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JCIMCR OPEN ACCESS Journal of Clinical Images and Medical Case Reports

ISSN 2766-7820

Case Report

Open Access, Volume 2

Madelung's disease: A case report of laryngeal localization and a review of the literature

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Received: May 01, 2021
Accepted: Jun 01, 2021
Published: Jun 03, 2021
Archived: www.jcimcr.org

Abstract

Madelung's Disease (MD), also known as benign multiple symmetric lipomatosis or Launois-Bensaude syndrome, is a rare condition. The characteristic feature is the presence of numerous diffuse lipomas at the level of the neck or upper limbs. The etiology is unknown, but a close association with ethyl abuse has been observed. The use of radiological examinations such as ultrasound, computed tomography and magnetic resonance imaging is helpful for the differential diagnosis. There are two classifications mainly used: The Enzi classification and the Donhauser classification. In this article we present a case of MD with laryngeal localization. A 50-year-old man was referred to our department complaining of dysphonia for about 6 months. An abnormal and diffuse enlargement of the anterior part of the neck was noticed, compatible with "Madelung's Collar". Fiberoptic examination of the larynx revealed the presence of a lipomatous-like neoformation of the left false vocal cord. The patient underwent surgical removal of the laryngeal neoformation with transoral laser microsurgery. With this article we suggest a possible diagnostic and therapeutic procedure for the treatment of laryngeal lipomatosis.

Keywords: Lipoma; TML; Larynx; Dysphonia; ENT.

Introduction

Madelung's Disease (MD), also known as Launois-Bensaude syndrome or multiple symmetric lipomatosis and benign symmetric lipomatosis [1], is a rare condition, with a prevalence of 1: 25,000. It mainly affects males living in the Mediterranean area, with a male: female ratio 15-30: 1 [2]. It presents with the appearance of diffuse lipomas in the proximal upper limbs and neck. The etiology is unknown, but it seems that catecholamines have a fundamental role in promoting the process of lipogenesis [3] and an association with chronic alcoholism (60-90% of patients) is reported [4]. In its classic form, a specific sign is represented by an important flaring at the level of the anterior neck, which is known as Madelung collar or horse collar [5,6]. Diagnosis is based on the patient's history and physical examination, while imaging in the form of ultrasound, computed tomography and magnetic resonance, can help in the differential diagnosis. In this report, we present a case of laryngeal MD and share our experience in its treatment.

Case report

A 50-year-old man presented with a 6-month history of mild dysphagia and progressive dyspnea. Flexible transnasal endoscopy revealed a cystic growth originating from the left ventricle, partially projected into the lumen, with partial reduction of the respiratory space. The lesion was approximately 1.5 cm in diameter, translucent in appearance and covered with normal mucosa (Figure 1a). Both vocal cords were moble and hypopharyngeal and laryngeal anatomy showed no other abnormalities. CT scan showed hypertrophy of the paraglottic adipose tissue at the level of the left false vocal cord, extended up to its free edge (Figure 2). Neck US showed hypertrophic - hyperechoic tissue apparently of lipomatous nature at the level of the neck and the parotid. Indication to surgical removal via Transoral Laser Microsurgery (TLM) was given. The size of the lesion and its well-defined border allowed for complete surgical excision. At the end of the procedure, a continuous wave laser treatment on the excisional margins and on the wound bed was performed [7], in order to prevent possible relapses (Figure 3).

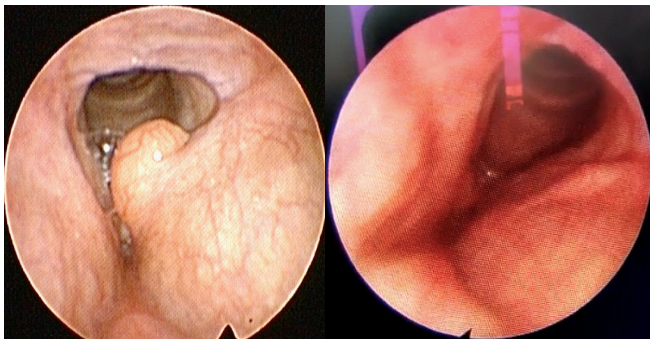

Figure 1: Pre and postoperative examination of the lesion with flexible laryngoscopy. **(a)** 1 cm neoformation of the left ventricle, projecting into the lumen. **(b)** At the 2-month follow-up visit, no recurrence or airway obstruction was found.

