

**OSA and COPD:
What happens when the two OVERLAP?**
Overlap Syndrome

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Objectives

By the end of this session, you should be able to:

- Define obstructive sleep apnea (OSA), chronic obstructive pulmonary disease (COPD) & overlap syndrome
- Understand how COPD affects breathing during sleep
- Learn how to screen patients for overlap syndrome
- Understand effective treatment and reimbursement guidelines

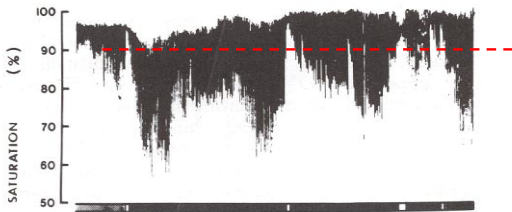
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What is Overlap Syndrome?

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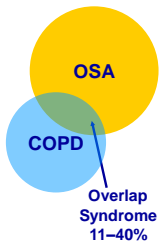
Ever Seen a Patient Like This?



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What is Overlap Syndrome?

- The term "overlap syndrome" was introduced in 1985 by Dr. Flehley
- The combination of chronic obstructive pulmonary disease (COPD) and obstructive sleep apnea (OSA), which results in nocturnal hypoventilation and hypoxemia
- ~11% of OSA patients have some degree of COPD
- 20-40% of COPD patients have OSA
Douglas, Sleep Disorders 1998



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Prevalence Data

- OSA
 - 6% of US adults have moderate to severe SDB¹
 - 17% of adults are estimated to have mild to moderate SDB¹
 - 18 million Americans suffer from OSA (NIH 2007)
 - 75% of cases of SDB remain undiagnosed²
- COPD
 - 12.1 million Americans suffer from COPD (CDC 2006)
 - An estimated 24 million Americans show signs of impaired lung function, indicating there are many unaware they have COPD (CDC 2006)
 - 4th leading cause of death in the US (NHLBI 2006)

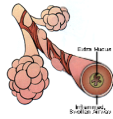
1 - Young et al. Sleep disordered breathing and mortality: Eighteen-year follow-up of the Wisconsin Sleep Cohort. SLEEP 2008
2 - Punjabi NM. The epidemiology of adult obstructive sleep apnea. Proc Am Thorac Soc 2008;5:136-43

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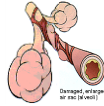
Chronic Obstructive Pulmonary Disease (COPD)

- General term describing major chronic lung disease
 - ie, emphysema and chronic bronchitis
- Airflow from the lungs is permanently obstructed
- Result of lung injury due to smoking and exposure to environmental pollution

Chronic Bronchitis



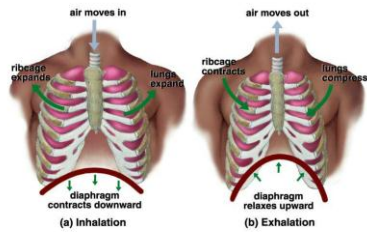
Emphysema



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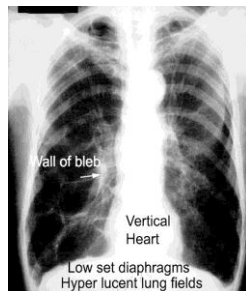
Normal Breathing



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X-ray Findings



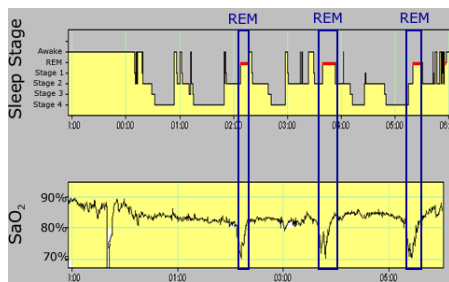
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Consequences of Overlap Syndrome

- The coexistence of COPD and OSA:
 - Leads to more severe nocturnal desaturations
 - Leads to poor quality of sleep
 - Increases risk for pulmonary hypertension, cor pulmonale, hypercapnia and polycythemia than patients with OSA alone
 - Increases cardiac morbidity and mortality
- Douglas, *Sleep Disorders* 1998

Desaturations During REM in COPD Patient's





Identifying Patients with Overlap Syndrome

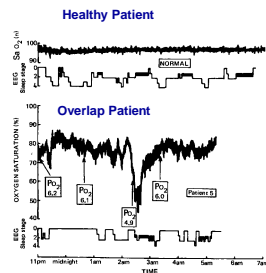
How do you know?

