The ABCD (&E’s) of Obstructive Airways Disease. 
Asthma, COPD and the Overlap Syndrome 2019

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Disclosures

• No disclosures
Outline

1. What is Asthma-COPD Overlap Syndrome (ACOS)?
   - What is Asthma? What is COPD?
   - How do we define Airways Disease?

2. Stepwise approach to the diagnosis and management of ACOS

3. Approach to Airways Disease
   - Is it Simple as ABCD&E?
What is Asthma-COPD Overlap

• A clinical reality! A distinct disease entity, maybe

• Asthma-COPD overlap are patients that have features of both syndromes
  – Incompletely reversible airflow obstruction (COPD)
  – Increased variability of airflow with associated symptoms (asthma)
Current Definitions

- **Asthma** *(GINA)*
  - A heterogeneous disease, characterized by chronic airway inflammation with respiratory symptoms that vary over time and intensity associated with variable airflow obstruction

- **COPD** *(GOLD)*
  - Persistent airflow obstruction that is progressive characterized by enhanced chronic inflammatory response in the airways to noxious particle or gases
  - Exacerbations and comorbidities contribute to the overall severity in individual patients
COPD and Asthma are Similar but Different

- Both common
- Both increasing globally
- Both involve chronic inflammation of respiratory tract
- Both characterized by acute exacerbations
- Both result in airflow obstruction

- Different inciting etiologies
- Different inflammatory cells
- Different mediators
- Different inflammatory consequences
- Different response to treatment
The Emerging Significance of ACOS

• ACOS patients:
  – More symptomatic: increased rates of wheeze, dyspnea, cough
  – Reduced baseline activity
  – Increased Rate of Exacerbations
  – Worse reported quality of life
  – More rapid decline in lung function
  – Higher mortality*
  – Consume 2-6 fold more healthcare resources
GINA/GOLD – 5 step Process For Diagnosis

• **Step 1** – Does the patient have chronic airways disease?

• **Step 2** – Characteristics of patients presentation: distinct vs. overlapping features.
  – Checkbox of 11 features for each disease, **3 or 4 more features under each diagnosis** (in absence of an alternative diagnosis) **present a high likelihood for correct diagnosis**
    • ACOS Diagnosis is made with similar number of checked under both conditions

• **Step 3** – Obtain Spirometry
  – Preferably before and after a trial of treatment

• **Step 4** – Commence therapy based on guidelines. If unsure error on side of Asthma

• **Step 5** – **Referral for special investigations to bolster, refute diagnosis**
Step 1: Does Patient Have Chronic Airways Disease?

• Features to suggest chronicity:
  – History of recurrent cough, sputum production, dyspnea or wheeze
  – History of repeated LRTI?
  – Exposure history (>10 pack-year smoking, 2nd hand, dust, fumes, etc)
  – Prior MD diagnosis*
    *considerable variability
  – Abnormal exam*: hyperinflation, distant BS, etc.
  – Abnormal imaging: emphysema, air-trapping, airway thickening, etc
### Step 2: Review Features for Each Syndrome: Asthma v. COPD

<table>
<thead>
<tr>
<th>Feature</th>
<th>Favors Asthma</th>
<th>Favors COPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>☐ Onset before Age 20</td>
<td>☐ Onset after Age 40</td>
</tr>
<tr>
<td>Pattern of Symptoms</td>
<td>☐ Variation in sx. Over minutes, hours, days</td>
<td>☐ Persistence in daily symptoms</td>
</tr>
<tr>
<td></td>
<td>☐ Symptoms worse at night or early AM</td>
<td>☐ Good days and bad days, but with exertion</td>
</tr>
<tr>
<td></td>
<td>☐ Triggers for sx. – exercise, allergens, dust, etc</td>
<td>☐ Chronic cough and sputum, unrelated to triggers</td>
</tr>
<tr>
<td>Lung Function</td>
<td>☐ Record of variable airflow obstruction</td>
<td>☐ Record of persistent airflow obstruction</td>
</tr>
<tr>
<td>Lung Function Between Symptoms</td>
<td>☐ Lung function normal between symptoms</td>
<td>☐ Lung function abnormal between symptoms</td>
</tr>
<tr>
<td></td>
<td>☐ Previous MD diagnosis</td>
<td>☐ Prior MD diagnosis COPD</td>
</tr>
<tr>
<td></td>
<td>☐ + fam Hx. Asthma, atopy, allergies</td>
<td>☐ + exposure to RF (smoke, dust, fumes, etc)</td>
</tr>
<tr>
<td>Course</td>
<td>☐ No progressive symptoms but variable</td>
<td>☐ Symptoms worse over time</td>
</tr>
<tr>
<td></td>
<td>☐ May improve spontaneously or immediate response to BD or ICS</td>
<td>☐ Rescue inhalers limited relief</td>
</tr>
<tr>
<td>CXR</td>
<td>☐ Normal</td>
<td>☐ Severe hyperinflation</td>
</tr>
</tbody>
</table>
## Step 3 - Spirometry

