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>I don't sleep soundly because of my lung condition</td>
<td></td>
</tr>
<tr>
<td>I have lots of energy</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>I have no energy at all</td>
<td></td>
</tr>
</tbody>
</table>

TOTAL SCORE

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