

# 非肥胖患者阻塞性睡眠呼吸暂停综合征研究进展

胡热西坦木·阿布德热西提<sup>1</sup>, 凯迪日亚·库尔班<sup>2</sup>, 刘北林<sup>1\*</sup>

<sup>1</sup>新疆医科大学第五附属医院呼吸与危重症医学科, 新疆 乌鲁木齐

<sup>2</sup>新疆医科大学第一附属医院心理医学中心, 新疆 乌鲁木齐

收稿日期: 2023年3月21日; 录用日期: 2023年4月17日; 发布日期: 2023年4月25日

## 摘要

目前睡眠障碍越来越受到关注, 已是一个重要的公共卫生问题。阻塞性睡眠呼吸暂停(Obstructive Sleep Apnea, OSA)是不同睡眠相关呼吸障碍(Sleep-Related Breathing Disorders, SRBD)中最常见的。肥胖是OSA的已知相关危险因素, 但OSA在非肥胖人群中很多见。许多文献中对非肥胖患者OSA的描述很少。临床表现与肥胖者相似, 但病理生理学和多导睡眠图特征存在差异。非肥胖者OSA的严重程度表现较轻, 因此需要早期识别和不同的治疗策略, 以防止对这些患者的管理不当。

## 关键词

睡眠呼吸暂停综合征, 非肥胖, 非肥胖睡眠呼吸暂停病理生理, 非肥胖呼吸睡眠暂停解剖

# Progress in Obstructive Sleep Apnea Syndrome in Non-Obese Patients

Hurexitanmu·Abuderexiti<sup>1</sup>, Kaidierya·Kuerban<sup>2</sup>, Beilin Liu<sup>1\*</sup>

<sup>1</sup>Department of Respiratory and Critical Care Medicine, Fifth Affiliated Hospital of Xinjiang Medical University, Urumqi Xinjiang

<sup>2</sup>Psychological Medical Center, The First Affiliated Hospital of Xinjiang Medical University, Urumqi Xinjiang

Received: Mar. 21<sup>st</sup>, 2023; accepted: Apr. 17<sup>th</sup>, 2023; published: Apr. 25<sup>th</sup>, 2023

## Abstract

Sleep disorders are of growing concern and are a major public health problem. The obstructive

\*通讯作者。

文章引用: 胡热西坦木·阿布德热西提, 凯迪日亚·库尔班, 刘北林. 非肥胖患者阻塞性睡眠呼吸暂停综合征研究进展[J]. 临床医学进展, 2023, 13(4): 6384-6388. DOI: 10.12677/acm.2023.134897

sleep apnea (OSA) is the most common among different sleep-related breathing disorders (SRBDs). Obesity is a known associated risk factor for the OSA but is not limited to them. OSA is also recognized in nonobese population. The description of OSA in non-obese patients in the literature is sparse. The clinical presentation is similar as in obese but has few differences as far as pathophysiology and polysomnographic features are concerned. The severity of OSA in nonobese has less severe manifestations thus requires early recognition and different treatment strategy to prevent mismanagement of these patients.

## Keywords

Sleep Apnea Syndrome, Non-Obesity, Non-Obese Sleep Apnea Pathophysiology, Non-Obese Respiratory Sleep Pause Dissection

Copyright © 2023 by author(s) and Hans Publishers Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## 1. 引言

睡眠障碍日益引起人们的关注, 并已成为一个主要的公共卫生问题。睡眠障碍包括睡眠期间呼吸困难, 并被统称为睡眠相关呼吸障碍。SRBDS 主要包括中枢性睡眠呼吸暂停综合征、阻塞性睡眠呼吸暂停、低通气/低氧综合征、非特异性/未定义的睡眠障碍[1]。SRBDS 中, 阻塞性睡眠呼吸暂停(OA)是最常见的。其特征是睡眠时上呼吸道重复、部分或全部塌陷导致间歇性低氧血症和睡眠碎片化[2], 这些使得 OSA 成为心血管事件[3], 糖尿病[4], 中风[5], 过早死亡[6], 认知功能下降[7]和生活质量差[8]等的危险因素。多导睡眠图是其诊断标准, 多导睡眠图显示 OSA 的严重程度通过呼吸暂停通气指数(AHI)指定[9]。AHI  $\geq 15$  既没有症状, 或 AHI 5 至 15 之间, 伴有上述相关症状的情况下才给予诊断, 具体分度为:  $5 \leq \text{AHI} < 15$  的 OSA 分为轻度,  $15 \leq \text{AHI} < 30$  的 OSA 分为中度,  $\text{AHI} \geq 30$  的 OSA 分为重度[10]。肥胖是 OSA 的主要危险因素[11]。除了肥胖、下颌后畸形、软腭松弛或巨舌症等解剖因素外, 许多其他因素也参与了该病的发病机制[12]。这些因素包括遗传易感性、吸烟、饮酒和性别。OSA 的病理生理学仍然很复杂: 很明显, 解剖易感因素存在于所有患者(30%无其他因素的患者) [13]。因此, 本文讨论非肥胖患者睡眠呼吸暂停综合征的特点。以下结合最新关于非肥胖 OSA 患者解剖及其他特征表现的研究进行综述分析。

