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SFORL Guidelines

Guidelines (short version) of the French Society of Otorhinolaryngology (SFORL) on cervical lymphatic malformation in adults and children: Diagnosis

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ABSTRACT

Objectives: The authors present the guidelines of the French Society of Otorhinolaryngology (SFORL) for the diagnosis of cervical lymphatic malformation in adults and children.
Methods: A multidisciplinary work group was entrusted with a review of the scientific literature on the above topic. Guidelines were drawn up, based on the articles retrieved and the group members' individual experience. They were then read over by an editorial group independent of the work group, and finalized in a coordination meeting. Guidelines were graded A, B, C or expert opinion, by decreasing level of evidence.
Results: The SFORL recommends that complete ENT examination should be performed to identify lesions at high risk of complication or associated with poor prognosis. In case of diagnostic doubt, especially in latero-cervical or oral floor lesions, fine-needle aspiration cytology should be performed before therapeutic decision-making. One or more validated classifications should be used to assess treatment efficacy and monitor progression. The reliability of antenatal diagnosis should be ensured by associating MRI to ultrasound. In antenatal diagnosis, the locoregional extension of the cervical lymphatic malformation should be evaluated accurately for prognosis, and associated malformations should be screened for, to guide treatment options.

1. Introduction

Head and neck lymphatic malformations (LM) (ISSVA classification: International Society for the Study of Vascular Anomalies) are rare low-flow vascular lesions with incidence between 1.2 and 2.8 per 1000 deliveries. Under 2-year-olds are concerned in 90% of cases. Location is in the head and neck region in more than half of cases [1,2] (level of evidence, 4). Some, however, are detected only in adulthood. LMs comprise 2 anatomo-clinical types: macrocystic (> 1 cm, the most common), microcystic (< 1 cm), or mixed.

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Pathophysiology is poorly known, despite recent progress in biology and knowledge of the lymphatic system.

Drawing up guidelines on cervical LM in adults and children was confided to a nation-wide French multidisciplinary work group, using the formalized expert consensus methodology for good practice guidelines recommended by the French Health Authority (*Haute Autorité de santé* (HAS): http://www.has-sante.fr). A pilot group organized the logistics of the consensus conference, selected the editorial group, and analyzed the literature on a PubMed search. Guidelines were graded A, B, C or expert opinion according to decreasing level of evidence, in line with the literature analysis and guideline grading system of the French National Agency for Accreditation and Evaluation in Health (*Agence nationale d'accréditation et d'évaluation en santé*: ANAES). A rationale was drawn up, enabling an initial series of guidelines to be formulated, which were then assessed by the editorial group and adapted to the comments made.

2. Results

2.1. Clinical diagnosis

> Complete clinical ENT examination should be performed to identify lesions at risk of complication or with poor prognosis (Grade C).

Clinical signs depend on lesion size, extension, location and type (macrocystic, microcystic or mixed).

Diagnosis is usually suggested by a soft, fluctuating, pain-free swelling. Adjacent skin is normal, except in case of cutaneomucosal extension with small vesicles (lymphangiectasia), especially on the tongue. It is typically transilluminable.

Clinical presentation varies according to lesion type and location. Macrocystic LMs are usually soft, depressible, present at birth and with progressive growth. Microcystic LMs infiltrate surrounding tissue, causing soft-tissue expansion and inducing superficial vesicles [3] (level of evidence, 4).

Respiratory functional signs, swallowing and speech disorder should be screened for, as they indicate infiltration or extrinsic compression of pharyngolaryngeal structures. There may be episodes of dyspnea and dysphagia and edema of the tongue and oral floor, associated with oral bleeding, salivary leakage and speech or dental articulation disorder [4] (level of evidence, 4). Blemishes can have serious psychological and social impact.

Progression may involve more or less painful episodes of inflammation, superinfection or intracystic bleeding, inducing large sudden increases in volume [5,6] (level of evidence, 4). These episodes may be secondary to trauma or to infection, especially viral. Rare spontaneous resolution is reported in 3–15% of cases [7] (level of evidence, 3) [7] (level of evidence, 4).

Some authors report left predominance [8–10] (level of evidence, 4).

Three anatomic regions are frequently involved: face and oral cavity, parotid and submandibular gland, and neck [11] (level of evidence, 4).

Macrocystic lesions seem to predominate in the neck and microcystic lesions in the oral or maxillary cavity [10] (level of evidence, 4). Sun et al. reported that unilateral sub-hyoid LM was predominantly macrocystic [3] (level of evidence, 4).

