



Review Article

Diagnosis of obstructive sleep apnoea-A review

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ABSTRACT

Obstructive sleep apnoea (OSA) is a breathing disorder that takes place during sleep and it involves a decreased or complete cessation in airflow despite the effort to breathe. The diagnosis of obstructive sleep apnoea syndrome (OSAS) requires the combined assessment of clinical features and the assessment of abnormal breathing during sleep. Current evidence indicates that attempts to base the diagnosis of the clinical syndrome on either aspect alone are unreliable. In this review article, we will discuss various modalities to make diagnosis of obstructive sleep apnoea by various ways.

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1. Introduction

Obstructive sleep apnoea syndrome (OSAS) is a highly prevalent disorder of the upper airway occurring during the sleep cycle.¹⁻⁴ During sleep when the muscles relax, the soft tissue in the back of the throat collapse and upper airway is blocked. This results in hypopnoeas (partial reductions) and apnoeas (complete block) in breathing. During these episodes, there is typical oxyhemoglobin desaturation. Episodes are terminated by brief microarousals that result in sleep fragmentation and diminished amounts of slow wave and REM sleep.⁵ Patients usually present with loud habitual snoring, witnessed apnoea and excessive daytime sleepiness. Despite the high prevalence of OSAS in the general population, the condition is frequently unrecognized and undiagnosed as patients often regard their symptoms as normal variants and/or a manifestation of poor lifestyle. However, during sleep, patients have significant breathing problems, while awake most of them have no any detectable respiratory abnormality.⁶ Proper diagnosis at right time is very important for the disease to be cured. It includes signs, symptoms, questionnaire, imaging and polysomnography.

The definitive diagnosis and grading of OSA require an overnight polysomnogram (PSG). Although imaging cannot diagnose OSA, it can strongly suggest the diagnosis.⁷ Various imaging modalities like Erect Lateral Cephalogram, Cone Beam CT Scan (CBCT), CT Scan and MRI can demonstrate significantly narrowed airway in patients with symptoms suggestive of OSAS.⁸

2. Prevalence

Prevalence of OSA increases between middle and older age group, however it can occur at any age. 4% of men and 2% of women shows OSA with resulting daytime sleepiness. Breathing symptoms of OSA with or without daytime sleepiness occurs in about 24 percent of men and 9% of women. Approximately 80-90% of adults with OSA remain undiagnosed. Prevalence of OSA in children is about 2% and is most common at preschool ages.⁹

3. Risk Groups⁹

1. People who are overweight (Body Mass Index 25-29.9) and obese (Body Mass Index \geq 30).

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2. Men and women with large neck circumference: ≥ 17 inches for men, ≥ 16 inches for women.
3. Middle-aged and older men, post-menopausal women.
4. People with head and neck abnormalities (the bony and soft tissue structure assessed with Cephalogram).
5. Adults and children with Down Syndrome.
6. Children with adenoids and large tonsils.
7. Retrognathia.
8. People having family history of OSA.
9. People with endocrine disorders (like Acromegaly and Hypothyroidism).
10. Smokers.
11. People suffering from nocturnal nasal congestion due to abnormal morphology, rhinitis or both.

4. Diagnosis of OSAS

4.1. Common OSAS signs¹⁰ include

1. Snoring.
2. Day time sleepiness or fatigue.
3. Restlessness during sleep.
4. Dry mouth or sore throat when wake up.
5. Difficulty in concentrating, forgetfulness or depression.
6. Headaches in the morning.
7. Night sweats.
8. Waking up suddenly and feeling like gasping or choking.
9. Trouble getting up in the mornings.
10. Waking up often in the middle of the night to pass urine.
11. Person may feel drowsiness, increasing the risk of accidents while driving or working.
12. High blood pressure.

4.2. Standardized questionnaires:

Questionnaires are increasingly being used in primary care both to screen high-risk patient groups for OSA and to identify those that would benefit from treatment if they have symptomatic OSA. Screening can be performed using the Berlin (BQ), STOP-Bang and OSA-50 questionnaires.¹¹ The Epworth sleepiness scale (ESS)¹² quantifies excessive daytime sleepiness.