## 2. 非肥胖 OSA 患者的解剖学因素

上呼吸道阻塞可能发生在在一个或多个水平, 包括鼻咽, 口腔, 咽咽(咽后空间), 舌后区域(舌后区域), 下咽(舌根和喉之间的区域)和喉[14]。而咽部是呼吸道(鼻孔和小气道除外)唯一可折叠的部分, 也是睡眠时上气道关闭或变窄的部位。咽部的通畅是由两种反作用力维持的, 即上气道肌肉(使咽部扩张和僵硬)和腔内负压(使咽部变窄)。这两者之间的不平衡是 OSA 产生的基础。口咽部咽后区和舌后区是 OSA 气道狭窄的常见累及部位[15]。在 OSA 中, 肥胖患者上气道软组织肿大可能起着更重要的作用, 而骨结构差异可能是非肥胖患者的主要原因, 因为肥胖和非肥胖患者的某些因素是相同的: 巨舌症、下颌后畸形、软腭组织改变、炎症和喉水肿(与吸烟、酗酒或胃食管反流有关)。在一项研究中, Mortimore [16]等人发现非肥胖 OSA 患者有过多的脂肪沉积, 尤其是上气道前外侧。Chierakul N [17]等研究认为, 非肥胖的男性患者通常具有更小的颈围、更短的甲颏距离, 这与骨性结构的差异相关。颈围与 OSA 之间是正相关的,

因此,对于非肥胖的患者,颈围也是需要注意的主要指标之一[18]。Sakakibara H [19]等人比较肥胖和非肥胖 OSA 患者的软组织异常,发现肥胖组软组织异常更重要。非肥胖患者的面部前后距离(A-P)较窄,骨性咽部较窄。

### 3. 非肥胖 OSA 患者的表型特征

关于非肥胖 OSA 患者的多导睡眠图参数,AHI 明显较低,最低氧饱和度超过 90%,而呼吸努力相关的唤醒明显较高[20]。Ghanem 和 Mahmood [21]在他们的研究中对 102 名患有 OSA 的非肥胖患者进行了研究,发现这一亚组的睡眠较少或醒来较多。Kumar [20]等人比较肥胖和非肥胖 OSA 患者的临床和多导睡眠图资料,他们的研究表明,在 OSA 患者中,肥胖患者的 BMI、男性性别、颈围和大声打鼾比非肥胖患者更普遍。此外,非肥胖的 OSA 患者通常更年轻,因此早期发现和护理可以降低与该综合征相关的长期风险[13]。一些作者支持这样的观点,即常见的临床和多导睡眠图特征提示了一种特殊的流行病理生理因素[22]。因此,在非肥胖患者中识别该综合征非常重要。

### 4. 非肥胖 OSA 患者的病理生理特点

非解剖学病理生理特征在促成 OSA 的存在中尤为重要,70%的患者有一个或多个非解剖学表型合并的解剖学因素[23]。主要的非解剖学因素如下:1) 睡眠时上气道肌肉反应性降低;2) 低呼吸觉醒阈值;3) 高环路增益。这些和其他病理生理因素相互作用,与上气道溃散和解剖学,最终决定 OSA 的发病和严重程度。低觉醒阈值的个体通常在严重的气体交换异常(低 SpO<sub>2</sub>)发生之前醒来。在这些患者中,慢性睡眠碎片化和间歇性缺氧有关联。引起 OSA 的其他非解剖学特征可能在非肥胖患者中也很常见,但唤醒阈值是唯一一个以非侵入性方式进行临床评分研究的因素。Redolfi [24]等人研究发现,在对非肥胖个体施加下半身正压后,每条腿中大约 160-190 毫升的液体转移到上躯干和颈部区域,这降低了上气道口径。在 Redolfi [25]等人的另一项最新研究中,发现这种液体在睡眠过程中会自发地从腿部转移到颈部,据报道这与 AHI 密切相关。然而,具有高 AHI 值的患者中,更多的液体汇集在间质区域,即使在非肥胖患者中也可能有助于 OSA 的发病[26]。Garg R [27]等在观察中注意到,与肥胖的受试者相比,非肥胖的受试者更有可能在睡眠中服用镇静剂。

