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Editorial Open Access

Weight Reduction Programs in Obese Sleep Apnea Patients: The Role of the Mediterranean Diet

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Editorial

Obstructive Sleep Apnoea Syndrome (OSAS) is considered to be one of the most prevalent sleep-related breathing disorders, with an enormous effect on public health. Approximately 2-4% of the general adult population experiences some degree of this syndrome [1]. This percentage increases even more with obesity, up to 20-40%, especially in individuals with an excessive Body Mass Index (BMI) $\geq$ 30 kg/m^2 [2]. OSAS is associated with significant systemic consequences, including cardiovascular morbidity and mortality, and the risk increases with the severity of the syndrome [3]. The pathophysiology underlying the link between OSAS and the cardiovascular system is attributed largely to systemic inflammation and oxidative stress, which are both contributors to endothelial dysfunction [4]. The treatment modalities of OSAS include Continuous Positive Airway Pressure (CPAP), weight loss, upper airway surgery, and oral devices [5]. CPAP is the first line therapy, as a means of maintaining upper airway patency [6], and it is well known that this intervention reduces morbidity and mortality [7]. In severe cases of OSAS the weight loss strategy is essential and must accompany CPAP treatment [8]. A growing body of evidence in OSAS supports the beneficial role of weight reduction, induced by diet alone [9-12] or in combination with exercise [13], leading to a reduction in apnoeas and hypopnoeas. A recent study conducted at the University of Crete examined the effect of the Mediterranean diet (MD) compared with that of a prudent diet on obese adults with moderate-to-severe OSAS who were treated with CPAP while receiving counselling to increase their physical activity [14]. The results showed that people following the MD had a reduced number of disturbances, known as apnoeas, during the rapid eye movement (REM) stage of sleep, which usually accounts for approximately 25% of total sleep during the night. Recent reports have related an increase in disturbances during REM sleep with the risk of developing significant systemic consequences like diabetes type II. However, its clinical significance remains unclear.

The findings also revealed that people following the MD also showed a greater adherence to the calorie restricted diet, an increase in physical activity and a greater decrease in abdominal fat. The MD promotes satiation and encourages consumption of a variety of palatable foods, optimizing adherence to a caloric restricted diet [15]. It is also possible that the MD along with increased physical activity could promote changes of relevant anthropometric determinants such as waist size and finally better outcome. It has been suggested that abdominal fat is a risk factor for OSAS in obese patients [16]. It is related with a reduction in pharyngeal lumen size due to fatty tissue within the airway or in its lateral walls, and a decrease in upper airway muscle protective force due to fatty deposits in the muscle. It has also been reported that abdominal fat is associated with reduced upper airway size secondary to the mass effect of the large abdomen on the chest wall and tracheal traction [17]. Moreover, an association between increased Body Mass Index (BMI) and the development of hypoventilation is well recognized, as abdominal fat accumulation is known to impair diaphragmatic excursion and rib cage expansion [18]. Since, diaphragm consists the main inspiratory muscle during REM sleep [19], abdominal obesity may mechanically affect the expansion of the diaphragm, probably by encroaching into the chest by the chest wall or diaphragm or by impeding the descent of the diaphragm during forced inspiration [20]. While obesity alone does not account for the development of hypoventilation, it would be possible that by decreasing abdominal fat, breathing would have improved during REM sleep. Therefore, it is likely that the patients in the MD group reduced AHI/REM more than those in the PD group because of the greater reduction in abdominal fat, via an improvement in the mechanical load associated with OSAS [21].

Another possible explanation for the AHI/REM improvement in the MD group compared to the PD group would be through inflammation, although not examined in the aforementioned study. It has been reported that inflammation is associated with a reduced muscle and diaphragm contractibility [22,23]. The inflammation of upper airway tissues is primarily related to abdominal fat [24]. Dietary components may also contribute to the inflammation seen in OSAS. On the other hand, the Mediterranean dietary pattern has shown anti-inflammatory effects due to its composition [25]. Finally, further studies in a larger sample are needed to clarify the role of the MD in the therapeutic plan of OSAS patients taking into account its anti-inflammatory properties.

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