<table>
<thead>
<tr>
<th>Spirometric Variable</th>
<th>Asthma</th>
<th>COPD</th>
<th>ACOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal ratio pre or post</td>
<td>Compatible with diagnosis</td>
<td>Not compatible with diagnosis</td>
<td>Not compatible unless other evidence of airflow limitation (RV, TLC)</td>
</tr>
<tr>
<td>Post BD &lt;0.7</td>
<td>Indicative of airflow obstruction which may improve spontaneously or with therapy</td>
<td>Required for diagnosis (GOLD)</td>
<td>Usually present</td>
</tr>
<tr>
<td>FEV1 &gt;80%pred</td>
<td>Compatible with diagnosis (normal in between flares)</td>
<td>Compatible with diagnosis (as long ratio &lt;70)</td>
<td>Compatible with diagnosis</td>
</tr>
<tr>
<td>FEV1 &lt;80%pred</td>
<td>Compatible with diagnosis, RF for exacerbations</td>
<td>Indicator of severity of airflow obstruction (associated with increased exacerbation and mortality risk)</td>
<td>Indicator of severity of airflow obstruction (associated with increased exacerbation and mortality risk)</td>
</tr>
<tr>
<td>Post BD increase 200ml + &gt;12%</td>
<td>Usual finding</td>
<td>Common and more likely with lower FEV1</td>
<td>Common and more likely with lower FEV1</td>
</tr>
<tr>
<td>Post BD increase 400ml + &gt;12%</td>
<td>High probability of asthma</td>
<td>Unusual for COPD</td>
<td>Compatible with diagnosis</td>
</tr>
</tbody>
</table>
STEP 4- Treatment

• How do we treat?
  – Not sure as not studied!
    • COPD studies have excluded asthmatics
    • Asthma studies have excluded COPD patients

• Treat Distinct Disease According to Guidelines
  – Stepwise for Asthma
  – COPD Grade

• If unsure err on side of Asthma
  – *PEARLS: when in doubt start LABA/ICS combination
What is Obstructive Lung Disease

It’s a Fan!

It’s a Wall!

It’s a Spear!

It’s a Snake!

It’s a Tree!

It’s a Rope!
What is Asthma?

Antiquity → Today catch all phrase for Numerous Respiratory Ailments

Historically five theories:

**Humoral** (400B.C.) → imbalance of humors (>>phlegm)

**Dyspneic** → asthma = dyspnea

**Spasmodic/convulsive** (~1700s) → contraction of muscles that line bronchiole tubes
main component of asthma vs. paralytic/Diaphragmatic spasm → tonic spasms of diaphragm caused asthma

**Neurotic** (16th → 19th century) → ‘nervous in origin, caused by things that influence the mind

**Bronchitic/Pneumatic theory** → (18th century) wheezing and dyspnea depend on obstruction of air tube by catarrh (inflammation)
Modern Evolution of Asthma Concept

Adapted from Makino and Sagara 2010
Rick Frea – hardluckasthma.blogspot.com
“A Plea to Abandon Asthma as a Disease Concept

The general consensus now emerging is that, even in adults, asthma is unlikely to be a single disease entity....Is it not time to step out of the straightjacket of a seemingly unifying name that has outlived its usefulness? The conclusion should surely be that it is best to abolish the term asthma altogether.”
What is COPD?