Some exceptional sites have been reported, especially in adults: nasopharynx, palatine tonsil or vallecula [11] (level of evidence, 4).

In case of extensive head and neck involvement, upper airway impact is especially severe in younger subjects, as seen in children with LM of the oral floor, tongue or neck [12] (level of evidence, 4).

2.2. Radiologic diagnosis

> In case of diagnostic doubt, especially in latero-cervical or oral floor lesions, fine-needle aspiration cytology should be performed before therapeutic decision-making. (Grade C).

The aim of cervical LM imaging is to confirm diagnosis and determine extension, uni-or bilateral involvement and anatomo-radiologic type, and analyze anatomic relations to guide treatment planning.

Ultrasound in macrocystic forms finds large uni- or multiloculated, trans-sonar, avascular fluid pockets that may be heterogeneous, iso- or hyper-echogenic with fluid-fluid level in case of intracystic bleeding due to rupture of small septal vessels. Microcystic forms show an aspect of heterogeneous iso-echogenic tissue with multiple scattered subcentimetric fluid pockets, sometimes with normal vascularization on Doppler scan.

Fine-needle aspiration cytology can be contributive, sometimes finding lymphocyte-rich yellow fluid ruling out certain differential diagnoses of cervical cyst.

MRI determines deep extension, notably mediastinal, pharyngeal and laryngeal. It visualizes macrocystic forms, large lymphatic cysts hypointense on T1-weighted sequences and hyperintense on fat-sat T2, with hypointense trabeculae corresponding to septa. Hyperintense signal on T1 with fluid levels may be found in case of hemorrhagic content [13] (level of evidence, 4). After intravenous gadolinium chelate injection, only the cyst walls show enhancement [14] (level of evidence, 4). Infiltrating microcystic LM can be hard to diagnose, with misdiagnosis of venous malformation even on dynamic MRI angiography [15] (level of evidence, 4).

In periorbital LM, complementary brain MRI is recommended, as intracranial vascular abnormalities are associated in 70% of cases: developmental venous abnormalities (61%), cavernoma (6%), and/or pial or dural arteriovenous fistula (15%) [9] (level of evidence, 4).

CT is used only if MRI is contraindicated.

Arteriography, phlebography and lymphography are not contributive to exploration of head and neck LM.

Whenever possible, and especially in children, cystic lymphangioma should be monitored on ultrasound.

Differential diagnoses comprise congenital cyst (thyroglossal duct cyst, ranula, thymic cyst, branchial cyst, bronchogenic cyst or digestive duplication), and vascular abnormalities in children, and cystic metastasis of tonsillar or thyroid cancer in adults. In a retrospective study of 29 adults operated on for branchial cyst, Sira et al. found preoperative misdiagnosis (lymphatic metastasis of thyroid cancer or benign lesions: laryngocele, cystic neuroma or parotid cyst) in 21.7% of cases [16] (level of evidence, 4).

2.3. Classifications

> One or several validated classifications should be used to assess treatment efficacy and monitor progression (Expert opinion).

2.3.1. Prognostic classifications by location

Serres' classification (Table 1) groups LM according to head and neck location [17] (level of evidence, 4), with respect to the hyoid bone and uni- or bilateral involvement, but does not take account

Table 1
Topographic classification of head and neck lymphangioma (De Serres et al. [17]).

Type	Lymphangioma location
I	Unilateral sub-hyoid
II	Unilateral supra-hyoid
III	Unilateral supra- and sub-hyoid
IV	Bilateral supra-hyoid
V	Bilateral supra- and sub-hyoid

Table 2
Classification of laryngeal lymphatic malformation (Berg et al. [18]).

Grade I	Macro- or microcystic pharyngeal or tongue base lesions exerting mass effect on the larynx but not invading laryngeal structures
Grade II	Macro- or microcystic lesions infiltrating tongue base, vallecula or lingual side of epiglottis. No infiltration of laryngeal side of epiglottis or aryepiglottic folds or arytenoids. The endolarynx is easily exposed
Grade III	Macro- or microcystic lesions infiltrating laryngeal side of epiglottis or aryepiglottic folds or arytenoids, causing significant destruction. Endolaryngeal exposure more difficult
Grade IV	1) Microcystic lesions of tongue base or lingual side of the tongue, causing complete destruction of epiglottic relief 2) Macro- or microcystic endolaryngeal lesions. Clear visualization of the endolarynx impossible, whatever the intubation maneuvers performed

Table 3
Classification of LM with lingual involvement (Wiegand et al. [19]).