### 5. 结论与展望

非肥胖 OSA 患者是一个具有解剖结构、多导睡眠图和病理生理特征的个体亚组。对于临床标志物较少的患者,早期识别该病至关重要,因为他们通常较年轻,对这些患者进行 OSA 治疗具有长期心血管疾病,糖尿病和中风等的预防作用,而老年非肥胖的 OSA 患者有心血管和神经疾病等共病,同时口咽肌薄弱,容易导致气道溃散并阻塞,因此导致被忽略。然而非肥胖患者还需要通过多导睡眠图研究进行彻底的临床评估和确认,因为许多表现白天嗜睡和疲劳特征的患者可能被错误地视为心理症状。近年来对 OSA 病理生理学的认识的提高为其根据亚群和机制个体化治疗提供了机会。在患有 OSA 的非肥胖成年人中,CPAP 的依从性差的问题强调了个性化治疗的日益重要的作用。

### 参考文献

- [1] Adir, Y., Humbert, M. and Chaouat, A. (2021) Sleep-Related Breathing Disorders and Pulmonary Hypertension. *European Respiratory Journal*, **57**, Article ID: 2002258. <https://doi.org/10.1183/13993003.02258-2020>
- [2] Bikov, A., Frent, S.M., Meszaros, M., et al. (2021) Triglyceride-Glucose Index in Non-Diabetic, Non-Obese Patients with Obstructive Sleep Apnoea. *Journal of Clinical Medicine*, **10**, 1932. <https://doi.org/10.3390/jcm10091932>
- [3] 尹恺. 中青年高血压合并阻塞性睡眠呼吸暂停低通气综合征患者心血管损伤特征分析[D]: [硕士学位论文]. 太原: 山西医科大学, 2021.

