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REVIEW ARTICLE

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Lymph node transplantation for the treatment of lymphedema

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Lymphedema is a complex disease process with deranged lymphatic transport, fluid accumulation and secondary lipedema and fibrosis. This is a challenging disease to treat with a surgical focus on debulking and physiologic strategies. One strategy is the use of vascularized lymph node transplant (VLNT) to improve physiologic lymph clearance. In this article, VLNT is discussed in detail, including mechanisms, combined strategies, and outcomes.

KEYWORDS
lymphatic surgery, lymphedema, vascularized lymph node transplant (VLNT)

1 | INTRODUCTION

The lymphatic system is an important, albeit frequently forgotten, vascular system with a host of functions. The lymphatic system is a key component in fluid homeostasis, lipid metabolism, and immune control. It consists of a network of lymphatic vessels and lymph nodes which transport fluid, immune cells, macromolecules, and molecules packaged into carriers such as lipoproteins, vesicles, or exosomes. These all enter lymphatic capillaries to form lymph fluid which then flows through a network of afferent lymphatic vessels, lymph nodes and efferent (post-nodal) lymphatic vessels converging at the thoracic lymph duct where it drains directly into the venous system.

The clinical diagnosis of lymphedema is hallmarked by derangement of this dynamic system. In secondary lymphedema, surgically induced lymphatic obstruction is the catalyst for lymphostasis, lymphatic vessel hypertension, dilation, and eventual failure. Dermal backflow develops with lymph fluid leaking into the interstitial compartment and collecting within superficial lymphatic capillaries.

In primary lymphedema, there are areas of structurally aberrant lymphatics, though collecting vessels may be present, proximal flow is diminished or static.[1-3] Both conditions are amenable to surgical treatment, with indications and techniques related to lymph node transplant discussed in this manuscript.

2 | SURGICAL TREATMENT OPTIONS FOR LYMPHEDEMA

Lymphedema is one of the most challenging complications following oncologic surgery.[3] Concepts of lymphedema treatment have been engrained within plastic surgery since the time of Gilles and Millard who proposed "lymphatic wicks" to provide an alternative drainage pathway for extremities with obstructed lymphatics utilizing the waltzing flap concept. Since that time, the advent of microsurgery and innovations related to imaging technologies have expanded surgical options. Physiologic procedures, such as lymphovenous bypass and lymph node transplant have gained popularity as one mechanism to improve the drainage of a lymphedematous limb. Other procedures involving excision of diseased tissue have also been used with success to relieve symptoms as related to heaviness.