Screening Patients in the Sleep Lab

- Review patient's history & physical:
 - Does patient have history of cardiopulmonary disease?
 - Current medication list – pulmonary medications?
- Interview patient:
 - Ask patient if they take breathing treatments – inhalers/"puffers"?
 - Ask patient if they use oxygen at home?
 - Observe patient for shortness of breath (SOB) while walking with you to their room?
 - Is patient using accessory muscles to breathe?
 - Is patient telling you they can't lie down flat to sleep?

What to Look For in a PSG

- During PSG:
 - Watch oximetry trending during study
 - Overlap subjects may demonstrate prolonged hypoxemia during sleep
 - SpO₂ often does not recover between episodes of repetitive apnea
 - Significant desaturations during REM



Douglas et al Sleep and Breathing 1979

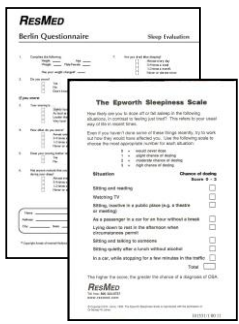
Screening Patients in the Homecare Setting

- COPD patients: Do they have OSA?
 - Does O₂ patient continue to have desaturations?
- Routinely ask COPD patients about their:
 - Sleep quality
 - Level of daytime sleepiness
 - Is patient on CPAP for OSA but noncompliant?
- Simple screening questions:
 - Do you snore?
 - Do you have shortness of breath at night or wake up choking?
 - Have you been told you stop breathing during sleep?
 - Do you have a history of hypertension?
 - Is your neck size > 17" (male) or > 16" (female)?

Coexisting Signs and Symptoms

- | | |
|--|---|
| <p>COPD / Hypoventilation</p> <ul style="list-style-type: none"> • Excessive daytime sleepiness • Morning headaches • Memory loss • Hypoxemia (on O₂) • Hypercapnia • Worsening daytime blood gases • Shortness of breath | <p>OSA</p> <ul style="list-style-type: none"> • Excessive daytime sleepiness • Morning headaches • Memory loss • Snoring • Witnessed apneas • Waking, gasping, choking |
|--|---|

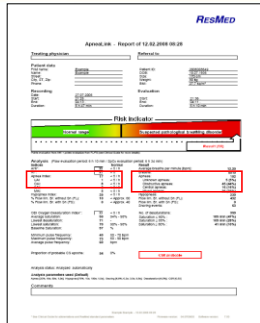
Screening Tools to Assist You



- Questionnaires
 - Berlin
 - Epworth Sleepiness Scale
- Nocturnal Oximetry
- Screening Device – ApneaLink™ Plus



ApneaLink™ Plus



ApneaLink™ Plus

Extended Report





Treatment Options for Overlap Syndrome

Treating Both Diseases

- OSA Treatment: **CPAP Therapy** (gold standard)
 - CPAP splints the upper airway
 - Challenges:
 - CPAP alone will not provide ventilatory assistance to overcome hypoventilation
 - CPAP may increase work of breathing
 - Nocturnal Hypoventilation Treatment: **Bilevel Therapy**
 - Augments the patient's tidal volume (minute ventilation) and decreases work of breathing
 - Improves gas exchange
 - * ΔP must be at least 4 cm H₂O in order to provide ventilatory assistance
- * ΔP = IPAP - EPAP

Two Uses of Bilevel

Comfort

- Non-tolerant CPAP patient
- High pressure
- Difficulty exhaling
- CPAP ineffective

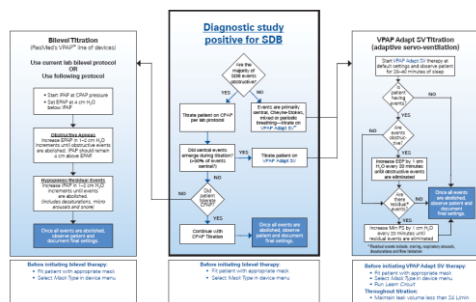
Ventilation

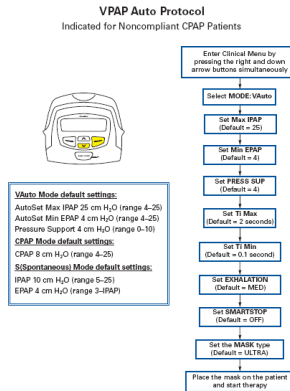
- Nocturnal hypoventilation
 - Disease states with reduced ventilatory function during sleep
- **Overlap syndrome**
 - Patients with COPD and OSA