Grade I	Isolated superficial microcystic LM
Grade II	Isolated superficial microcystic LM with lingual muscle infiltration: A: lingual segment; B: extension to whole tongue
Grade III	Microcystic LM of tongue extending to oral floor
Grade IV	Extensive LM infiltrating tongue, oral floor and adjacent cervical structures

of macro/microcystic aspect. It guides prognosis, which is poorer for higher-grade types.

Berg's classification (Table 2) focuses on laryngeal locations, with 4 grades [18] (level of evidence, 4). It enables prognosis in treatment. Grades III and IV correlate with high rates of tracheotomy and decannulation failure.

Wiegand's classification (Table 3) grades microcystic lingual lesions for prognostic purposes [19] (level of evidence, 4). It comprises 4 grades according to extension and infiltration depth, with prognostic value.

2.3.2. Classifications by impact

The Cologne Disease Score (CDS) (Table 4) grades severity of signs from 0 to 2 (0: severe; 2: absent), with 5 items: respiration, feeding, phonation, esthetic aspect, and progression [20] (level of evidence, 4). The lower the grade, the more severe the impact and the poorer the quality of life.

The Lymphatic Malformation Function (LMF) instrument (Table 5) is a classification based on parental assessment of the impact of the child's head and neck LM [21] (level of evidence, 3). It comprises 12 items, rated 0 (never) to 2 (most of the time).

Table 5
Lymphatic Malformation Function (LMF) instrument (Kirkham et al. [21]).

	Items	Score
1	Oral bleeding	For each item: 0: never; 1: sometimes; 2: most of the time
2	Swollen tongue	
3	Difficulty chewing	
4	Difficulty swallowing	
5	Drooling	
6	Dysphonia	
7	Dyspnea	
8	Unable to do what he/she wishes	
9	Avoids going out in public	
10	Seems sad or angry	
11	Seems to be suffering	
12	Shows sleep disorder	

2.4. Antenatal diagnosis

To improve the reliability of antenatal diagnosis, MRI should be associated to ultrasound. (Grade C).

LM is present at birth in half of cases [22] (level of evidence, 4). Antenatal forms should be discussed within an antenatal diagnostic center, where ENT opinion may be sought.

LM can be diagnosed prenatally [23] (level of evidence, 4), as of GW6, in the vast majority of cases during 2nd semester ultrasonography [22] (level of evidence, 4). Doppler ultrasound characterizes masses as cystic or solid, shows absence of calcification, analyzes swallowing and fluid flow in the airway in the 3rd semester, but is not effective in visualizing the trachea. Fetal MRI provides more detailed upper airway assessment (multiplanar and 3D study, airway deviation and compression), and screens for differential diagnosis of a postnatal cystic cervical mass [24] (level of evidence, 4), such as teratoma [22,25,26] (level of evidence, 4).

In antenatal diagnosis, the locoregional extension of the cervical lymphatic malformation should be evaluated accurately for prognostic purposes. (Grade C).

Fetal MRI provides perfect visualization of the mouth, pharynx, larynx, trachea and mediastinum, shedding light on prognosis. However, account must be taken of malformation intrauterine growth dynamics: one-third of cervical LMs increase in volume during pregnancy, one-third are stable, and one-third diminish [27] (level of evidence, 4).

In antenatal diagnosis, associated malformations should be screened for, to guide treatment options (Grade C).

Table 4
Cologne Disease Score (CDS) (Wittekindt et al. [20]).

	Items specific to LM				Observer assessment	
	Respiration	Feeding	Phonation	Esthetics	Progression	Total (0–10)
2	Normal	Normal	Normal	No visible lesion	Improvement	
1	Impaired	Impaired	Impaired	Face/neck asymmetry	No change	
0	Tracheotomy	Enteral feeding	Absent	Blemish	Aggravation	

There are many reports of associations of LM with various other malformations or genetic abnormalities: notably, Noonan's syndrome [22,28] (level of evidence, 4), and trisomy 13, 18 and especially 21 [28,29] (level of evidence, 4). Organ abnormalities (essentially cardiac or urogenital), without necessarily being syndromic, are also frequently associated [22] (level of evidence, 4).

3. Conclusion

Clinical diagnosis of cervical LM aims to identify locations at risk of complications: i.e., suprahyoid, such as lips, hypopharynx, tongue or oral floor. MRI and ultrasound are the key examinations.

Disclosure of interest

The authors declare that they have no competing interest.

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