4.3. Polysomnography

Obstructive Sleep Apnoea is diagnosed with a sleep study (polysomnography) which is carried out at an overnight sleep laboratory. This records eye and leg movements, brain waves, oxygen levels, airflow, and heart rhythm during sleep. The test is interpreted by a physician who specializes in sleep disorders. Also, Home Sleep Apnoea Testing (HSAT) can be done at home in place of the laboratory study. The number of apnoea and hypopnoea episodes that

occur every hour i.e., Apnoea Hypopnoea Index (AHI) determines sleep apnoea severity:¹²

1. Normal - 0-5 apnoea/ hypopnoea episodes per hour.
2. Mild sleep apnoea - 5-15 apnoea/ hypopnoea episodes per hour.
3. Moderate sleep apnoea - 16-30 apnoea/ hypopnoea episodes per hour.
4. Severe sleep apnoea - >30 apnoea/ hypopnoea episodes per hour.

4.4. Imaging

Extensive research, using imaging performed during wakefulness and sleep, has confirmed a highly significant correlation between the dimensions and shape of the upper airway with the measure of airway collapsibility, as well as the AHI: the severity of OSA. The cheapest and most widely available research and assessment tool is the erect lateral cephalogram. There is a highly significant relationship between an inferiorly positioned hyoid bone and the severity of OSA.⁸

The key measurements of the upper airway during wakefulness⁸

1. Transverse diameter of the oropharynx
 ≥ 10 mm
2. Minimum area of the oropharynx
 ≥ 100 mm²
3. Oropharyngeal length
 ≥ 70 mm in males and 65 mm in females
4. Tongue length
 ≥ 65 mm in males and 60 mm in females
5. Position of the hyoid
 ≥ 20 mm below the mandibular plane when imaged erect and 18 mm when supine.

5. Conclusion

As untreated sleep apnoea disorder progresses, it causes impaired performance at work. Patients with OSA can develop cognitive and neurobehavioral dysfunction, lack of concentration, memory impairment and mood changes like irritability and depression. This reflects their performance at work and quality of life may be affected. If remains untreated, OSA can lead to cardiovascular morbidity and mortality. Any individual with excessive daytime sleepiness or other symptoms of sleep apnoea can be diagnosed by signs, symptoms, questionnaires, imaging and polysomnography so that diagnosis may be made and treatment may be started at the earliest.

6. Source of Funding

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7. Conflict of Interest

None.

References

1. Young T, Palta M, Dempsey J, Skatrud J, Weber S, Badr S. The Occurrence of Sleep-Disordered Breathing among Middle-Aged Adults. *N Engl J Med*. 1993;328(17):1230–5.
2. DURÁN J, ESNAOLA S, RUBIO R, IZTUETA A. Obstructive Sleep Apnea–Hypopnea and Related Clinical Features in a Population-based Sample of Subjects Aged 30 to 70 Yr. *Am J Respir Crit Care Med*. 2001;163(3):685–9.
3. Young T, Peppard PE, Gottlieb DJ. Epidemiology of Obstructive Sleep Apnea. *Am J Respir Crit Care Med*. 2002;165(9):1217–39.
4. Tishler PV, Larkin EK, Schluchter MD, Redline S. Incidence of sleep disordered breathing in an urban adult population: the relative importance of risk factors in the development of sleep-disordered breathing. *JAMA*. 2003;289(17):2230–7.
5. Deegan PC, McNicholas WT. Pathophysiology of obstructive sleep apnoea. *Eur Respir J*. 1995;8(7):1161–78.
6. Broadbent WH. ON CHEYNE-STOKES' RESPIRATION IN CEREBRAL HÆMORRHAGE. *Lancet*. 1877;109(2792):307–9.
7. Whyte A, Gibson D. Imaging of adult obstructive sleep apnoea. *Eur J Radiol*. 2018;102:176–87.
8. Whyte A, Gibson D. Adult obstructive sleep apnoea: Pathogenesis, importance, diagnosis and imaging. *J Med Imaging Radiat Oncol*. 2020;64(1):52–66.
9. American academy of sleep medicine. Obstructive Sleep Apnea. North Frontage Road Darien, IL 60561. Available from: <https://aasm.org/>.
10. Walter T, Nicholas M. Diagnosis of Obstructive Sleep Apnea in Adults. *Proc Am Thorac Soc*. 2008;5(2):154–60.
11. Hamilton GS, Chai-Coetzer CL. Update on the assessment and investigation of adult obstructive sleep apnoea. *Aust J Gen Pract*. 2019;48(4):176–81.
12. Schlosshan D, Elliott MW. Clinical presentation and diagnosis of the obstructive sleep apnoea hypopnoea syndrome. *Thorax*. 2004;59(4):347–52.

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