

Assessment of head and neck lymphedema

By Marize Ibrahim

The World Health Organization estimates the incidence of head and neck cancers (HNC) worldwide is more than 550,000 cases per year.¹ In Canada, an estimated 7,400 Canadians will be diagnosed with head and neck cancer annually.² About 90% of all head and neck cancers are squamous cell carcinomas, making it the sixth leading cancer by incidence worldwide.¹ A strong association exists between HNC and certain environmental and lifestyle risk factors including tobacco and alcohol use, with evidence implicating human papilloma virus exposure.³ Multimodal treatments for HNC may include surgery, radiotherapy and chemotherapy. These may have significant acute and/or late side effects that could be physically, functionally, and psychologically debilitating.^{4,6} There is a need to investigate and address these side effects as early as possible in order to limit their long term sequelae.⁴

Head and neck lymphedema (HNL) is a significant and commonly neglected side effect that unfortunately remains underdiagnosed and understudied.⁷ HNL is defined as a build-up of fluid and inflammatory products in the interstitial space caused by a disruption of lymphatic flow, from surgery and/or radiation therapy.⁸ HNL could manifest externally (e.g. skin, face, neck, head), internally (e.g. oral cavity, tongue, pharynx) or both.⁸ This may profoundly impact critical physical functions (e.g. speech, breathing, swallowing, and eating), decreased quality of life (QOL), increased infection risk along with body image and psychological sequelae (e.g. anxiety, depression).^{4,6,8,9}



Marize Ibrahim MSc, PT, CLT-LANA is a lymphedema therapist working at the McGill University Hospital Center Lymphedema Clinic with Dr. Towers and her multidisciplinary team. She is a certified Clinical Specialist in Oncology by the Physiotherapy Specialty Certification Board of Canada.



The prevalence of HNL among those treated for HNC is significant but needs to be further defined. The literature has identified a prevalence range between 12% to 90%^{4,9} for external HNL, and as high as 97%⁶ for internal HNL. As external HNL is visible, it receives the greatest attention as it can easily be captured over time with a specialized lymphedema assessment including circumference measures and photographs.⁸ There are growing reports on the importance of addressing internal HNL, including the use of a transnasal laryngoscopy, which has been documented to be the best way to assess internal HNL.^{4,7,9} As this requires skilled technicians or physicians to perform; currently lymphedema therapists still have to

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rely on a physical evaluation to estimate the extent of the HNL.

There is to date no gold standard for assessing HNL. In fact, a lack of common evaluation tools has led to a wide variation in assessment methods between institutions currently managing HNL. An assessment protocol has been established at the McGill University Health Centre – Lymphedema Clinic, a Lymphatic Education & Research Network (LE&RN) of Excellence, using a multidisciplinary approach to evaluate HNL. The following is a brief outline of the assessment evaluation utilized.



Images of four patients from the MUHC Lymphedema Clinic displaying Head and Neck Lymphedema at various stages. Pictures attained with permission of patients.

Objective evaluation includes four sections:

- ① **General observation and posture evaluation:** mobility device usage and type, gait disturbances, posture. (i.e. torticollis tendencies, neck and scar contractures, cervical and thoracic spine kyphosis, scapular winging, shoulder depression/protraction, stoma and or PEG presence, scar mobility, etc.). Additionally, a visual observation is made on the location and severity of swelling.
- ② **Tissue change evaluation:** dryness, radiation dermatitis, neck pitting edema, fungal infection (thrush), induration, radiation fibrosis: mild/moderate/severe, trismus, and if any wounds or ulcers are present.
- ③ **Range of motion:** shoulder mobility, cervical spine/neck mobility (flexion, extension, rotation, side flexion combined movements), tongue mobility (frenulum, elevation, protrusion, lateralization bilaterally) and TMJ (depression, elevation, protrusion, retraction and lateral movements). TMJ mouth opening is taken based on a 3-finger test used in a clinical assessment to document any trismus.⁷
- ④ **Lymphedema circumference measures** are based on Lymphedema Outcomes in Patients with Head and Neck Cancer by Smith et al.¹⁰ Neck composite, circumferential measures are taken (i.e. superior, middle and inferior neck) along with right and left facial composite (i.e. tragus to: mental, mouth corner; mandible to: nasal wing, internal and external eye and mental; internal eye to mental). Furthermore, tragus-to-tragus measurements are taken. Although internal cheek edema may be palpated by the therapist, internal neck lymphedema is not traditionally assessed by the lymphedema therapist. Because this requires skilled technicians or physicians to perform, the lymphedema therapists have to rely on a physical evaluation to estimate the extent of the HNL. The revised Patterson Edema Scale is appropriate for use by trained professionals who regularly use endoscopy to assess patients with HNL to determine the degree of laryngeal and pharyngeal edema.¹¹

