



Historical development of methods for diagnosis and treatment of OSA

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Abstract: Obstructive sleep apnea (OSA) has been known to mankind since ancient times. Medical documents from 2000 years ago that have been found contain information describing severe snoring (apnea) characteristic of OSA. In order to obtain the information targeted research was carried out in the Scientific databases PubMed, Scopus, ScienceDirect, Web of Science. „History of OSA”, „CPAP”, „Polysomnography” keywords were used in for the search.

The aim of this article is to present the historical development of methods for diagnosis and treatment of OSA. In 1981 Sullivan et al. published in the Lancet scientific paper on Obstructive Sleep Apnea “ Reversal of obstructive sleep apnea by continuous air-

way pressure applied through the nares “. At the end of the XIX th century, the term “Pickwickian syndrome” was introduced in the medical literature. In 1965, the polysomnographic unit was created and for the first time, with the help of electronic device, sleep apnea was registered in patients. Eventually ambulatory sleep testing was introduced as an alternative to polysomnography. Apnea Graph is a new innovative ambulatory sleep analysis tool that identifies the location of snoring obstruction and OSA. It also determines the type of OSA. In 1981, the first CPAP for treatment OSA was created. Sullivan’s findings prove that CPAP is a very effective device for treating OSA.

Keywords: History of OSA, CPAP, Polysomnography

Introduction

Obstructive sleep apnea (OSA) has been known to mankind since ancient times. Medical documents from 2000 years ago that have been found contain information describing severe snoring (apnea) characteristic of OSA. In 1981 Sullivan et al . published in the Lancet scientific paper on Obstructive Sleep Apnea „Reversal of obstructive sleep apnea by continuous airway pressure applied through the nares“. (1)

The aim of this article is to present the historical development of methods for diagnosis and treatment of OSA .

Materials and methods

in order to obtain the information targeted research was carried out in the Scientific databases ScienceDirect, Web of Science, PubMed, Scopus. „History of OSA”, „CPAP”, „Polysomnography” keywords were used in for the search.

Results and discussions

at the end of the XIX th century, the term „Pickwickian syndrome” was introduced in the medical literature. Symptoms of OSA have been described with this syndrome. Pickwick syndrome describes the symptoms of apnea in obese patients. The authors concluded that OSA research should be directed not only to patients with obesity, but also to patients with airway obstruction and sleep-disordered breathing. (2, 3, 4, 5)

In 1965, the polysomnographic unit was created and for the first time with the help of electronic device sleep apnea was registered in patients. During the 1960s many studies have described

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concomitant diseases associated with Obstructive Sleep Apnea. It was found that, in addition to the obesity factor, obstructive sleep apnea is also influenced by other concomitant diseases.

In 1970 The scientific researcher from Toronto, Canada Phillipson E. studied respiratory control in dogs. Sullivan K. followed in his footsteps and in 1976 in Sydney, Australia did scientific research, studying the mechanisms of REM sleep, hypocapnia and hypercapnia. Sullivan K. in 1979 invented a mask for dogs that supplies air or medical gas during apnea. (1) Later, as a result of experiments with dogs in laboratory conditions, a mask was invented that can also be used by people with OSA. The masks that are made are created individually for each patient. First an impression of the patient's nose and the area around it was taken. After that plaster casts were made, and then a fiberglass mask equipped with an air inlet and outlet. Patients stayed overnight with this mask while having a constant source of positive airway pressure that was subject to regulation. In 1981, the first CPAP for treatment OSA was created. Sullivan with his findings proves that CPAP is an extremely good alternative for the treatment of OSA much more painless and acceptable to patients, compared to the tracheotomy method used in the past.

William Dement is the founder of the first sleep medicine clinic established at Stanford University, California, USA in 1970. In the period from 1975 to 1985, scientists studying OSA patients published over 319 scientific articles. During this period, a very important case related to the position of the airway obstruction was discussed and resolved. As a result of the studies, the scientific researchers came to the conclusions that the obstruction of the respiratory tract occurs in the oropharynx.

Young et al. conducted an epidemiological study on OSA, concluding that OSA occurs in 4% of middle-aged men and 2% of women. Seven years later, the authors described the relationship between Obstructive Sleep Apnea and hypertension as a comorbidity. (6)

In 2001, scientific studies were conducted, the results of which described the relationship between stroke, coronary heart disease, heart failure and severe forms of obstructive sleep apnea.

A number of modern authors consider polysom-

nography to be one of the most useful and accessible methods in the diagnosis of OSA both in adults (7, 8, 9, 10, 11) and in children (12, 13, 14, 15). B. A. Stuck and J. T. Maurer (2017) systematized the new scientific literature on the diagnosis of OSA in childhood. (16, 17) Polysomnography (PSG) performed in the sleep laboratory is used as the reference standard for the diagnosis of OSA. Polysomnography measures several sleep variables, one of which is the apnea-hypopnea index (AHI) or respiratory disturbance index (RDI). Diagnosis with a polysomnograph is also carried out at home. (18) Ambulatory sleep testing is introduced as an alternative to polysomnography. Apnea Graph is a new innovative ambulatory sleep analysis tool that identifies the localization of snoring obstruction and OSA and determines the type of OSA (obstructive or central). In Apnea Graph is about combining a polysomnographic sleep study with nasopharyngeal air pressure recording. The essential features of the method are the following: sleep study, validated against complete polysomnography; localization of the level of obstruction during sleep in order to improve the diagnosis and the results of surgical treatment; no technical assistants are needed to perform the study and no sleep medicine doctors to interpret the results; Apnea Graph is performed in an ambulatory setting and the method is more cost-effective than conventional polysomnography. Other methods used for diagnosis and supporting the diagnosis of OSA are: Nasal endoscopy, Acoustic rhinometry, Anterior active rhinomanometry, Acoustic pharyngometry, Image diagnostics – orthopantomography, computed tomography, magnetic resonance tomography.

The gold standard for the treatment of obstructive sleep apnea is continuous positive airway pressure (CPAP). Other methods used for the treatment of Obstructive Sleep Apnea are: Intraoral devices for the treatment of Obstructive Sleep Apnea and surgical treatment – uvulopalatopharyngoplasty, maxillo-mandibular advancement, maxillo-facial orthognathic surgery, mandibular osteotomy, distraction osteogenesis. Ratneswaran D., Cheng M. et al. described in their scientific work in 2023 an innovative method for the treatment of obstructive sleep apnea (OSA) by stimulation of the hypoglossal nerve (HNS). With their research, the authors prove that home transcutaneous electrical stimulation (TESLA) will control sleep apnea and provide health benefits.(19)



Conclusions

Sleep disorders, including Obstructive Sleep Apnea, are extremely common in the human population. This has necessitated in the past and in our time the development of methods for the diagnosis and treatment of OSA. Historically, with the development of technology, various methods for the diagnosis and treatment of obstructive sleep apnea have been developed and perfected. Modern diagnostic devices today support disease screening and improve patients' quality of life.

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