The patient was discharged the day after the surgery, reporting neither dysphagia nor breathing difficulties. Pathological examination revealed a 1.5 cm lipomatous formation with focal spindle cells, without atypia. After 2 months, no recurrence was noticed (Figure 1b).

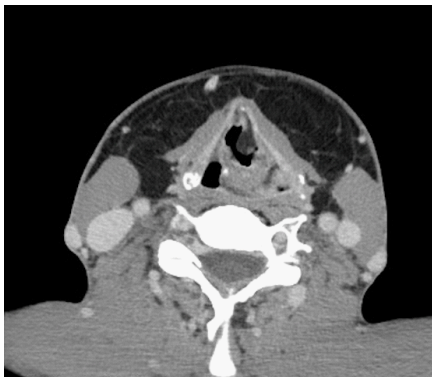

Figure 2: Computed Tomography (CT) of the lesion. A plain CT scan of the neck showed a well-circumscribed very-low-density mass located on the left false vocal cord. Transverse CT image.

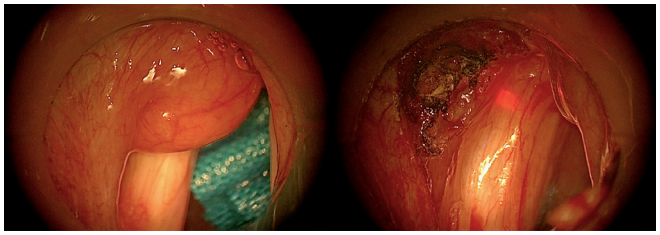

Figure 3: Removal of tumor. **(a)** Before the operation. **(b)** The lesion was completely resected by TLM with CO2 laser with post margin photocoagulation.

Table 1: Enzi and Donhauser classification of Madelung's disease.

Enzi	Donhauser	Affected body areas
Type 1	Type I (horse collar)	Neck, upper back, shoulder girdle, and upper arms
	Type II (pseudo athletic type)	Shoulder girdle, deltoid region, upper arms, and thorax
	Type III (gynecoid type)	Lower body, especially the thighs and medial side of the knees
Type 2	Type IV (abdominal type)	Abdomen

Table 2: Summary of reported cases of endolaryngeal lipoma from 1994 to today.

Author	Country	No. pts.	Age/ sex	Site	Symptoms
Eckel and Jungehülsing, [23] 1994	Germany	3	-	Hypopharynx	-
Zbären et al, [23] 1995	Switzerland	1	47/M	Larynx	-
Wenig et al, [23] 1995	USA	3	28/F 51/F 51/M	Supraglottic larynx (n = 2) and piriform sinus	Airway obstruction, dysphagia, throat discomfort, sensation of excessive secretion in the throat
Welinder et al, [23] 1996	Denmark	1	-	Vallecula epiglottica	Fatal airway obstruction
Anand, [13] 1997	India	1	48/M	Right aryepiglottic fold	Intermittent respiratory obstruction