- Two landmark conferences:
  - CIBA Guest Symposium 1959
  - American Thoracic Society Symposium 1962
- First agreed upon definitions of chronic bronchitis and emphysema
  - "a unifying hypothesis of chronic bronchitis and emphysema – spectrum labeled chronic obstructive pulmonary disease"
- 1970 working definition: COPD is a mixture of chronic bronchitis and emphysema
What Is Chronic Obstructive Pulmonary Disease Anyway?  
Continua, Categories, Cut Points, and Moving beyond Spirometry

The Many “Small COPDs”*  
COPD Should Be an Orphan Disease

*Stephen I. Rennard, MD, FCCP; and Jørgen Vestbo, DrMedSci
What is Chronic Obstructive Pulmonary Disease?

- **Current Definitions**

A common, preventable but treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases.

An umbrella term used to describe progressive lung diseases, including emphysema, chronic bronchitis, refractory (non-reversible) asthma and some forms of bronchiectasis. The disease is characterized by increasing breathlessness.

COPD is a slowly progressive disease involving the airways or pulmonary parenchyma (or both) that results in airflow obstruction...a diagnosis is confirmed when a patient who has symptoms of COPD (cough, wheeze, dyspnea) is found to have airflow obstruction.
COPDGene Proposed Subtypes

- Emphysema
  - Centrilobular
  - Paraseptal
  - Panacinar
- Mixed emphysema
- Rapid Decliners
- Frequent Exacerbators
- Gas Trappers
- +Bronchodilator Response

- Bronchiolitis/Small airways
- Mixed Emphysema/Fibrosis
- Nonsmokers
- A1AT
COPD = progressive airflow limitation that is not fully reversible

- Spirometry
  - Forced vital Capacity (FVC)
  - FEV1 – forced expiratory volume in 1 sec
  - FEV1/FVC ratio
- Post Bronchodilator
  FEV1/FVC <70%
FEV1/FVC ratio 56%: Is this the same disease?
Limits of Spirometry

- FEV1 does not fully express the complexity of COPD and its various manifestations
- FEV1, FEV1/FVC ratio only explain ~ 10-25% of disease impact
  - FEV1 severity poorly correlates with symptoms
  - FEV1 response to bronchodilator therapy may not reflect symptom or exercise response
  - Improved symptoms may not be reflected in FEV1
    - Decreased lung hyperinflation may occur in the absence of marked FEV1 response, correlated better with exertional symptoms
Distinguish Asthma from COPD

- **Bronchodilator Response**
  - can be seen in ⅔ of COPD patients

- **Bronchoprovocation (methacholine challenge)**
  - response to 8 mg/mL methacholine
    - 99% of asthmatics (good finding asthmatic)
    - 3% of normal healthy individuals
    - 68% of COPD patients
  - good at distinguishing asthma from normal
  - **not good at distinguishing asthma from COPD!**
Imaging Detects earlier signs of COPD before Spirometry

- Definite Emphysema
- Airway Thickening
- Emphysema or airways disease
- >20% air trapping

- Never Smokers
- Gold 0
- Gold 1
- Gold 2-4
Defining Airways Disease

• **Asthma (GINA)**
  - A heterogeneous disease, characterized by chronic airway inflammation with variable airflow obstruction.

• **COPD (GOLD)**
  - Persistent airflow obstruction that is progressive characterized by enhanced chronic inflammatory response in the airways to noxious particle or gases.
  - Exacerbations and comorbidities contribute to the overall severity in individual patients.
Asthma–COPD Overlap Syndrome: A Heterogeneous Definition of Two Heterogeneous Diseases

<table>
<thead>
<tr>
<th>Definitions of ACOS in the literature with references between brackets</th>
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<tbody>
<tr>
<td><strong>GINA/GOLD 2014 (1,2)</strong></td>
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<tr>
<td><strong>Fu et al. AAIR 2014 (3)</strong></td>
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<tr>
<td><strong>Menezes et al. Chest 2013 (4)</strong></td>
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<tr>
<td><strong>Miravitlles et al. 2013 (5)</strong></td>
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<td><strong>De Marco et al. 2013 (6)</strong></td>
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<td><strong>Louie et al. 2013 (7)</strong></td>
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<td><strong>Hardin et al. 2011 (8)</strong></td>
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<td><strong>Gibson et al. 2009 (9)</strong></td>
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<td><strong>Kauppi et al. 2011 (10)</strong></td>
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<tr>
<td><strong>Zeki et al. 2011 (11)</strong></td>
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<tr>
<td><strong>Marsh et al. 2008 (12)</strong></td>
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<tr>
<td><strong>Magnussen et al. 2008 (13)</strong></td>
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</tbody>
</table>
All that wheezes Is Not Asthma...Disorders of the Airways