Bilevel Therapy
Pathway for titration and reimbursement

Bilevel Titration Protocol

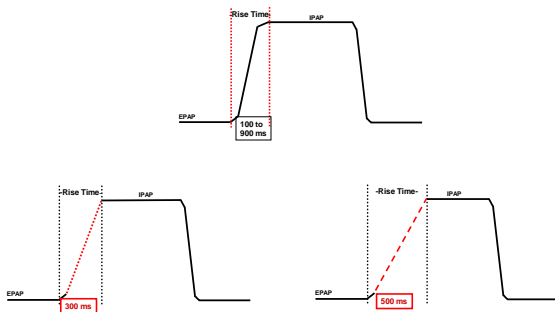




Comfort Features

- Comfort feature enhancements were developed to provide a more comfortable and customized titration
- TiControl™—combination of features:
 - Rise time (S,ST and T modes)
 - Ti Max and Ti Min (S,ST and VAuto Modes)
 - Trigger and cycle sensitivities (S,ST and VAuto modes)
 - Vsync™

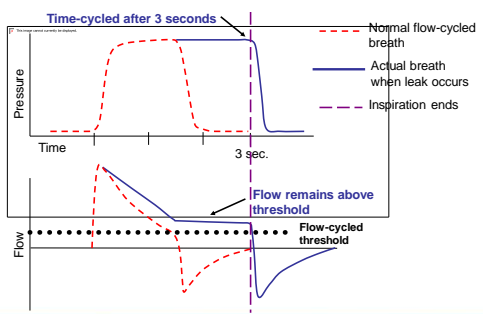
TiControl: Rise Time



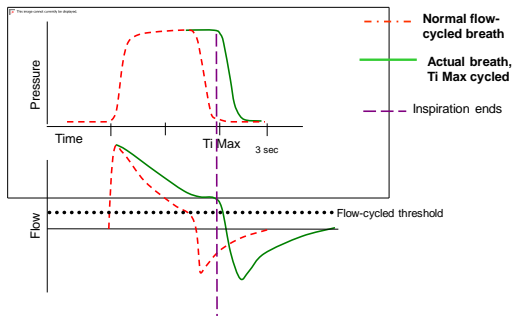
Ti Max

- Ti Max = maximum time the device will stay at inspiratory (IPAP) pressure
- Created to resolve poor IPAP-to-EPAP transitions due to mouth leak
- Adjust to ensure that COPD patients have adequate expiratory time
- Improves effectiveness of therapy where mouth leaks are present
 - Mouth leak reduces effective treatment
Teschler et al, *Eur Respir J* 1999

Leak on Competitor Bilevel

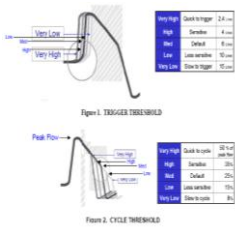


Leak on VPAP with Ti Max



Trigger & Cycle Sensitivity

- Trigger Sensitivity – further synchronizes pressure response to patient's breathing effort
 - High sensitivity accommodates even pediatric patients on the VPAP
- Cycle Sensitivity – helps synchronize breath termination to the patient's needs
- Vsync
 - Automatic leak compensation to accurately stabilize trigger and cycle sensitivity
 - Ensures that VPAP machines stay in sync with patient's breathing pattern even in the presence of leaks



Using Bilevel to Ventilate

- Ventilation may not occur without at least a 4 cm split in pressures (IPAP – EPAP)
- Less than 4 cm split, then it is “comfort” feature
- Per AASM guidelines of CPAP and Bilevel Titration:
 - “The recommended minimum IPAP-EPAP differential is 4 cm H₂O”

RESMED Respiratory Assist Device (RAD) Qualifying Guidelines

CMS guidelines February 2010

I. Restrictive Thoracic Disorders

Documentation of neuromuscular disease or severe thoracic cage abnormality

Perform one of the following:

- ABGc (done while awake) PaCO₂ > 45 mm Hg (patient's prescribed FIO₂) or
- Sleep oximetry Oxygen saturation < 88% for > 5 minutes, minimum 3 hours recording time (patient's prescribed FIO₂) or
- For neuromuscular disease only either PFC < 50% of predicted or MEP < 50 cm H₂O

