

Snoring and Pathologic UARS

Principles and Practice of Sleep Medicine Chapter 112



Overview

- Snoring and UARS = Obstructed breathing but too mild for treatment
- Terms to know:
 - Inspiratory airflow limitation (IFL) = State of upper airway during sleep in which inspiratory airflow plateaus at a maximal level despite a continued increase in the pressure gradient between the nostrils and hypopharynx
 - 2 subgroups:
 - Snoring (further subdivided into two subgroups)
 - Habitual snoring
 - Isolated snoring
 - Silent IFL

Overview

- Terms to know:
 - Snoring = Audible inspiratory fluttering of the upper airway
 - ICSD definition: Respiratory sound generated in upper airway during sleep that typically occurs during inspiration but may also occur in expiration
 - Habitual snoring = Consistent snoring during sleep
 - Isolated snoring = When patient does not meet criteria for OSA
 - Silent IFL = Same fluttering as snoring but inaudible to the human ear
 - RERA = Transient arousals following a period of IFL
 - UARS = Symptom of hypersomnolence or fatigue together with the presence of IFL and an AHI < 5/hour

UARS vs. Pharyngeal Collapse

- Upper airway during sleep in UARS has increased upper airway resistance and upper airway collapse
- Pharyngeal collapse is not synonymous with apnea
 - It can cause either persistent apnea or IFL
- Pharyngeal critical pressure = P_{crit}
 - When pressure at upstream end of pharynx falls below P_{crit} , pharynx collapses, resulting in persistent apnea
 - When pressure at the nares is above P_{crit} but pressure at downstream end of pharynx falls below P_{crit} (as seen in snoring), pharynx also collapses
- Starling resistor model states the upper airway does not experience increased resistance during sleep, but a fixed driving pressure that limits airflow to a maximal level

Inspiratory Airflow Limitation

- Because RERAs incorporated into diagnostic criteria for OSA, you need to be able to recognize IFL preceding an arousal and differentiate that breathing from normal breathing
 - Necessary for PSGs, HSTs, and titrations
- During IFL, ratio of inspiratory time to the time of the entire respiratory cycle is prolonged
 - Non-flow-limited breaths have a more prolonged expiratory time
 - IFL will have a more plateaued appearance to the airflow

UARS

- ICSD3 does not include UARS in its classification of SRBD
 - Absorbed it into OSA—replaced AHI with RDI for classification of OSA
 - This new clinical criteria makes former UARS cases now OSA cases
- UARS came to attention following a case series by Guilleminault and associates
 - Snoring was noted
 - AHI < 5/hour
 - Arousal index > 10/hour
 - Reduced airflow not meeting hypopnea criteria noted
 - Treatment of these patients with nasal CPAP eliminated these events and arousals and relieved their hypersomnolence
 - UARS was designated because they did not meet criteria for OSA
 - Was controversial as many thought RERAs and hypopneas were essentially the same phenomenon

UARS

- Defined as symptom of either hypersomnolence or fatigue together with presence of IFL during sleep and $AHI < 5/\text{hour}$
- Patients are usually younger, leaner, and more frequently female compared to OSA
 - Mean age = 40 years
 - BMI between 23-30
 - Approximately 50% female
- Signs and symptoms:
 - Nonapneic, habitual snoring or silent IFL
 - $AHI < 5/\text{hour}$
 - Nonrestorative sleep, fatigue, sleepiness, or insomnia

UARS

- Hypersomnolence and fatigue are not the same thing
 - Hypersomnolence = Increase sleep pressure with short sleep latency
 - Inconsistent with insomnia
 - Fatigue = Longer sleep latency
 - Reflects state of hyperarousal commonly observed in insomnia patients
- 1/3 of UARS patients complain of sleep-onset insomnia
 - 2/3 report sleep maintenance insomnia
- UARS patients can also experience parasomnias
- Not enough evidence yet to conclude UARS as an independent cardiovascular risk factor
 - Although some arterial hypertension has been noted in these patients

UARS

- Depression and anxiety have been reported in UARS patients
- PSG findings re: breathing:
 - AHI < 5/hour
 - Periods of IFL during sleep terminated by arousals or changes in background EEG associated with return to normal airflow
 - SpO2 > 90% during sleep
- PSG findings re: sleep architecture:
 - Unstable, nonrestorative sleep
 - Alpha intrusion
 - Alpha-delta sleep
 - Increased sleep stage shifts
 - Cyclic alternating pattern (CAP)
 - Increased alpha frequency
- Treatment = Nasal CPAP

