

CASE REPORTS

## A case of Madelung's disease presenting with obstructive sleep apnea

Charnsiri Segsarnviriyaya, MD<sup>1,2</sup>; Naricha Chirakalwasan, MD<sup>2,3</sup>

<sup>1</sup>Department of Otolaryngology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand; <sup>2</sup>Excellence Center of Sleep Disorders, King Chulalongkorn Memorial Hospital, Thai Red Cross Society, Bangkok, Thailand; <sup>3</sup>Division of Pulmonary and Critical Care Medicine, Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Madelung's disease is a rare condition characterized by diffuse, multiple, symmetric, nonencapsulated fatty accumulation predominantly in the neck and upper trunk, which can predispose to obstructive sleep apnea. This case report involves a 51-year-old man affected by Madelung's disease who complained of difficulty breathing and inability to sleep in a supine position. An overnight pulse oximetry was performed, and the result was suggestive of moderate to severe obstructive sleep apnea. After auto-titrating continuous positive airway pressure therapy, the patient was prescribed continuous positive airway pressure therapy at the pressure setting of 13 cm of water. Alcohol cessation was also advised. At the 6-month follow-up visit, a marked improvement in neck cosmetic appearance and alleviation of sleep disturbance-related symptoms were observed. Polysomnography finally confirmed the diagnosis of severe obstructive sleep apnea. This case illustrates that a patient with Madelung's disease may present with a clinical presentation of obstructive sleep apnea, which should be promptly diagnosed. Continuous positive airway pressure remains the treatment of choice.

**Keywords:** Madelung's disease, multiple symmetrical lipomatosis, obstructive sleep apnea

**Citation:** Segsarnviriyaya C, Chirakalwasan N. A case of Madelung's disease presenting with obstructive sleep apnea. *J Clin Sleep Med.* 2020;16(9):1603–1605.

### INTRODUCTION

Madelung's disease, also known as multiple symmetrical lipomatosis or Launois-Bensaude syndrome, is a rare condition characterized by diffuse, multiple, symmetric, nonencapsulated fatty accumulation. It is usually found in the head and neck region and upper trunk resulting in cosmetic deformities and neck movement reduction.<sup>1</sup> The incidence of Madelung's disease is high in middle-aged men (between the ages of 30 and 60 years) from Mediterranean countries with a history of heavy alcohol consumption. Recent studies have hypothesized that the decreased lipid oxidation effects of alcohol may play a role in the development of adipocyte hyperplasia.<sup>2</sup>

In some patients, fatty accumulation around the neck region can contribute to narrowing of the upper airway in various ways, including pharyngeal adipose tissue infiltration and macroglossia, resulting in sleep-related breathing disorders. Here we report a rare case of Madelung's disease with clinical symptoms and diagnosis of obstructive sleep apnea (OSA).

### REPORT OF CASE

A 51-year-old man was referred to the Excellence Center of Sleep Disorders, King Chulalongkorn Memorial Hospital, Thai Red Cross Society, Bangkok, Thailand. The patient noticed a gradually increased neck size over 3 years. He had difficulty breathing and experienced choking during sleep, particularly in a supine position, for several months. He was unable to sleep in a supine position and needed to be in a lateral or upright position. He did not have apnea, excessive daytime sleepiness (Epworth

Sleepiness Scale = 9), or dyspnea on exertion. He had a history of heavy alcohol and cigarette use.

Physical examination revealed enlarged soft tissue masses around the cheeks and anterior and posterior cervical regions (**Figure 1A**). His neck circumference was 95 cm, and micrognathia was observed. His body mass index was 26.6 kg/m<sup>2</sup>. Intraoral findings included macroglossia, tonsillar enlargement grade I, and Friedman tongue position grade IV. Fiberoptic laryngoscopy in an upright position showed a patent pharyngeal airway with intact bilateral vocal cord movement. Laboratory data including arterial blood gas and chest radiography were within normal limits. Electrocardiography did not show any signs of elevated pulmonary pressure or right ventricular hypertrophy.

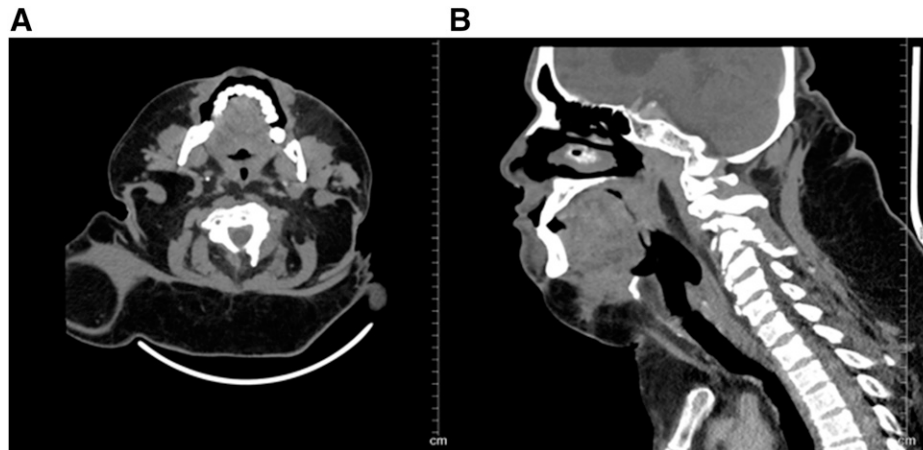
Computed tomography of the neck was performed showing nonencapsulated fatty tissue diffusely involving the subcutaneous layer of bilateral neck, supraclavicular region, and upper back, with severe narrowing of the oropharyngeal airway at the C2 level (**Figure 2**). These findings suggested Madelung's disease as the clinical diagnosis. The surgical management was discussed by otolaryngologists and neurological surgeons.