Mevio et al, [14] 1997	Italy	1	-	Larynx	-
Gao et al, [23] 1997	China	1	-	Hypopharynx	Dysphagia, throat discomfort, and airway obstruction
Yoskovitch et al, [15] 1999	Canada	1	-	-	-
Barry et al, [23] 2000	France	5	M/F	Hypopharynx and larynx	-
Jungehülsing et al, [23] 2000	Germany	7	M/F	Hypopharynx and larynx	-
Maged and Riad, [23] 2000	Scotland	1	50/M	Larynx	Hoarseness and dyspnea
Srinivasan and Davies, [23] 2000	UK	1	57/M	Pharynx and larynx	Snoring and intermittent choking
Nishiyama et al, [23] 2001	Japan	1	82/F	Hypopharynx	Wheezing and intermittent breathlessness
Grützenmacher et al, [23] 2002	Germany	1	42/M	Left aryepiglottic fold	Throat discomfort and airway obstruction
Lippert et al, [23] 2002	Germany	2	-/-	-	-
Miloudi et al, [23] 2005	Morocco	1	57/F	Epiglottis	Dyspnea and dysphagia
Singhal et al, [23] 2005	India	1	56/F	Epiglottis	Fatal airway obstruction
Dereköy et al, [23] 2007	Turkey	1	63/F	Tonsil	Confusion, disorientation, and difficult intubation
Jawar et al, [17] 2007	India	1	63/M	Right arytenoid	Change of voice
Mitchell et al, [23] 2007	UK	1	62/F	Oropharynx	Stridor
Mattioli et al, [23] 2008	Brazil	1	58/M	Larynx	Hoarseness and dyspnea
Minni et al, [23] 2008	Italy	1	48/M	Paraglottic space	Hoarseness and soft voice
De Vincentis et al, [23] 2010	Italy	1	62/M	Right ary-epiglottic fold	Dyspnea, dysphonia
Mohammad et al, [23] 2010	Iran	1	41/M	Right supraglottic larynx	Voice change and dyspnea
Megan et al, [20] 2010	England	1	-/-	Larynx	-
Eyigor et al, [23] 2011	Turkey	1	60/M	Vocal fold and vocal process of the arytenoids	Hoarseness
Lee DH et al, [16] 2011	Korea	1	-	Larynx	Dyspnea
Nader et al, [23] 2012	Iran	1	63/M	Right aryepiglottic fold	Intermittent stridor and snoring
Landínez-Cepeda et al, [21] 2012	Spain	1	-/M	Larynx	Dyspnea
Lee HS et al, [22] 2013	Taiwan	4	-/M 56/M 57/M 50/M	Glottic larynx (n = 3) and larynx	Dyspnea, stridor, neck swelling, dysphonia
D'antonio et al, [24] 2013	Italy	1	65/M	Left true vocal fold	Hoarseness, choking spells, stridor, dyspnea
Cáceres et al, [25] 2013	Spain	1	-/-	Pharyngoepiglottic	-
Sotirović et al, [26] 2014	Serbia	1	-	Hypopharynx	-
Kodiyan et al, [27] 2015	USA	2	58/M 79/F	Larynx	Shortness of breath, dysphagia, and globus sensation. Non-progressive hoarseness and globus sensation
Tan et al, [28] 2016	Malaysia	1	55/M	Right vallecula	Odynophagia and mild shortness of breath
Bochnia et al [29] 2016	Poland	1	-/-	Left arytenoepiglottic fold	Light dysphagia
Hui Zhu et al, [30] 2016	USA	3	34/M 70/F 56/M	Left arytenoids	Hoarseness and difficulty breathing.
				Hypopharyx	Dysphagia and difficulty breathing.
				Posterior arytenoids and left piriform sinus	Difficulty breathing and swallowing
Acquaviva et al, [31] 2016	Italy	1	63/F	Left piriform sinus	Severe dyspnea
Deutsch et al, [32] 2016	UK	1	62/M	Left laryngopharynx	Intermittent airway obstruction, dysphagia
Demir et al, [33] 2016	Turkey	1	34/-	False vocal fold	Hoarseness, globus sensation

