Hypoglossal Nerve Stimulation Therapy in Obstructive Sleep Apnea

Taylor Fontaine
University of North Dakota

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Abstract

- Obstructive sleep apnea (OSA) is a disorder that results in loud snoring, gasping respirations, and excessive daytime sleepiness.
- OSA also has the potential to progress to other significant diseases such as hypertension, diabetes mellitus, stroke, and pulmonary hypertension.
- Continuous positive airway pressure (CPAP) has been the first line treatment for OSA since the early 1980’s. Unfortunately, despite the ability of CPAP to significantly improve symptoms of OSA, a large amount of patients struggle to comply with this treatment.
- A new alternative treatment for OSA is hypoglossal nerve stimulation therapy (HGNS), resulting in an increase in muscle tone of the oropharynx, keeping the airway patent during inspiration.
- This review of the literature will examine the efficacy and safety of HGNS, including broken leads and a failed pulse generator.
- Literature Review

Epidemiology and Pathophysiology of OSA

OSA is defined as the repetitive obstruction of the upper airway tissues during inspiration, resulting in an obstructed airway during sleep.

Physical exam will most commonly show obesity, large neck circumference, sleepiness, and/or nasal-sounding speech.

Lee et al. 2008 suggests up to 80% of moderate to severe OSA sufferers are thought to be un-diagnosed.

CPAP and Alternative Treatments for OSA

CPAP, which is the first line treatment for OSA, is a nasal or oral-nasal mask which pushes pressurized air upon inspiration.

Notable alternative treatments currently used are oral mandibular devices and uvulopalatopharyngoplasty (UPPP).

Doff et al. 2013 reports significant improvements in AHI with CPAP and oral appliance therapy (as shown in Figure 1).

27% of the 103 participants in the Doff et al. study were lost to non-compliance or unsuccessful treatment with CPAP and oral appliances.

HGNS Therapy in Obstructive Sleep Apnea

Hypoglossal Nerve Stimulation Therapy

HGNS therapy showed success in subjective and objective testing in both studies referenced.

As Figure 3 illustrates, HGNS appears to be capable of creating a more patent airway compared to no treatment.

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However, more clinical research is necessary to guarantee the efficacy, safety, and reliability of the product being used.

Reference


Statement of the Problem

- There is a significant need for a reliable alternative treatment for OSA when patients are intolerant of CPAP therapy and oral appliances.
- Papadakis & McPhee, 2014 explains that only about 75% of patients continue to use their CPAP device after the first year.

Research Questions

- How significant is noncompliance to CPAP treatment?
- In patients diagnosed with OSA who are intolerant of CPAP, is hypoglossal nerve stimulation therapy a safe and efficacious alternative treatment?

Discussion

- Obesity is the largest contributing factor in the development of OSA. It is broadly understood that the best management is prevention through healthy diet and regular exercise.
- CPAP is found to be very effective in patients who are able to tolerate the many disabling side effects.
- In order to increase the compliance rates of CPAP, patients need accessibility and education regarding the use and management of CPAP.
- As for all other diseases, a safe and efficacious alternative treatment is necessary for those who do not comply with CPAP.
- As Figure 3 illustrates, HGNS appears to be capable of creating a more patent airway compared to no treatment.
- HGNS therapy showed success in subjective and objective testing in both studies referenced.
- However, more clinical research is necessary to guarantee the efficacy, safety, and reliability of the product being used.

Applicability to Clinical Practice

- Obstructive sleep apnea is a disease that is rapidly increasing in incidence, yet is relatively unknown to the general public.
- Providers need to be screening and catching this “not-so-silent killer” before it manifests into other significant comorbidities or a fatal accident.
- CPAP alternatives, such as oral mandibular devices and UPPPs, often create their own significant side effects and are usually less effective.
- Instead of cycling between these treatments, extensive education is necessary for the compliance of CPAP. This includes finding an appropriately fitting mask and appropriate pressure settings.
- Despite favorable outcomes in the clinical studies for HGNS therapy, it is considered an extremely invasive alternative treatment.
- HGNS is in the very early stages to the road toward being a feasible alternative to CPAP, as there are very few physicians trained in the procedure or equipment.
- Considering the lack of research for HGNS, providers should be exhausting all efforts into assuring patients are adequately educated about the benefits of CPAP, including ways to overcome its many side effects.

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