- Post-viral cough
- Rhinitis
- Concurrent Reactive airways disease
  - SAFS/APBA
  - Eosinophilic bronchitis
  - Churg strauss
- COPD/Chronic Bronchitis
- Bronchiectasis
- Obliterative Bronchiolitis
- Tracheomalacia
- Cryptogenic organizing pneumonia
- Sarcoidosis
- Vocal cord dysfunction
- Dysfunctional Breathing
- Aspiration
- CHF (cardiac asthma)
- PE (focal wheeze)
- Pulmonary Fibrosis
- Central airway stenosis
- Foreign body
Evaluating Obstructive Lung Disease

It’s Asthma

It’s bronchitis

It’s Emphysema

It’s Alpha-1

It’s overlap

It’s bronchiolitis
Goals of Assessment of Airways Disease

1. Chronic airways disease: Evaluate the ABCD&E’s
2. Determine Severity of Disease and Risk of Future Events
3. Assess Impact of Comorbidities
   – Actively identify and manage accordingly
Airways Disease Spectrum: The ABCD&E’s

A: Airway Hyper-responsiveness

B: Bronchitis (Inflammation: Eos vs Neu vs mixed)

C: Cough

D: Damage (remodeling, airway, parenchymal destruction)

E: Extrapulmonary effects (comorbidities)

Pavord and Wardlaw 2009
Assessing Components of Airways Disease

A: Airway Hyper-responsiveness:
1. PFTs with Bronchodilators
2. Methacholine Challenge
3. Peak flow variability
4. CPET

B: Bronchitis
1. Sputum Cell Count
2. FeNO
3. Bronchoscopy
4. Serum biomarkers*
5. Eosinophilia

C: Cough
1. Esophageal pH Monitoring
2. Nasopharyngoscopy
3. Cough Monitoring
4. Speech evaluation

D: Damage
1. CXR
2. HRCT with dynamic images/quantitative analysis

E: Extrapulmonary effects
1. Sleep Study
2. ECHO
3. Allergy Testing (RAST, Skin Prick)
4. Aspergillus IgE
5. ANCA
6. pH monitoring
7. Oximetry
Airway Disease Pheno/Endotyping

Adapted S Wenzel Nature Medicine 2012
Goals of Assessment of Airways Disease

1. Chronic airways disease: Evaluate the ABCD&E’s

2. Determine Severity of Disease and Risk of Future Events

3. Assess Impact of Comorbidities
   – Actively identify and manage accordingly
Lung Attacks Comprise Majority of Disease Burden and Cost

EXACERBATIONS

- Negative impact on quality of life
- Impact on symptoms and lung function
- Increased lung function decline
- Increased economic costs
- Increased Mortality
Frequent Exacerbation and Impact on Lung Function Decline

Excess decline in 23 ml/yr FEV1 decline for mild, 87ml/yr decline for severe exacerbation  AJRCC 2016
Lung Function Decline is Steeper in Early COPD

\[ \text{FEV}_1(\% \text{ predicted}) \]

- Stage I: \( \Delta 40 \text{ mL/yr} \)
- Stage II: \( \Delta 47-79 \text{ mL/yr} \)
- Stage III: \( \Delta 56-59 \text{ mL/yr} \)
- Stage IV: \( \Delta < 35 \text{ mL/yr} \)

Years

Tantucci 2012
Airways Disease Has Systemic Consequences:

- Anxiety
- Depression
- Lung Cancer
- Hypertension
- Cardiovascular disease
- Muscle weakness
- Osteoporosis
Goals of Management of Airways Disorders

- **REDUCE SYMPTOMS**
  - Improve QOL
  - Improve exercise tolerance
  - Improve Health Status
  - Reduce irritant exposure
  - Smoking cessation