- ① **Medical history:** a thorough history is taken, including surgery, extent of lymph node dissection, chemotherapy and/ or radiotherapy. Surgical and pathology reports, if available, are verified to assist with the medical history intake. Medical imaging and notes regarding any cancer recurrence are reviewed to understand the extent of the HNC.
- ② **Both internal and external edema information:** is recorded including trigger of lymphedema, location, frequency of infection (cellulitis), and treatment management (including compression) to date, whether successful or not.
- ③ **Functional evaluation:** is performed using a head and neck function and symptom tool. Six conceptual domains are evaluated by the patient and therapist, regarding the impact of HNL on function and QOL, including: (a) Range of motion (neck mobility/stiffness, mouth opening/

temporomandibular joint mobility, tongue mobility, scar tissue restrictions, radiation fibrosis); (b) Difficulty with swallowing/ chewing (i.e. dysphagia; difficulty swallowing soft solids, solids, mashed or pureed food, thick liquids; difficulty chewing; teeth/ dentures present/absent/pending, etc.); (c) Speech, hearing and visual impairments (i.e. hoarseness, dysphasia, difficulty talking and/or being understood by others, voice changes, tinnitus, blurred vision, headache) (d) Appetite (i.e. increased/decreased, decreased salivation production and/ or dry mouth, thick saliva/ increased secretions); nausea/vomiting, frequent hydration, change in taste, altered senses including smell and weight loss (e) Lymphedema location (i.e. head, face, neck, throat, chin, cheeks, tongue) and (f) Psychological impact (i.e. pain, anxiety, feeling grouchy, tired/fatigued/lack of energy, depression, difficulty sleeping).

TABLE 1

MDACC Head and Neck Lymphedema Rating Scale

Levels	Description
0	No visible edema but patient reports heaviness
1a	Soft visible edema; no pitting, reversible
1b	Soft pitting edema; reversible
2	Firm pitting edema; not reversible; no tissue changes
3	Irreversible; tissue changes

Reference: Smith, B. G. (2019). *Lymphedema in Head and Neck Cancer. In Clinical Care and Rehabilitation in Head and Neck Cancer (pp. 377-396). Springer, Cham.*

Once the assessment has been completed, the lymphedema therapist may establish the stage of lymphedema using the M.D. Anderson Cancer Center (MDACC) head and neck lymphedema rating scale, which was adapted from the Foldi Lymphedema Rating Scale.¹² The scale is divided into 5 levels: a) 0 = no visible edema present, but patient reports heaviness; b) 1a = soft visible edema is present, with no pitting (reversible); c) 1b = soft pitting edema is present (reversible); d) 2 = firm pitting edema is present, no

reversible edema and no tissue changes, e) 3 = irreversible edema and tissue change are present.

Along with the stage of lymphedema, the therapist identifies a list of identified rehabilitation needs, to then establish and create an individualized treatment plan for the patient. Further details on the management of head and neck lymphedema will be discussed in a future article.

In summary, the treatment of HNC leads to post-treatment sequela including lymphedema,

which can worsen and pose a great challenge for patients and clinicians to manage. Unfortunately, HNL has not been well studied nor documented. This article summarizes an evaluation protocol followed at the MUHC Lymphedema Clinic for patients with HNL. Our early experience using an objective evaluation and treatment protocol holds promise for a better understanding of HNL in patients treated for HNC. 

A full set of references can be found at www.lymphedemapathways.ca

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