

Cutaneous Lymphatics and Chronic Lymphedema of the Head and Neck

M. A. Feely¹, K. D. Olsen², G. L. Gamble³, M. D. Davis⁴, M. R. Pittelkow⁴

¹ Mayo Clinic College of Medicine, Mayo Clinic, Rochester, Minnesota, USA

² Department of Otorhinolaryngology – Head and Neck Surgery, Mayo Clinic, Rochester, Minnesota, USA

³ Medical Director of Cancer Rehabilitation, Rehabilitation Institute of Chicago, Cancer Rehabilitation Center, Chicago, Illinois, USA

⁴ Department of Dermatology, Mayo Clinic, Rochester, Minnesota, USA

▲ Head and neck lymphatics are a complex vascular anatomic system that has been studied for millennia. Pan et al.'s recent cadaveric studies beautifully delineate this intricate network. Their work utilizes lymphoscintigraphy, a technique that affords both anatomic and functional data by tracking the clearance of gamma-emitting colloid injected into the dermal interstitium using a scintillation counter. While the details of this anatomic network are too expansive to explore in this abstract, Pan et al.'s work enhances our understanding of lymphatic drainage patterns in vivo and reinforces the diversity of these pathways amongst individuals. This is

Report on: **Cutaneous Lymphatics and Chronic Lymphedema of the Head and Neck.** Clin Anat 2012;25(1):72-85.

a valuable guide for clinicians in designing treatment plans for head and neck cancer and in comprehending the sequelae of infection and trauma in the region. To illustrate, melanomas of the head and neck do not

subscribe to stepwise drainage patterns, as a third unexpectedly metastasize to contralateral or otherwise remote sentinel lymph nodes.

The role of the cutaneous lymphatics is to maintain fluid balance by filtering interstitial fluid through interendothelial junctions in a process governed by the autonomic nervous system and the Starling mechanism. The anatomy and functional capacitance of the head and neck

Tab. 1: Differential Diagnosis for Head and Neck Lymphedema

Inflammatory	Congenital	Miscellaneous
Acne vulgaris Lymphedematous rosacea Morbus Morbihan Melkersson-Rosenthal syndrome Dermatomyositis Panniculitis Angioedema Sarcoidosis Irritant contact dermatitis Allergic contact dermatitis Systemic lupus erythematosus	Turner's syndrome Noonan's syndrome Hennekam syndrome Milroy's disease Mucopolysaccharidoses Sturge-Weber syndrome Apert's syndrome Infantile cortical hyperostosis McCune-Albright syndrome Facial hemiatrophy	Blunt trauma Postoperative and radiation trauma Amyloidosis Hypothyroidism Nephrotic syndrome Rosai-Dorfman disease Superior vena cava syndrome Scleromyxedema
Infectious	Malignant	
Erysipelas Filariasis Trichinosis Leprosy Herpes zoster Mononucleosis Tuberculosis	Lymphoma Lymphosarcoma Leukemia cutis Angiosarcoma Myeloma Mycosis fungoides Kaposi's sarcoma	

Adapted from Bernardini et al., 2000; Connelly and Winkelmann, 1985; Harvey et al., 1998.

lymphatics determine the evolution and distribution of lymphedema. Yet the pathophysiology and susceptibility for lymphatic dysfunction have not been well defined. To this end, we reviewed the demographics, presentation, associated conditions, histopathology, therapeutic regimens and clinical outcomes for patients with facial lymphedema throughout the literature. Table 1 organizes facial lymphedema into inflammatory, infectious, post-operative or radiation-induced, congenital-hereditary and miscellaneous categories. The debilitating diseases resulting from lymphatic dysfunction are frequently not well identified or respected clinically. Within the inflammatory subdivision, there is debate whether Morbus Morbihan, acne rosacea and acne vulgaris represent distinct clinical entities or are conversely one disorder. Anatomists provided the foundation for our current understanding of the head and neck lymphatic microanatomy and the pathophysiology underlying lymphatic dysfunction. Still there remains a wealth of knowledge to be discovered the field. This is reflected by many novel

studies recently reported on the subject, ranging from near-infrared fluorescence imaging to guide manual lymphatic drainage following head and neck surgery, to the anastomosis of donor and recipient lymphatics in skin grafts in mice models, reinforcing the potential for lymphatic regeneration through tissue transfer. It is our hope this review will improve the clinical recognition of head and neck lymphedema and motivate individuals in the medical and research fields to advance our understanding of the pathophysiology of this complex network, furthering our ability to prevent and treat disease processes resulting from lymphatic dysfunction.

Address for correspondence

Meghan A. Feely, MD
Mayo Clinic College of Medicine
Mayo Clinic
200 First St. S.W.
Rochester, MN 55905, USA
E-Mail: meghan.feely1000@gmail.com