COPD does not contribute significantly to pulmonary limitation

(E0470) or (E0471)
Based on the treating physician's judgment

II. COPD

ABGc (done while awake) PaCO₂ > 52 mm Hg (patient's prescribed FIO₂)

Sleep oximetry Oxygen saturation < 88% for > 5 minutes, minimum 2 hours recording time (or 2 L/min O₂ or patient's prescribed FIO₂, whichever is higher)

OSA and CPAP treatment has been considered and ruled out

(E0470)

For COPD patients to qualify for a RAD with backup rate (E0471):

Situation 1
After period of initial use of an (E0471), ABGc (done while awake) shows PaCO₂ remains > 7 mm Hg compared to original ABGc result (on patient's prescribed FIO₂). PSG demonstrates oxygen saturation < 88% for > 15 minutes, minimum 2 hours recording time, or an (E0471) not caused by obstructive upper airway events (i.e. AHI < 15)

Situation 2
No worse than 31 days after initial use of (E0471), ABGc (done while awake) shows PaCO₂ > 52 mm Hg (on patient's prescribed FIO₂). Sleep oximetry on an (E0471) demonstrates oxygen saturation < 88% for > 5 minutes, minimum 2 hour recording time (on 2 L/min O₂ or patient's prescribed FIO₂, whichever is higher).

Respiratory Assist Device (RAD) Documentation Requirements for Continued Coverage
Patients on an E0470 or E0471 device must be reevaluated no sooner than 61 days after initiating therapy.

Required Documentation

- Progress of relevant symptoms
- Signed and dated statement by treating physician declaring patient using average 4 hours per 24-hour period and patient benefiting from use

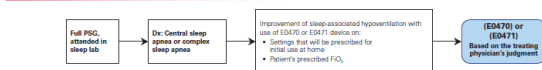
ResMed E0470 and E0471 Devices
E0470-Bilevel without a backup rate

- VPAP™ Auto ZS
- VPAP S

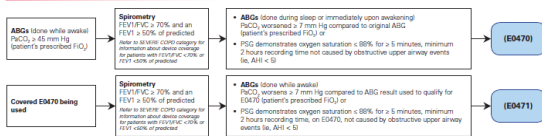
E0471-Bilevel with a backup rate

- VPAP ST
- VPAP Adapt SV™

III. Central Sleep Apnea or Complex Sleep Apnea



IV. Hypoventilation



A diagnosis of **central sleep apnea (CSA)** requires all of the following:

1. An apnea/hypopnea index > 5
2. Central apnea/hypopnea > 50% of the total apnea/hypopnea
3. Central apnea or hypopnea > 5 times per hour
4. Symptoms of either excessive sleepiness or disrupted sleep

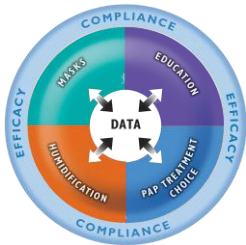
Complex sleep apnea (CompSA) is a form of central apnea

- Identified by the persistence or emergence of central apneas or hypopneas upon exposure to CPAP or an E0470 device when obstructive events have disappeared
- CompSA patients have predominantly obstructive or mixed apneas during the diagnostic sleep study occurring at a > 5 times per hour
- With use of a CPAP or E0470 device, they show a pattern of apnea and hypopnea that meets the definition of CSA

This information is provided as the date listed, and all testing and performance information is subject to change without notice. It is the provider's responsibility to verify coding and coverage with payers directly for full description of the policy. go to www.resmed.us for a full description of the policy. 1-800-424-6737 and select option 4.

Verify Noncompliance

- Work to improve compliance first by:
 - Providing effective patient/family education
 - Ensuring proper mask fit/mask choice
 - Using adequate humidification
- If patient continues to be intolerant of CPAP therapy, transition patient to VPAP bilevel therapy
- Medicare guidelines define compliance as use of PAP therapy for greater than 4 hours per 24-hour period



Summary

- Overlap combines the morbidities of OSA and COPD
- COPD affects sleep negatively, especially the ventilation capabilities
- It is important to realize how to screen for overlap patients, since both diseases are frequently missed
- Know the best treatment for overlap is to assist the ventilation that is not adequate
- Know the guidelines to get reimbursed for bilevel therapy

ResMed Resources

www.myresmed.com



www.healthysleep.com



www.sleepapneainfo.com



www.resmed.com