Fundamentals of Snoring

- Habitual snoring can be observed in patients with OSA complaining of EDS, fatigue, and insomnia
 - But it can also occur in the absence of symptoms and signs of OSA and without an RDI meeting OSA criteria
- Sleep-related sound caused by vibration of soft tissue in upper airway under conditions of IFL
- [What causes snoring and sleep apnea?](#)
- Treatment difficult because snoring can originate from any membranous part of upper airway lacking cartilaginous support
- [Where Snoring Comes From](#)

Pathophysiology of Snoring

- Structures of upper airway vibrate
 - This includes soft palate, uvula, faucial pillars, pharyngeal walls
- Snoring is not measured quantitatively
 - Only commented upon in general terms
- Methods of measurement vary
 - No uniform method of measurement

Epidemiology of Snoring

- Snoring is common but estimates of prevalence vary and are imprecise
- There are ethnic differences in snoring
- Bed partners or family members describe patient's snoring so reports are subjective and inconsistent
- There is night-to-night variability with snoring
- There is male predominance in snoring prevalence
- Snorers usually have history of at least one other affected family member

Health Effects of Non-apneic Snoring

- EDS
 - ESS increased progressively with snoring severity
- Cardiovascular disease
 - Correlation between snoring and hypertension, cardiovascular disease, and stroke
- [Health Effects](#)

Assessment of Snoring

- Clinical history
 - How bad is snoring?
 - Determine loudness and frequency and whether it is positional
 - Time course of snoring
 - Age of onset
 - Is snoring getting worse?
- What risk factors for snoring are present?
 - Weight gain
 - Alcohol consumption
 - Use of sedative medications
 - Nasal congestion, discharge, trauma or surgery
 - Tonsillitis
 - Other medical conditions

Assessment of Snoring

- Clinical history
 - Does patient in fact have OSA?
 - Inquire about nighttime symptoms and daytime symptoms
 - Quantify daytime sleepiness through a standardized tool like ESS
 - Document medical conditions that are possibly associated with OSA, like hypertension and cardiovascular disease
- Physical exam
 - Should include: BP, BMI, neck circumference, inspection of nose, dimensions of oropharynx
- Clinical and laboratory investigations
 - Upper airway assessment
 - Assess during wakefulness through x-ray cephalometry, computed tomography, or MRI
 - Can visualize using fiberoptic nasopharyngoscopy
 - Endoscopic exam
- Polysomnography
 - Gold standard for evaluating SDB
 - Used to differentiate nonapneic snoring from OSA and UARS
 - Those with intermediate to high probability of OSA should be evaluated first
- Treatment
 - Nonsurgical
 - Surgical

Nonsurgical Treatment

Lifestyle modification

- Weight loss
- Avoidance of alcohol and sedatives
- Positional training
- Partner interventions

Treating nasal congestion

- Pharmacologic treatments
 - Tissue lubricants
 - Intranasal corticosteroids
 - Nasal decongestants
- Nasal dilators – pulls nares open

Oral appliances

- Mandibular repositioning appliance is most commonly used
- Snoring shown to improve with these devices
- Must be constructed by dentists with specialized expertise
- [Video](#)

CPAP

- Snoring can be eliminated with CPAP use in most patients
- Patient has to be motivated to use therapy though

Surgical Treatment

Nasal surgery

Pharyngeal surgery

- Uvulopalatopharyngoplasty (UPPP)
 - Was the surgical option of choice for snoring and OSA
 - Quite painful surgery and not 100% effective for all patients
- Laser-assisted Uvuloplasty (LAUP)
 - Alternative for UPPP
 - Office procedure done under local anesthesia
 - Resects less tissue than UPPP
 - Not generally recommended as treatment for snoring
 - [Video](#)

Surgical Treatment

- Pharyngeal surgery
 - Injection snoreplasty
 - Injecting sclerotherapy agent into submucosa of soft palate
 - Outpatient surgery
 - Induces scarring and may serve to stiffen and shorten the palate, reducing snoring
 - Not enough evidence to recommend as treatment
 - Radiofrequency ablation
 - Outpatient procedure applying thermal energy to pharyngeal tissues
 - Causes volume reduction and stiffening of pharynx
 - Need more studies to determine effectiveness

Surgical Treatment

Palatal implants

- Stiffens soft palate
- Insufficient evidence to recommend as treatment

Tonsillectomy

- Effective for pediatrics, but for adults, there is not much data on effectiveness

The Reason Many Snoring Patients Get Referred to the Sleep Lab....

I love waking up with you every morning - If your horrendous snoring didn't make me want to punch you in the face every night, I'd love falling sleep with you, too.



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