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The Successfulness of a Multidisciplinary Approach for Obstructive Sleep Apnea

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Abstract

Background: Obstructive Sleep Apnea (OSA) is a global problem that has an impact on health and quality of life (QOL). There are a lot of risk factors for OSA, i.e. anatomical abnormality and comorbidity. A multidisciplinary approach can improve the symptoms and the impact of OSA and QOL too.

Materials and methods: This case report is structured according to The CARE (Case Report) guideline.

Case: A male, 37 years old, came with the chief complaint of snoring for 6 years. The patient felt unfit and dissatisfied with his sleep (Sleep Condition Indicator: 2.5). This impacted the daily activities and caused excessive daytime sleepiness. He could fall asleep while doing activities (Epsworth Sleepiness Scale: 24). The condition was worsening and he was often found apnea during sleep. The patient's body mass index was 38.3kg/m2 (type I obesity) and the neck diameter was 43 cm. The polysomnography showed sleep architectural abnormality and the patients suffered from moderate OSA (Apnea-Hipopnea Index: 23.7). The patient was hospitalized for 7 days and got a Continuous Positive Airway Pressure Device (CPAP). Anatomical abnormality was investigated but none needed surgical intervention. Metabolic syndrome intervention includes therapy for hypertension, dyslipidemia, and diabetes. Collaboration with a clinical nutritionist for nutritional intervention. After 7 days, the sleep quality, the symptoms, and the SCI score were improved (7.1).

Conclusion: OSA risk factors are varied and needed to be identified. In addition to definitive therapy, management of comorbidities, such as metabolic syndrome, should be addressed. A multidisciplinary approach can thereby improve OSA, patient's health, and QOL.

Keywords: Metabolic Syndrome, Multidisciplinary Approach, Obstructive Sleep Apnea, Quality of Life

1. INTRODUCTION

Obstructive Sleep Apnea (OSA) is a global problem that affect health and Quality of Life (QoL) (1–3). Its prevalence is high worldwide, with nearly 1 billion people affected (4). In Asia, particularly in Taiwan, the prevalence of OSA reached 2.6% and may be even higher (5). In Indonesia, the exact prevalence is still unknown due to limited research on OSA. However, this problem represents an iceberg phenomenon, where the actual number of cases exceeds the reported ones due to underreporting, underdiagnosis, and a lack of patient awareness (6).

The risk factors of OSA include anatomical abnormalities, such as craniofacial bone and tissue dysmorphic, young age (<5 years) or old age (>65 years), male, obesity, diabetes mellitus, Chronic Obstructive Pulmonary Disease (COPD), hypertension, and metabolic syndrome (2,7–10). OSA can affect a patient's general health, causing cardiovascular disorders, worsening the existing

metabolic syndrome, leading to excessive daytime sleepiness, narcolepsy, depression, and anxiety, which affect the patient's social life and QOL (10–13). It also imposes significant economic burdens and become a global problem (3).

Diagnosing and managing OSA is crucial to minimizing its impact on the patient (14). A comprehensive assessment, including overnight studies polysomnography, electroencephalogram, oximetry, and other evaluations, is essential for promptly diagnosing OSA and investigating its underlying disease (15).

Studies have shown successful outcomes with the multidisciplinary management of OSA, combining Continuous Positive Airway Pressure (CPAP) therapy with the management of comorbidities to improve patient's QoL (16,17). Although CPAP is the firs-line therapy, it is not always successful in certain patients. In such cases, non-CPAP therapies can be applied and been proven effective in improving patient outcomes. Symptom control is also a priority in managing the long-term outcomes in OSA patients (18).

Given the multifactorial etiology of OSA, its treatment should involve various medical disciplines and be personalized based on patient's underlying causes and preferences (19). Studies also suggest that multidiscipline therapy has a significant impact on patient outcomes and improve patient's QoL (20). This case study highlights the importance and the success of patient based on multidisciplinary approach in treating OSA.

2. MATERIALS AND METHODS

This case report has been structured in accordance with the CARE (Case Report) guidelines (21–23).

3. CASE

A 37-year-old man presented with a complaint of snoring for 6 years, felt unwell and poor sleep (Sleep Condition Indicator: 2.5). His symptoms affected daily activities, causing daytime drowsiness and the ability of fall asleep during activities (Epsworth Sleepiness Scale: 24). The complaints were felt to be severe with frequent episodes of stopped breathing during sleep.

Physical examination revealed a body mass index of 38.3kg/m2 (obesity type I) and a neck circumference of 43 cm. Sleep quality assessment showed an Epworth sleep scale score of 24 (high probability of falling asleep), an insomnia severity index of 8 (subthreshold insomnia), a snoring score of 4, a STOP-BANG score of 7 (high risk of experiencing OSA), and the Berlin questionnaire value of 10. Polysomnography confirmed a high risk OSA with a disrupted sleep architecture (lengthening of N1 and N2 and shortening of N3 and rapid eye movement (REM) phases). The patient experienced moderate OSA (Apnea-Hypopnea Index: 23.7) without periodic limb movements. He snored with an index of 36.5. The lowest pulse rate was 25 times/minute, and the lowest oxygen saturation was up to 60%.

The patient was hospitalized for 7 days and received CPAP. The patient was consulted with The Ear Nose Throat-Head Neck Department and endoscopy examination revealed adenoid hypertrophy, grade-II lingual tonsil hypertrophy, anteroposterior retroglossal Muller maneuver <25%, and anteroposterior and laterolateral retropalatal Muller maneuver >75% (Picture 1). CT scan showed hypertrophy of the left middle and inferior nasal ligaments and a retention cyst in the left maxillary sinus. This disorder did not affect the patient's OSA condition. Therefore, surgery was not advisable.

