



Reversibility of Obstructive Sleep Apnea Consequences

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Abstract

Many medical journals have presented evidence that particular medical conditions are consequences of Obstructive Sleep Apnea (OSA) in adults. Some of those publications discuss the reversibility of those conditions just by overcoming the OSA, usually by the patient's adherence to Continuous Positive Air Pressure (CPAP) therapy used during sleep. This paper presents a comprehensive tabulated list of twenty-nine OSA consequences in adults based on a review of the literature according to whether they are reported to be reversible (at least partially) just by overcoming the OSA, not reversible, or their reversibility has not yet been reported. This list would be beneficial to medical practitioners for their diagnosis and treatment of OSA and its consequences.

Introduction

Knowledge of the consequences of Obstructive Sleep Apnea (OSA) can be a great aid in the screening process for this disease. Of particular immediacy is the recognition of OSA's reversible consequences as screening clues, hopefully before OSA's life-threatening irreversible consequences develop. Furthermore, prompting OSA patients to adhere to its recommended treatment may be additional therapy for treatment of those co morbidities of OSA which are reversible. The presence of irreversible consequences may also be useful screening clues with the aim of preventing additional serious consequences from occurring by overcoming the OSA.

Summary Chart

Table 1 summarizes the OSA consequences in each of those three reversibility categories, based on reports in the published peer-reviewed literature: reversible, irreversible, and degree of reversibility not yet reported. Included with all but one of the entries in Table 1 are bracketed numbers [1-34] which refer to the corresponding numbers in the reference list of this paper which support their inclusion in the particular column of the table.

Reversible Entries

All entries in the leftmost column of Table 1 are referenced to previous peer-reviewed medical journal papers which present evidence of their reversibility. Gout attacks, defined as the formation of monosodium urate crystals in body tissues and fluids (not only in synovial fluid as arthritic gout) resulting from hyperuricemia, are listed first because this author considers them to be a bellwether for the presence of OSA [35]. For gout reversibility, the author has relied on online unsolicited testimonials from former gout sufferers because no formal studies about the reversibility of gout by overcoming OSA have been published. Although overcoming sleep apnea can prevent any future gout attacks, it may not lead to the dissolution of previously occurring monosodium urate crystals.

Undetermined Reversibility Entries

The first entry is the residual monosodium urate crystals from previous gout attacks, which may require a period of urate lowering therapy to dissolve them before they can cause significant joint damage. The other entries in the center column of Table 1 reference previous peer-reviewed medical journal papers which present evidence that they are consequences of OSA, but this author has found no medical journal papers that show them to be reversible by overcoming OSA.

Irreversible Entries

All entries in the rightmost column of Table 1 are referenced to previous peer-reviewed medical journal papers which present evidence that they are consequences of OSA. Myocardial infarction is listed as irreversible because after it occurs a portion of the heart muscle has been irreversibly damaged by interruption of its blood flow for too long a time. Ischemic stroke is listed as irreversible because after it occurs a portion of the brain has been irreversibly damaged by interruption of its

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Table 1: OSA Consequences and their reversibility just by overcoming OSA.

Usually Reversible (at least partially)	Reversibility undetermined	Usually irreversible
Gout attacks - immediately [1]	Residual monosodium urate	Myocardial infarction [27]
Atrial fibrillation - 6 months [2]	Coronary artery disease [13]	Ischemic stroke [28]
Hypercoagulability - 6 months [3]	Dyslipidemia/atherosclerosis [14]	Type 2 diabetes [29,30]
Chronic kidney disease - 3 months [4,5]	Congestive heart failure [15]	Cancer [31-33]
Ventricular mechanical dysfunction - 3 months [6]	Alzheimer's disease [16]	Mitral valve disease [34]
Hypertension [7]	Cognitive impairment [17]	
Nonalcoholic fatty liver disease [8,9]	Depression [18]	
Excessive daytime sleepiness [10]	Autoimmune diseases [19]	
Nocturia [11]	Chronic migraine [20]	
Shortening of telomeres [12]	Esophageal reflux [21]/Barrett's esophagus [22]	
	Hypothyroidism [23]	
	Systemic inflammation [24]	
	Erythrocytosis/polycythemia [25]	
	Insomnia [26]	

blood flow for too long a time. Type 2 diabetes has been reported to be irreversible because the chronic intermittent hypoxemia of sleep apnea has reduced the pancreatic beta cell mass. Cancer is listed as irreversible because treatments other than overcoming OSA are needed to shrink the cancer. Mitral valve disease is listed as irreversible because the demands on the heart during the hypoxemic episodes can be so extreme that some of the cords which control the mitral valve leaflets can become ruptured, repairable only by surgery. If the mitral valve disease is from stenosis that too would not reverse by overcoming OSA.

Conclusion

The tabulated review of OSA consequences has divided known consequences of OSA into three categories: those that are reversible, those that are irreversible, and those whose reversibility has yet to be determined. There are life-threatening conditions in each category. Those who overcome their OSA are fortunate if the only consequences which they have experienced are reversible, because promptly overcoming their OSA may reverse the progress of these diseases, as well as greatly reduce their risks for developing other life-threatening diseases that are consequences of OSA. Those who have experienced irreversible consequences are much less fortunate. The consequences whose reversibility has yet to be determined provide much fodder for future studies aimed at determining their reversibility.

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