- **PREVENT LUNG ATTACKS/EXACERBATIONS**
  - Prevent disease progression
  - Prevent and treat exacerbations
  - Reduce morbidity and mortality

Treat Comorbidities
Treatment of Airways Disease

• Treat Distinct Disease According to Guidelines
  – Stepwise for Asthma
  – COPD per Grade

• ACOS? – err on side of Asthma = (LABA/ICS)

• Maximize Standard Therapies
  – COPD → LABA/LAMA combinations

• Treat Aggravating Conditions
## Asthma Steps

**STEPWISE APPROACH FOR MANAGING ASTHMA LONG TERM**

The stepwise approach tailors the selection of medication to the level of asthma severity (see page 5) or asthma control (see page 6). The stepwise approach is meant to help, not replace, the clinical decisionmaking needed to meet individual patient needs.

**ASSESS CONTROL:**

**STEP UP IF NEEDED** (first, check medication adherence, inhaler technique, environmental control, and comorbidities)

**STEP DOWN IF POSSIBLE** (and asthma is well controlled for at least 3 months)

<table>
<thead>
<tr>
<th>STEP 1</th>
<th>STEP 2</th>
<th>STEP 3</th>
<th>STEP 4</th>
<th>STEP 5</th>
<th>STEP 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Persistent Asthma: Daily Medication</strong></td>
<td><strong>Intermittent Asthma</strong></td>
<td><strong>Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3.</strong></td>
<td><strong>low-dose ICS</strong></td>
<td><strong>medium-dose ICS</strong></td>
<td><strong>high-dose ICS</strong></td>
</tr>
<tr>
<td>Preferred Treatment†</td>
<td>SABA* as needed</td>
<td>low-dose ICS* + LABA* or medium-dose ICS*</td>
<td>low-dose ICS* + LABA*</td>
<td>high-dose ICS* + LABA* AND consider omalizumab for patients who have allergies**</td>
<td>high-dose ICS* + LABA* + oral corticosteroid*** AND consider omalizumab for patients who have allergies**</td>
</tr>
<tr>
<td>Alternative Treatment‡‡</td>
<td>cromolyn, LTRA*, or theophylline§</td>
<td>low-dose ICS* + either LTRA*, theophylline§ or zileuton‡</td>
<td>medium-dose ICS* + either LTRA*, theophylline§ or zileuton‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥12 years of age</td>
<td></td>
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</table>

**Quick-Relief Medication**
- SABA* as needed for symptoms. The intensity of treatment depends on severity of symptoms: up to 3 treatments every 20 minutes as needed. Short course of oral systemic corticosteroids may be needed.
- Caution: Use of SABA >2 days/week for symptom relief (not to prevent EIB*) generally indicates inadequate control and the need to step up treatment.
Pharmacologic Therapy: GOLD GRADE

GROUP A

A bronchodilator (SABA/SAMA)

Evaluate effect

Continue, stop or try alternate class

GROUP B

A long-acting bronchodilator (LABA or LAMA)

GROUP C

LAMA

LAMA + LABA

LABA + ICS

Further exacerbations

GROUP D

Adjuvant therapies?

Further exacerbations?

LAMA + LABA + ICS

Triple therapy

Dual therapy

Further exacerbations

LABA + ICS

LAMA + LABA

LAMA +
LABA

Persistent Symptoms?
Maximizing Standard Therapies: Inhaler Delivery and Technique

Several factors influence delivery:

a. Difficulty with coordination/pill crushing
   • DPI require less coordination than MDI

b. Aerosol vehicle
   • MDI deliver smaller more consistently sized particles than DPI

c. Particle size:
   • 5 μm may deposit in mouth and trachea
   • 2-5 μm bronchi and bronchioles (upper/central airways)
   • < 2 μm peripheral airways alveoli

• Formulation important for pulmonary deposition
  - <20% is deposited in lower airway

• Education for technique is essential
- Fixed airflow obstruction can be established with baseline spirometry PFTS
- Variability in airways requires serial evaluations
- BHR can be seen in both diseases
- Spirometry is to airways disease as the Blood pressure cuff is to HTN

**Asthma**

1. Failure to demonstrate a clinical response to ICS often relates to 5 factors:
   - Poor inhaler technique
   - Poor adherence to maintenance therapy
   - Ongoing exposure to allergens, triggers
   - Comorbidities contributing to symptom persistence
   - Erroneous diagnosis

**COPD**

1. Shouldn't treat a chronic disease with a short acting medication (wouldn't treat HTN with as needed antihtn) → Need a Long acting bronchodilator
CASE 1: 45 y/o obese male, dx asthma 4 years ago recurrent episode of chest tightness and “breath stopping” provoked with exertion, anxiety and cold air “inhaler don’t work”...

