SLEEP APNEA, ASTHMA AND ALLERGIC RHINITIS: LINK AND MANAGEMENT

Presented by Meenal Basu, RN RPSGT
CCSH
► What is the prevalence of Obstructive Sleep Apnea (OSA) in the US?
► Can Allergic Rhinitis (AR) influence OSA?
► Can the treatment of AR influence OSA?
► Is age a risk factor for Sleep Apnea and Asthma?
► Can the use of CPAP (continuous positive airway pressure) have an impact on Asthma outcomes?

HAVE THESE QUESTIONS COME UP FOR YOU IN YOUR PATIENT CARE EXPERIENCES?
WHAT IS SLEEP-DISORDERED BREATHING (SDB)?

SDB describes a number of nocturnal breathing disorders.
- Obstructive sleep apnea (OSA)
- Central sleep apnea (CSA)
- Nocturnal hypoventilation
- Cheyne–Stokes respiration (CSR)
Prevalence of sleep-disordered breathing among U.S. adults

Estimates of sleep-disordered breathing vary but conservatively, based on laboratory and portable home sleep tests:

- 4% of men
- 2% of women
- 2% of children ages 8-11 in the US have SDB
AGING AND OSA

• There is a higher prevalence of Sleep Apnea in the Elderly

• Sleep disorders and troubles increase with age (American Thoracic Society Journal 2/15/2008)

• Post-menopausal women not on hormone replacement therapy also run a higher risk of developing sleep apnea.

FACTORS THAT INCREASE THE RISK OF DEVELOPING SLEEP APNEA

1. BMI

2. GENDER

3. ETHNICITY

4. PHYSICAL FEATURES, CO-MORBIDITIES

5. LIFESTYLE CHOICES

6. MEDICATIONS
LINK BETWEEN ALLERGIC RHINITIS AND OSA

• There is a biologic basis for the mutual influences of rhinitis and OSA.

• Rhinitis can be divided into allergic and non-allergic rhinitis.

• AR may be seasonal, perennial, or occupational. The most common cause of nonallergic rhinitis is acute viral infection.


• AR has been shown to be associated with OSA.

COMPLIANCE WITH CPAP

The most effective treatment is a continuous positive airway pressure (CPAP) device that delivers pressurized air to the upper airway, via a mask, splinting the airway open. However, the effectiveness of this treatment is often substantially reduced or nullified by inconsistent or inadequate use by patients.

PAP is the treatment of choice for moderate or severe OSA; however, the rate of adherence to this form of therapy is less than 70%

RISKS OF UNTREATED SLEEP APNEA

Side Effects From Sleep Apnea

- Brain Fog
- Anxiety
- Stroke
- Depression
- Arrhythmia
- High Blood Pressure
- Congestive Heart Failure
- Impotence
- Obesity
- Low Blood Oxygen Level
- Type II Diabetes
NASAL OBSTRUCTION AND CPAP

Over 50% of CPAP users complain of significant nasal symptoms, such as nasal congestion, rhinorrhea, nasal dryness, and sneezing, which may become more significant if the patient presents any structural abnormality of the nose.

MANAGEMENT OF AR

• These findings suggest that nasal obstruction due to allergic rhinitis favors worsening of sleep apnea and that treatment with intranasal corticosteroids can be somewhat beneficial in cases of mild to moderate OSA.

• Leukotriene receptor antagonists were also associated with positive results on OSA in adult patients with concomitant AR but current data are limited in the case of children.
TREATMENT OF ALLERGIC RHINITIS

Allergen avoidance

Oral antihistamines

Intranasal corticosteroids

Combination intranasal corticosteroid/antihistamine spray

Leukotriene receptor antagonists

Allergen immunotherapy
ALLERGEN AVOIDANCE
# INTRANASAL CORTICOSTEROIDS

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<th>Active Ingredient</th>
<th>Brand</th>
<th>Status</th>
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<tr>
<td>Bedromethasone dipropionate</td>
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<td>Bedromethasone dipropionate monohydrate</td>
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<td>Mometasone furoate monohydrate</td>
<td>Nasonex</td>
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<tr>
<td>Triamcinolone acetonide</td>
<td>Nasacort Allergy 24HR</td>
<td>Over the counter</td>
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INS = intranasal corticosteroid
NASAL OBSTRUCTION AND CPAP

• Nasal congestion has been shown to be an independent risk factor for both OSA and habitual snoring


Young T, Finn L, Palta M. Chronic nasal congestion at night is a risk factor for snoring in a population-based cohort study. Arch Intern Med 2001; 161: 1519


NASAL RESISTANCE AND SLEEP

In patients with nasal obstruction secondary to chronic rhinitis, the main cause of increased nasal resistance is edema and turbinate hypertrophy. Among the options for drug treatment are topical corticosteroids and sympathomimetic decongestants. These medications reduce the levels of inflammatory mediators, or even directly cause vasoconstriction, thereby leading to a decrease in nasal resistance and improved sleep.

MANAGEMENT OF AR AND OSA

AR increases the risk of developing OSA by two major mechanisms:

1) increase in airway resistance due to higher nasal resistance and
2) reduction in pharyngeal diameter from mouth breathing that moves the mandible inferiorly.

