

# Head and neck lymphoedema

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## Abstract

*Lymphoedema is a common condition of tissue swelling and fluid retention due to improper tissue drainage and a sign of lymphatic system dysfunction. It may occur on the trunk, limbs and in the head and neck region – head and neck cancer. Head and neck lymphoedema is a common complication of ENT procedures. The research reveals that up to 50% of patients with head and neck cancer develop head and neck lymphoedema. The lack of appropriate diagnostics and treatment of lymphoedema leads to serious complications, longer hospitalization and much higher costs of treatment. Head and neck lymphoedema significantly increases the level of frustration in patients, especially those with cancer who experience greater stress and anxiety as a result of uncertain prognosis. Therefore, it is advisable to broaden the research on HNL diagnosis and treatment. This review presents symptoms, current diagnostic strategies, treatment and recommendations in head and neck lymphoedema.*

**Key words:** head and neck cancer, head and neck lymphoedema, complete decongestive therapy

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## Introduction

Lymphoedema is a condition of tissue swelling and fluid retention due to improper tissue drainage and a sign of lymphatic system dysfunction. We can divide this condition into primary and secondary. Primary lymphoedema is caused by congenital defects of the lymphatic system, while secondary lesions are acquired impairments [1]. Chronic lymph stasis leads to inflammation with the increased proliferation of fibroblasts and connective tissue. Lymphoedema can cover various areas of the body and is very often a serious complication of cancer treatment. It may occur on the trunk, limbs and in the head and neck region – head and neck cancer (HNC) [1].

The most common causes of lymphoedema are the removal of lymph nodes, radiotherapy, pre- or postoperative chemotherapy, injuries and infections (filariasis) [2–4]. Obesity is very often indicated as a significant risk factor for HNL; however, this mechanism has not yet been elucidated [5]. Recent results have also shown the

polymorphism in many genes that may be associated with lymphoedema, particularly in patients treated for breast cancer [6, 7]. According to Wolff et al. [8] and Tribius et al. [9], HNL may be a complication of the treatment with cisplatin and radiotherapy, although the relationship between HNL and cisplatin has not been confirmed.

HNC constitutes 3–5% of all neoplasms [10]. The research reveals that up to 50% of patients with HNC develop HNL [11–14]. According to Deng et al. [15], HNL was found in 75.3% of patients with HNC, including 9.8% with external oedema, 39.4% with internal oedema and 50.8% with mixed oedema. However, there are not many works that thoroughly discuss this issue.

## Symptoms

Progressive lymphoedema is manifested by a feeling of compression, initially without damage to the organ/tissue functions. This effect is not only aesthetic but also functional. We divide postoperative lymphoedema

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into early and late. Early (acute) lymphoedema is the result of lymph nodes removal and usually resolves after a few days or weeks. It seems that this is the effect of regeneration of the lymphatic vessels, which later in some individuals degenerate for various reasons and permanent lymphoedema develops. Delays can last from several weeks to many years. Significant lymphoedema of the face, mouth and neck can impair the ability to talk, hear, eat and breathe. In advanced cases, dyspnoea in the course of HNL may require tracheotomy [16]. Patients after laryngectomy often have a difficulty in swallowing and breathing or require voice rehabilitation due to HNL. Lymphoedema of internal organs seems to be unique for HNL. In cases of limb oedema, the lesions affect the skin and subcutaneous tissue.

After interventions in the area of the throat and larynx, intraoral oedema often occurs, which impairs the process of swallowing [17, 18] and may sometimes require gastrostomy to feed the patient. Dysphagia in the advanced stage of HNL leads to a significant reduction in the quality of life [18, 19].

In addition to collecting lymph, the lymphatic system is a part of the immune system, which is responsible for the transport of cells, and therefore, apart from oedema, the local immune system is also impaired. Patients with HNL are exposed to frequent bacterial and fungal infections.

The psychological effect also seems to be important because patients with cancer and the accompanying growing lymphoedema of the face and neck more often manifest the symptoms of depression [20]. The treatment of HNL is necessary due to the impairment of the function of tissues and organs, as well as a significant reduction in the quality of life [20, 21].

The symptoms are divided according to MDACC (M.D. Anderson Cancer Centre Head and Neck Lymphedema Program) into mild to moderate HNL (visible swelling under the chin or on the face, including the eyes and mouth, the feeling of compression and limitation of movement) and into moderate to severe HNL (hard oedema, damage to sight/hearing, problems with swallowing/breathing/eating/speaking, chronic ear pain) [22].

The prevention of HNL after surgery is very important also to prevent infections, because lymph stasis impairs local antimicrobial defence. It is also recommended to raise the head above the level of the body, especially during sleep; proper hydration of the skin is also advisable.

## Diagnosics

Diagnosis is usually made based on medical history and physical examination. In addition, imaging studies showing the abnormal lymph flow, and local accumulation of fluid such as lymphoscintigraphy, computed tomography, magnetic resonance imaging, near-infrared fluorescence imaging (NIRF) and ultrasound examination [17] can be performed. The measurements of neck circumference and distances between anatomic points are often used to assess HNL. HNL is evaluated using ISL classification (Table 1).

Internal oedema of the mucous membrane and soft tissues of the throat and larynx found in the endoscopic examination is assessed according to the Patterson scale.

Bioelectrical impedance measurements can also be used.

## Treatment

In order to avoid the complication of connective and fat tissue proliferation, the treatment of HNL should be implemented as soon as possible after making a diagnosis. Complete decongestive therapy (CDT) is the gold standard for the treatment of lymphoedema. This method, which is applied by therapists, consists of lymphatic drainage, compression therapy, physical exercises, skin hygiene education and avoiding infection. Manual lymph drainage (MLD), that is a part of CDT, is a method originally created for the treatment of chronic sinusitis [23, 24]. The technique had been improved for many years, until finally Foldi and Asdonk developed a scheme included in CDT.

In some cases, surgical treatment is required. Liposuction is performed in order to remove the accumulating lymph and adipose tissue [25] or to create lympho-venous anastomoses, especially as a prevention of oedema or treatment of the early stages [26]. It is also possible to perform tissue transplantation from other parts of the body [27]. Surgical treatment is implemented if CDT therapy is ineffective or when severe breathing or swallowing disorders occur.

According to Piso et al. [17] and Brad et al. [29], postoperative oedema significantly reduced following MLD, which was confirmed by Szolnoky et al. [30].

## Conclusions

Despite the constantly increasing head and neck cancer incidence, the patients' life span prolongs. Although aggressive therapy performed in patients with local progression of the tumour allows for full recovery, it leads to early and late iatrogenic complications [10, 31].

The number of indications for ENT procedures is also increasing, and surgery has become safer than before.

HNL is a common complication of ENT procedures. The lack of appropriate diagnostics and treatment of lymphoedema leads to serious complications, longer hospitalization and much higher costs of treatment [30]. HNL significantly increases the level of frustration in patients, especially those with cancer who experience greater stress and anxiety as a result of uncertain prognosis [32–35]. Therefore, it is advisable to broaden the research on HNL diagnosis and treatment.

### Conflict of interest

None.

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