*ABNORMAL FINDINGS*
28 y/o female multiple admissions for severe asthma requiring brief intubations, now steroid dependent...

*ABNORMAL FINDINGS*
CASE 3
56 y/o HIV patient, prior lung cancer now with recurrent wheezing, “asthma attacks” refractory to nebulizers and steroids...

<table>
<thead>
<tr>
<th></th>
<th>Pre-Bronch</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Pred</td>
<td>%Pred</td>
</tr>
<tr>
<td><strong>SPIROMETRY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FVC (L)</td>
<td>*2.45</td>
<td>4.57</td>
<td>*53</td>
</tr>
<tr>
<td>FEV1 (L)</td>
<td>*1.60</td>
<td>3.50</td>
<td>*45</td>
</tr>
<tr>
<td>FEV1/FVC (%)</td>
<td>*65</td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>FEV1/SVC (%)</td>
<td>67</td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>FEV1/FEV6 (%)</td>
<td>*66</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>FEF Max (L/sec)</td>
<td>*5.12</td>
<td>9.06</td>
<td>*56</td>
</tr>
<tr>
<td>FEF 25-75% (L/sec)</td>
<td>*0.93</td>
<td>3.00</td>
<td>*31</td>
</tr>
<tr>
<td>FIVC (L)</td>
<td>2.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIF Max (L/sec)</td>
<td>2.44</td>
<td>3.83</td>
<td>63</td>
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<tr>
<td><strong>LUNG VOLUMES</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>SVC (L)</td>
<td>*2.39</td>
<td>4.57</td>
<td>*52</td>
</tr>
<tr>
<td>IC (L)</td>
<td>2.08</td>
<td>3.22</td>
<td>64</td>
</tr>
<tr>
<td>ERV (L)</td>
<td>0.31</td>
<td>1.35</td>
<td>23</td>
</tr>
<tr>
<td>TGV (L)</td>
<td>2.32</td>
<td>3.36</td>
<td>68</td>
</tr>
<tr>
<td>RV (Pleth) (L)</td>
<td>2.01</td>
<td>2.05</td>
<td>97</td>
</tr>
<tr>
<td>TLC (Pleth) (L)</td>
<td>*4.40</td>
<td>6.58</td>
<td>*66</td>
</tr>
<tr>
<td>RV/TLC (Pleth) (%)</td>
<td>*46</td>
<td>31</td>
<td></td>
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<tr>
<td><strong>DIFFUSION</strong></td>
<td></td>
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<tr>
<td>DLCOunc (ml/min/mmHg)</td>
<td>*16.49</td>
<td>28.55</td>
<td>*57</td>
</tr>
<tr>
<td>DLCOcor (ml/min/mmHg)</td>
<td>28.55</td>
<td></td>
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</tr>
<tr>
<td>DL/VA (ml/min/mmHg/L)</td>
<td>4.47</td>
<td>4.34</td>
<td></td>
</tr>
<tr>
<td>VA (L)</td>
<td>*3.69</td>
<td>6.58</td>
<td>*56</td>
</tr>
<tr>
<td>IVC (L)</td>
<td>2.32</td>
<td></td>
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Imaging
Asthma cured by breast implants!
Summary

• Airways disease are heterogeneous disorders!!
• Asthma-COPD Overlap are patients that have features of both syndromes
  – Incompletely reversible airflow obstruction (COPD)
  – Increased variability of airflow with associated symptoms (asthma)
  – 10-50% patients with Asthma or COPD may have ACOS
• Important to have empiric approach to chronic airways disorders
  – Goal of therapy is to improve symptoms and mitigate exacerbations
Questions?