The patient was suspected to have OSA according to a positive score on the STOP-Bang questionnaire (STOP-Bang score = 4). An overnight pulse oximetry was performed for sleep-related breathing disorder screening as a presurgical assessment due to the unavailability of in-laboratory polysomnography. The study showed an oxygen desaturation index of 50.7 events/h, minimum oxygen saturation of 48%, and a cumulative percentage of time at an oxygen saturation below 90% during 61.3% of total recording time. The saturation waveform pattern demonstrated major desaturation followed by abrupt resaturation with clustering and a periodic

**Figure 1**—Front view of the patient with Madelung’s disease at the first visit (A) and at the 6-month follow-up visit after alcohol abstinence (B).



**Figure 2**—Computed tomography of the neck demonstrated nonencapsulated fatty tissue diffusely involving the subcutaneous layer of bilateral neck with severe narrowing of the oropharyngeal airway at the C2 level.



(A) Axial view. (B) Sagittal view.

pattern. These findings were highly suggestive of moderate to severe OSA.

The patient underwent an auto-titrating continuous positive airway pressure titration for 7 days. The downloaded data showed that the 90th-percentile pressure was 13 cm of water. However, after multidisciplinary conference, the decision was made not to perform surgery because the fatty tissue infiltrated important anatomical structures. Finally, the patient was prescribed continuous positive airway pressure (CPAP) at the pressure setting of 13 cm of water. Alcohol cessation was encouraged. The patient demonstrated remarkable improvement in symptoms and ability to sleep in the supine position.

At the 6-month follow-up visit, after alcohol cessation, a substantial improvement in neck cosmetic appearance was observed and neck circumference was reduced to 57 cm with no change in body mass index (Figure 1B). However, intraoral findings did not change, with persistent macroglossia and Friedman tongue position grade IV. Sleep disturbance-related

symptoms, including difficulty breathing and choking during the supine position, had resolved. Subsequently, split-night polysomnography with transcutaneous carbon dioxide monitoring was performed. The baseline portion of the study showed severe OSA (apnea-hypopnea index of 81.0 events/h) with a minimum oxygen saturation of 43%. Frequent arousal was observed (arousal index of 85.1 events/h). There was no evidence of sleep-related hypoventilation. Optimal CPAP value was obtained at 13 cm of water, similar to the pressure suggested by auto-titrating continuous positive airway pressure titration. At this CPAP pressure, mean and minimal oxygen saturation was 96% and of 95%, respectively.

## DISCUSSION

Madelung’s disease or multiple symmetrical lipomatosis was first described in 1846 by Brodie.<sup>3</sup> In 1888, Madelung reported

33 patients with cervical lipomatosis,<sup>4</sup> which was defined as a syndrome in 1898 by Launois and Bensaude.<sup>1</sup> They defined this syndrome as multiple symmetric nonencapsulated fatty accumulations involving the head and neck region and upper trunk. The etiology is still unknown. According to the literature, 60–90% of patients have a history of alcoholism. Furthermore, hyperuricemia, gout, liver disease, polyneuropathy, diabetes, and glucose intolerance have occasionally been identified in patients with Madelung's disease.<sup>5</sup>

Madelung's disease was classified clinically into 2 types of fatty accumulation pattern. The type I pattern is characterized by the deposition of nonencapsulated lipomatous tissue affecting the neck and supraclavicular and deltoid region, giving the patient a "pseudo-athletic" appearance. The type II pattern is characterized by diffuse adipose tissue extending down over the trunk, giving the patient an appearance of obesity.<sup>6</sup>

Madelung's disease usually has no symptoms apart from cosmetic disfigurement. In some patients, the diffuse deposition of adipose tissue around the neck region can contribute to compressive symptoms in the aerodigestive tract, including dysphagia, dyspnea, upper airway obstruction, and OSA syndrome.<sup>5</sup>

Diagnosis of Madelung's disease is based on physical history and clinical examination. Our patient is a rare case of Madelung's disease with atypical presentation. The patient complained of difficulty breathing, choking during sleep, and inability to sleep in a supine position. The complete ears, nose, and throat examination was necessary to exclude critical conditions such as impending airway obstruction or head and neck malignancies. Computed tomography provides valuable information by defining the level of obstruction.