The patient suffered from metabolic syndrome, including hypertension type II, hypertensive heart disease, obesity, dyslipidaemia, and diabetes type II. The patient was consulted with the cardiac, endocrine, and metabolic specialists and received triple antihypertension, fenofibrate, and metformin. Clinical nutritionist was also involved in designing a nutritional program.

After 7 days of treatment with a multidisciplinary management, the patient's sleep quality improved, reflected in an increase in the Sleep Condition Indicator score to 7.1. OSA symptoms also improved, with an Epworth sleep scale score of 0, Insomnia severity index of 0, snoring score of 1, STOP-BANG Sleep Apnea Questionnaire of 4 with a moderate risk for OSA, and Berlin questionnaire of 3. A multidisciplinary

approach has been proven to improve OSA symptoms and the general health of the patients.

4. DISCUSSION

OSA is characterized by repeated upper airway obstruction during sleep, lowering oxygen saturation (10). OSA prevalence ranges from 35 to 40% in adult population, with 24-26% in men (9). OSA is associated with craniofacial anatomical abnormality, such as short mandibular body, mandibular retrognathia, maxillary constriction, narrow cranial base, and low hyoid bone position.

The most common connective tissue abnormalities include a large tongue, uvula, and soft palate, a large pharyngeal wall, a small upper airway, and an imbalance between tongue size and craniofacial size (2,24,25). An anatomical abnormality was identified in the patient, but surgery was not required.

OSA is also influenced by various risk factor, including young age and old age, male, obesity, diabetes mellitus, COPD, hypertension, and metabolic syndrome (2,7–10). Therefore, these patients have an increased risk of developing OSA. Obese patients are twice as likely to develop OSA compared to non-obese patients.

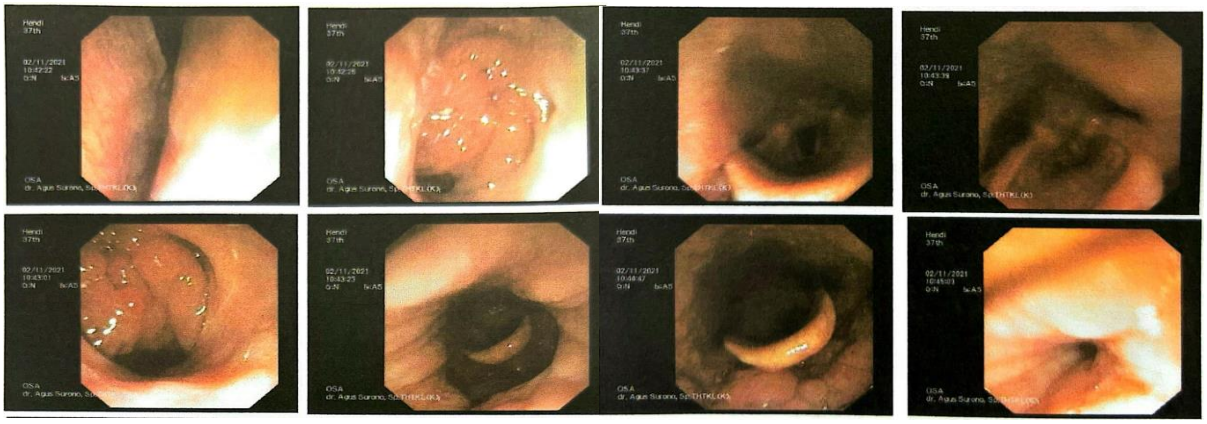

Figure 1. The endoscopy examination revealed adenoid hypertrophy, grade-II lingual tonsil hypertrophy, anteroposterior retroglossal Muller maneuver <25%, and anteroposterior and laterolateral retropalatal Muller maneuver >75% support the clinical findings of OS

Hypertension and diabetes are also the most common risks factors, with 83.5% of hypertension patients and 37.4% of diabetes patients experiencing OSA. When multiple risk factors and metabolic syndrome present, the incidence of OSA rises to 66% (26,27).

This patient's primary risk were metabolic syndrome and obesity. The patients received therapy for hypertension, dyslipidemia, and diabetes, along with nutritional management in collaboration with clinical nutrition. Metabolic syndrome and obesity increase the risk and severity of OSA by producing leptin and indirectly cause a collapse of the upper airway. These conditions are linked to a large neck from excess fat, which narrows and compresses the airway during sleep (28).OSA can worsen comorbidities and increase the risk of cardiovascular disease. It leads to insulin resistance, reduces insulin sensitivity, and higher fasting blood glucose levels. OSA raises the levels of epinephrine, norepinephrine, and cortisol, which increases gluconeogenesis and reduce glucose storage in skeletal muscles, leading to high blood sugar levels. Insulin resistance is caused by increased insulin inflammatory markers, such as TNF-∝, IL-6, and CRP. Additionally, hypoxemia in OSA patients can causes beta cell dysfunction, contributing to insulin resistance (28,29).

OSA increases the risk of cardiovascular disease. Hypoxemia in OSA increase the sympathetic response during sleep or upon awakening, leading to hypertension. Increase of inflammatory markers in OSA patient triggers the buildup of atherosclerotic plaque in the blood

vessels, increase the risk of cardiovascular disease and stroke (28,29).

The definitive therapy for OSA is CPAP. Previous studies have shown the efficacy of CPAP therapy for treating symptoms and reducing systemic effect like hypertension and metabolic abnormalities. Along with CPAP, OSA management also addresses comorbidities, including metabolic syndrome and anatomical abnormalities (30–32).

5. CONCLUSION

OSA risk factors are varied and needed to be identified. In addition to definitive therapy, management of comorbidities, such as metabolic syndrome, should be addressed. A multidisciplinary approach can thereby alleviate OSA, patient's health, and QOL.

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