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When Asthma and Sleep Apnea Overlap

Ryan Quigley:
This is *AudioAbstracts* on ReachMD. I'm Ryan Quigley, and today, I'll be talking about asthma and obstructive sleep apnea overlap, also known as alternative overlap syndrome.

There's a growing sense that when obstructive sleep apnea, also called OSA, and asthma coexist, we're not just seeing overlap—we're seeing something fundamentally different. A review published in *Respiratory Medicine* introduces this concept of "alternative overlap syndrome," and the data make a compelling case that this is more than coincidence.

It's worth noting this is a narrative state-of-the-art review. The authors synthesize data from current evidence and studies across both asthma and OSA populations to evaluate whether alternative overlap syndrome represents a distinct endophenotype. The strength here lies in integration—connecting mechanistic insights with clinical outcomes and therapeutic implications.

Nearly half of patients with asthma also carry an OSA diagnosis, resulting in a 2.6-fold higher risk in OSA compared to the general population. In more severe or difficult-to-control asthma, that risk climbs to 4.36-fold.

But what's interesting is how these two conditions actively reshape each other. Asthma contributes to upper airway instability through nocturnal bronchial hyperresponsiveness and reduced lung volumes during sleep, increasing the likelihood of airway collapse. On the flip side, OSA introduces chronic intermittent hypoxia, which is a process marked by repeated drops in oxygen during sleep, fuels oxidative stress and systemic inflammation. This hypoxia-driven signaling cascade, including cytokines like IL-six and TNF-alpha, promotes airway remodeling and worsens bronchial hyperresponsiveness.

Layer onto that shared risk factors—obesity, gastroesophageal reflux disease, also called GERD, and rhinitis—and you start to see a tightly interwoven pathophysiology. For example, obesity not only narrows upper airways mechanically but also amplifies systemic inflammation through adipokines such as leptin, which itself enhances airway reactivity. GERD adds another layer by triggering both reflex bronchoconstriction and upper airway inflammation, creating a feedback loop that destabilizes both diseases.

Clinically, alternative overlap syndrome patients don't behave like typical asthma or OSA populations. They experience more fragmented sleep, often driven by a low arousal threshold—meaning even minor airflow limitations trigger awakenings. This results in insomnia, excessive daytime sleepiness and cognitive symptoms, which can really impact quality of life.

Functionally, lung performance trends downward. Several studies report roughly a 10 percent reduction in FEV_1 and FVC compared to asthma alone, with steeper declines as OSA severity increases.

Disease control also suffers. OSA increases the odds of uncontrolled asthma by as much as 7.9, and in patients with difficult-to-treat asthma, it's linked to a threefold increase in exacerbation risk. On top of that, patients with alternative overlap syndrome experience a 20 percent higher risk of hospitalization and a 25 percent increase in exacerbations compared to asthma alone.

Management becomes more nuanced in this population. CPAP shows consistent benefits beyond sleep metrics in alternative overlap syndrome patients. In one cohort, asthma control scores improved from 15.35 to 19.8, and rescue inhaler use dropped from 36 percent to 8 percent regardless of BMI. Another study showed CPAP usage nearly halved asthma exacerbations.

But CPAP is only part of the story. Weight loss interventions—whether lifestyle-based or surgical—demonstrate meaningful reductions in apnea severity and improvements in asthma control. Emerging therapies like GLP-1 receptor agonists, including tirzepatide, are particularly intriguing, showing reductions in apnea-hypopnea index by up to 59 percent alongside significant weight loss.

So where does this leave us? What emerges is a phenotype defined by shared inflammation, disrupted sleep physiology, and amplified clinical risk. Alternative overlap syndrome patients tend to have poorer asthma control, more severe symptoms, and heightened cardiovascular risk—driven by chronic sympathetic activation and hypoxia.

So the takeaway is awareness and recognition. Identifying alternative overlap syndrome early opens the door to integrated management strategies that treat both airway systems together, rather than in isolation.

This has been an *AudioAbstract*, and I'm Ryan Quigley. To access this and other episodes in our series, visit ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening!

Reference

Fabozzi A, Bouloukaki I, Bonini M, Schiza SE, Palange P. Asthma-OSA overlap syndrome: A distinct endophenotype? *Respir Med*. 2025;248:108344. doi:10.1016/j.rmed.2025.108344