The diagnosis of OSA in this patient was preliminarily made with an overnight pulse oximetry type 4 sleep study. Recent studies showed that overnight pulse oximetry is a reliable screening tool for OSA diagnosis. Ayache and Strohl<sup>7</sup> described that the accuracy of a high sleep apnea suspicion score (oxygen desaturation index  $\geq 10$  and abnormal waveform pattern) in detecting an apnea-hypopnea index of 15 events/h or higher ranged from 88.0% to 94% (sensitivity of 91.3–95.7%, specificity of 81.5–92.6%). The patient's result was compatible with a high score for suspicion of moderate to severe sleep apnea, corresponding with subsequent in-laboratory polysomnography results. Despite improvement in neck cosmetic appearance at the 6-month follow-up visit likely related to alcohol abstinence, according to the in-laboratory polysomnography result the severity of this patient's OSA and the optimal CPAP pressure setting did not change. These findings illustrate the importance of multifactorial risk factors for OSA, particularly among Asians, including craniofacial structure restriction, such as micrognathia observed in this patient.<sup>8</sup>

CPAP remains the mainstay treatment of choice for OSA in Madelung's disease. Complete surgical removal of this tumor can jeopardize important anatomical structures because the adipose tissue can infiltrate or encapsulate these structures. Surgical treatment is indicated for some cases to improve the symptoms using partial surgical resection or liposuction. Some reported cases with lingual involvement underwent partial

glossectomy to reduce the shape and size of the tongue to enable the resolution of OSA.<sup>9</sup> Functional expansion pharyngoplasty was also reported in a patient who could not tolerate CPAP.<sup>10</sup> Alcohol cessation should be encouraged in all patients.

## ABBREVIATIONS

OSA, obstructive sleep apnea

CPAP, continuous positive airway pressure

## REFERENCES

1. Launois E, Bensaude R. De l'ade'no-lipomatose syme'trique. *Bull Mem Soc Med Hop Paris*. 1898;1:298–318.
2. Nisoli E, Regianini L, Briscini L, et al. Multiple symmetric lipomatosis may be the consequence of defective noradrenergic modulation of proliferation and differentiation of brown fat cells. *J Pathol*. 2002;198(3):378–387.
3. Brodie C. Clinical lectures on surgery delivered at St. George's Hospital. Philadelphia: Lea and Blanchard; 1846.
4. Madelung OW. Ueber den Fetthals. *Arch Klin Chir*. 1888;37:10630.
5. Kohan D, Miller PJ, Rothstein SG, Kaufman D. Madelung's disease: case reports and literature review. *Otolaryngol Head Neck Surg*. 1993;108(2): 156–159.
6. Enzi G, Busetto L, Ceschin E, Coin A, Digito M, Pigozzo S. Multiple symmetric lipomatosis: clinical aspects and outcome in a long-term longitudinal study. *Int J Obes Relat Metab Disord*. 2002;26(2):253–261.
7. Ayache M, Strohl KP. High interrater reliability of overnight pulse oximetry interpretation among inexperienced physicians using a structured template. *J Clin Sleep Med*. 2018;14(4):541–548.
8. Wong ML, Sandham A, Ang PK, Wong DC, Tan WC, Huggare J. Craniofacial morphology, head posture, and nasal respiratory resistance in obstructive sleep apnoea: an inter-ethnic comparison. *Eur J Orthod*. 2005;27(1): 91–97.
9. Lopez-Ceres A, Aguilar-Lizarralde Y, Villalobos Sánchez A, Prieto Sánchez E, Valiente Alvarez A. Benign symmetric lipomatosis of the tongue in Madelung's disease. *J Craniomaxillofac Surg*. 2006;34(8): 489–493.
10. Pinto V, Morselli PG, Tassone D, Piccin O. A case of severe obstructive sleep apnoea in Madelung's disease treated by lateral pharyngoplasty. *J Laryngol Otol*. 2017;131(9):834–837.

## SUBMISSION & CORRESPONDENCE INFORMATION

Submitted for publication April 17, 2020

Submitted in final revised form May 25, 2020

Accepted for publication May 28, 2020

Address correspondence to: Naricha Chirakalwasan, MD, Division of Pulmonary and Critical Care Medicine, Department of Medicine, Faculty of Medicine, Chulalongkorn University, 1873 King Rama IV Road, Pathum Wan, Bangkok, Thailand, 10330; Email: narichac@hotmail.com

## DISCLOSURE STATEMENT

All authors have seen and approved the manuscript. Work for this study was performed at the Excellence Center of Sleep Disorders, King Chulalongkorn Memorial Hospital, Thai Red Cross Society, Bangkok, Thailand. The authors report no conflicts of interest.