- [4] Reutrakul, S. and Mokhlesi, B. (2017) Obstructive Sleep Apnea and Diabetes: A State of the Art Review. *Chest*, **152**, 1070-1086. <https://doi.org/10.1016/j.chest.2017.05.009>
- [5] Otto-Yáñez, M., Torres-Castro, R., Nieto-Pino, J., *et al.* (2018) Obstructive Sleep Apnea-Hypopnea and Stroke. *Medicina*, **78**, 427-435.
- [6] Wickwire, E.M. (2021) Value-Based Sleep and Breathing: Health Economic Aspects of Obstructive Sleep Apnea. *Faculty Reviews*, **10**, 40. <https://doi.org/10.12703/r/10-40>
- [7] Gagnon, K., Baril, A.-A., Montplaisir, J., *et al.* (2019) Disconnection between Self-Reported and Objective Cognitive Impairment in Obstructive Sleep Apnea. *American Academy of Sleep Medicine*, **15**, 409-415. <https://doi.org/10.5664/jcsm.7664>
- [8] Lo Bue, A., Salvaggio, A., Iacono Isidoro, S., *et al.* (2020) OSA and CPAP Therapy: Effect of Gender, Somnolence, and Treatment Adherence on Health-Related Quality of Life. *Sleep Breath*, **24**, 533-540. <https://doi.org/10.1007/s11325-019-01895-3>
- [9] Salman, L.A., Shulman, R. and Cohen, J.B. (2020) Obstructive Sleep Apnea, Hypertension, and Cardiovascular Risk: Epidemiology, Pathophysiology, and Management. *Current Cardiology Reports*, **22**, 6. <https://doi.org/10.1007/s11886-020-1257-y>
- [10] Kapur, V.K., Auckley, D.H., Chowdhuri, S., *et al.* (2017) Clinical Practice Guideline for Diagnostic Testing for Adult Obstructive Sleep Apnea: An American Academy of Sleep Medicine Clinical Practice Guideline. *Journal of Clinical Sleep Medicine: JCSM: Official Publication of the American Academy of Sleep Medicine*, **13**, 479-504. <https://doi.org/10.5664/jcsm.6506>
- [11] Hsing, S.C., Chen, C.C., Huang, S.H., *et al.* (2022) Obese Patients Experience More Severe OSA than Non-Obese Patients. *Medicine*, **101**, e31039. <https://doi.org/10.1097/MD.00000000000031039>
- [12] 单珊, 苗玉花. 肥胖青少年上气道结构和体脂构成与阻塞性睡眠呼吸暂停的相关性研究[J]. 中国耳鼻咽喉颅底外科杂志, 2016, 22(4): 306-309+313.
- [13] Antonaglia, C. and Passuti, G. (2022) Obstructive Sleep Apnea Syndrome in Non-Obese Patients. *Sleep and Breathing*, **26**, 513-518. <https://doi.org/10.1007/s11325-021-02412-1>
- [14] Kumar, H.P.A. and Pushpa, K. (2021) Polysomnographic Study to Evaluate Obstructive Sleep Apnoea Syndrome in Obese and Non Obese Adolescents. *Journal of Clinical and Diagnostic Research*, **15**, CC10-CC12. <https://doi.org/10.7860/JCDR/2021/49412.15303>
- [15] 宋娜, 焦瑞华, 邵红峦, 等. 腭咽后区 MRI 测量参数对持续正压通气 OSAHS 患者临床评估的价值[J]. 临床误诊误治, 2019, 32(4): 59-63.
- [16] Mortimore, I.L., Marshall, I., Wraith, P.K., *et al.* (1998) Neck and Total Body Fat Deposition in Nonobese and Obese Patients with Sleep Apnea Compared with That in Control Subjects. *American Journal of Respiratory and Critical Care Medicine*, **157**, 280-283. <https://doi.org/10.1164/ajrccm.157.1.9703018>
- [17] Chierakul, N., Chaipattarapol, C., Ruttanaumpawan, P., *et al.* (2007) Comparison of Clinical and Polysomnographic Characteristics of Non-Obese and Obese Patients with Obstructive Sleep Apnea. *Journal of the Medical Association of Thailand*, **90**, 48-53.
- [18] Karakoc, O., Akcam, T., Gerek, M., *et al.* (2012) The Upper Airway Evaluation of Habitual Snorers and Obstructive Sleep Apnea Patients. *ORL: Journal for Oto-Rhino-Laryngology and Its Related Specialties*, **74**, 136-140. <https://doi.org/10.1159/000337134>
- [19] Sakakibara, H., Tong, M., Matsushita, K., *et al.* (1999) Cephalometric Abnormalities in Non-Obese and Obese Patients with Obstructive Sleep Apnoea. *The European Respiratory Journal*, **13**, 403-410. <https://doi.org/10.1183/09031936.99.13240399>
- [20] Kumar, P., Rai, D.K. and Kanwar, M.S. (2020) Comparison of Clinical and Polysomnographic Parameters between Obese and Nonobese Obstructive Sleep Apnea. *Journal of Family Medicine and Primary Care*, **9**, 4170-4173. [https://doi.org/10.4103/jfmpe.jfmpe\\_56\\_20](https://doi.org/10.4103/jfmpe.jfmpe_56_20)
- [21] Ghanem, A. and Mahmood, S. (2005) Is Obstructive Sleep Apnea (OSA) in Non-Obese Patients a Less Serious Disease than in Obese Patients? *Chest*, **128**, 231S. [https://doi.org/10.1378/chest.128.4\\_MeetingAbstracts.231S-a](https://doi.org/10.1378/chest.128.4_MeetingAbstracts.231S-a)
- [22] Bosi, M., De Vito, A., Kotecha, B., *et al.* (2018) Phenotyping the Pathophysiology of Obstructive Sleep Apnea Using Polygraphy/Polysomnography: A Review of the Literature. *Sleep and Breathing*, **22**, 579-592. <https://doi.org/10.1007/s11325-017-1613-3>
- [23] Eckert, D.J., White, D.P., Jordan, A.S., *et al.* (2013) Defining Phenotypic Causes of Obstructive Sleep Apnea. Identification of Novel Therapeutic Targets. *American Journal of Respiratory and Critical Care Medicine*, **188**, 996-1004. <https://doi.org/10.1164/rccm.201303-0448OC>
- [24] Yumino, D., Redolfi, S., Ruttanaumpawan, P., *et al.* (2010) Nocturnal Rostral Fluid Shift: A Unifying Concept for the

- Pathogenesis of Obstructive and Central Sleep Apnea in Men with Heart Failure. *Circulation*, **121**, 1598-1605.  
<https://doi.org/10.1161/CIRCULATIONAHA.109.902452>
- [25] Redolfi, S., Yumino, D., Ruttanaumpawan, P., *et al.* (2009) Relationship between Overnight Rostral Fluid Shift and Obstructive Sleep Apnea in Nonobese Men. *American Journal of Respiratory and Critical Care Medicine*, **179**, 241-246. <https://doi.org/10.1164/rccm.200807-1076OC>
- [26] Metin, M., Avcu, M., Ulcay, T., *et al.* (2021) The Relationship between Extracellular Fluid and Obstructive Sleep Apnea in Non-Obese Patients. *CRANIO: The Journal of Craniomandibular Practice*, 1-8.  
<https://doi.org/10.1080/08869634.2021.1894858>
- [27] Garg, R., Singh, A., Prasad, R., *et al.* (2012) A Comparative Study on the Clinical and Polysomnographic Pattern of Obstructive Sleep Apnea among Obese and Non-Obese Subjects. *Annals of Thoracic Medicine*, **7**, 26-30.  
<https://doi.org/10.4103/1817-1737.91561>