Other inflammatory mediators including histamine, CysLTs, IL 1β and IL-4 found in high levels in AR have also been shown to worsen sleep quality in OSA.
Asthma is a chronic disease involving the airways (tubes) that carry air in and out of the lungs. The inflammation makes the airways very sensitive, and the tubes often react to allergens or irritations.

Asthma symptoms may include wheezing, coughing, chest tightness and trouble breathing—especially early in the morning or at night.

American Academy of Allergy, Asthma and Immunology
INHALED ANTI-INFLAMMATORY AND COMBINATION MEDICATIONS

Inhaled Medicine

Anti-Inflammatories

- Amanex® HFA
  - Device: MDI with counter
- Armity® (Budesonide)
  - Device: Twisthaler®
- Alvesco® (Ciclesonide)
  - Device: MDI with counter
- Flovent® HFA (Budesonide)
  - Device: MDI with counter
- Pulmicort® (Budesonide)
  - Device: Flexhaler®
- QVAR® (Beclomethasone)
  - Device: Respidaler®

Combination LABA & Anti-Inflammatories

- Breezol® (Budesonide and salmeterol)
  - Device: Ellipta® (24 hours)
- Advair® HFA
  - Device: MDI with counter (12 hours)
- Advair® (Budesonide and salmeterol)
  - Device: Diskus® (12 hours)
- Symbicort® (Budesonide and formoterol)
  - Device: MDI with counter (12 hours)
- Dolera® (Budesonide and formoterol)
  - Device: MDI with counter (12 hours)

Combination Long-Acting Bronchodilators (LABA & LAMA)

- Aveza®
  - Device: Ellipta® (24 hours)
- Bevosp® (glycopyrrlate and formoterol)
  - Device: MDI AeriSphere® (12 hours)
- Striata® (salmeterol and fluticasone)
  - Device: Respin® (24 hours)
- Utlera® (Salmeterol and glycopyrrlate)
  - Device: Flohaler® (12 hours)
- Trilogy® (Budesonide, umecclidium and vilanterol)
  - Device: Ellipta® (24 hours)

Combination LABA, LAMA & Anti-Inflammatory

MDI = Metered Dose Inhaler
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W33251A MDC
INHALED CORTICOSTEROID EFFECT IN AIRWAY
SHORT ACTING BRONCHODILATORS FOR ASTHMA
SHORT AND LONG ACTING BRONCHODILATORS
MILD/MODERATE/SEVERE PERSISTENT ASTHMA

Inhaled corticosteroids
Target lungs to reduce chronic airway inflammation
Take daily to prevent asthma symptoms, exacerbations
 Preferred over oral steroids due to fewer systemic SE.
Side effects primarily due to deposition of med to oropharynx which leads to sore throat, oral candida and voice hoarseness
Not addictive.
Generally safe for pregnant women.
COMORBID CONDITIONS WITH ASTHMA

Why is my Asthma not improving?

• Rhinitis, rhinosinusitis
• GERD
• Obesity
• OSA
• Depression, anxiety
LINK BETWEEN ASTHMA AND OSA

• According to the AAAAI, 8% of the US population had asthma (1 in 12 people) in 2009 and this increased to 8.4% in 2010

• Asthma has been associated with poor sleep quality and increased daytime sleepiness, symptoms of OSA

• Diagnosed OSA increases the risk for worse asthma control in older patients, while CPAP therapy may have greater impact on asthma outcomes
Possible mechanisms for Asthma promoting OSA include:

- chronic disruption of sleep architecture or anatomical abnormalities that decrease pharyngeal area (chronic inflammation and pharyngeal wall fat deposition).
ASTHMA AND OSA

Common risk factors shared:
• Obesity
• Nasal congestion
• Nasal polyps

Possible contributing factors to both diseases:
• Chronic disruption of sleep architecture
• Anatomical issues decreasing pharyngeal area
ASTHMA AND OSA: PATHOPHYSIOLOGIC LINKS
ASTHMA AND OSA

- Asthma is a frequent comorbidity in adult patients with OSA and there is a higher prevalence of OSA in patients with Asthma.

- In difficult to treat asthmatics (DTA), those with more than three severe exacerbations per year were more likely to suffer from OSA than those with only one severe exacerbation per year.
ASTHMA AND OSA

CPAP effective in reducing asthma symptoms in patients with OSA and nocturnal asthma by improving daytime and nighttime PEFR, symptoms and usage of medications.


The worsening of asthma in patients with OSA may be due to obesity, activation of inflammatory pathways, gastroesophageal reflux disease (GERD) and cardiac pathology.

Management Tips for Asthma and OSA

• Obstructive sleep apnea (OSA) and Asthma are highly prevalent respiratory disorders that frequently overlap in patients.

• A high index of suspicion is warranted for overlap of OSA and Asthma, particularly in the presence of obesity, rhinitis, gastroesophageal reflux (GERD), and in patients poorly responsive to therapy.

• Individualized therapy addressing moderating factors such as weight gain, GERD, nasal obstruction, and cardiovascular disease is warranted for optimal outcomes.
THANK YOU