Wolf-Magele et al, [34] 2016	Austia	1	-/-	Larynx	Stridor and dyspnea
Nada et al, [35] 2017	Tunisia	1	32/F	Left aryepiglottic fold	Changes in voice
Burkes et al, [36] 2019	USA	1	-/M	Larynx	Hoarseness, dysphagia, globus sensation, and neck fullness
Reid et al, [37] 2019	Canada	2	-/-	Larynx	Dyspnea, hoarseness and stridor
Azimivaghar et al, [38] 2019	India	1	68/M	Left glottic	Dysphonia
Azandaryani et al, [39] 2019	India	1	47/M	Left supraglottic larynx	Hoarseness, dyspnea and neck fullness
Okromelidze et al, [40] 2019	USA	1	51/M	Left vocal folds	Hemoptysis and sore throat
Yunxia et al, [41] 2020	China	1	70/M	Suglottic	Progressive dyspnea
Qin-Ying et al, [42] 2020	China	1	65/F	Left epiglottis	Pharyngeal paraesthesia
Lombardo et al, [43] 2020	Italy	1	28/F	Left aryepiglottic fold	Dyspnea
Azar et al, [44] 2021	USA	1	35/M	Supraglottic	Dysphagia and dyspnea

Discussion

MD is a rare disease the pathophysiology of which is still unknown. Various theories have been proposed: A defect in the lipolytic pathway in response to catecholamines [3] or mutations or deletions of mitochondrial DNA [8]. Two different classifications are used in clinical practice: the classification by Enzi et al [9], based on the anatomical distribution of fat, and the more recently proposed by Donhauser et al [10]. Enzi's classification defines two categories: type 1, in which the distribution of fat is symmetrical and mainly involves neck, shoulders, supraclavicular triangle and proximal upper limbs and type 2, in which fat deposits are localized in the abdomen and thighs (also typical of the patient with classical obesity). The Donhauser classification defines three types of MD: Type 1 - neck distribution, type 2 - pseudo-athletic appearance and type 3 - gynecological appearance (Table 1).

The use of imaging is an aid in the diagnosis. CT scans primarily evaluate the size and location of the growth, while MRI provides superior definition of the soft tissues [11] allowing for better delineation of the extent and localization of the mass. On MRI, MD-related fat appears as unencapsulated and distributed along the vascular / muscular planes. On the contrary, the classic lipomas are localized in the subcutaneous space with an unencapsulated appearance.

Differential diagnosis encompasses other pathologies such as angiolipoma, neurofibroma, liposarcoma, lipoblastomatosis, lipodystrophy, lymphoma, neurofibromatosis and diseases of the salivary glands. Lipomas usually grow slowly and might cause aesthetic problems, rarely causing mass effect on surrounding structures, with symptoms depending upon their size and location. Laryngeal lipomas are rare, representing around 0.6% of all benign lesions of the larynx [12]. Given their location, they can be responsible for pharyngodynia, hoarseness, dyspnea and dysphagia. To date, 73 clinical cases of laryngeal lipomas have been found in the literature (Table 2).

The elective treatment of a laryngeal lipoma is radical surgical excision to reduce the chances of recurrence. Depending on the size and location of the tumor, endoscopic removal, with or without CO_2 laser, is indicated for lipomas smaller than 2 cm [36,37]. On the contrary, for non-pedunculated tumors or tumors larger than 2 cm, the definitive treatment is through an open technique with an external approach (thyrotomy, transhyoid pharyngotomy or lateral pharyngotomy) [36,38]. In the case exposed, the use of the TLM CO_2 laser proved to be effective in granting a radical excision in the absence of bleeding or other complications. The use of the photocoagulation technique on the resection margins was employed in order to decrease the chance of recurrence [34].

Conclusion

Lipomas of the larynx are rare and often asymptomatic diseases. However, as their dimension increases, they might lead to life-threatening clinical situations, including airway obstruction. In the literature, 2 cm lipomas represent the maximum limit for the use of intraoral surgery. Beyond this dimension, the surgical approach with an open technique might find indication. The use of the TLM with CO_2 laser made it possible to perform a less invasive surgery with a lower risk of bleeding, while granting a radical excision and a shorter hospitalization [26].

Authors' contributions: All authors contributed to data analysis and manuscript writing. All authors have reviewed and approved the final version of the manuscript.

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