



ELSEVIER

**JPRAS**  
An International Journal of  
Surgical Reconstruction  
[www.JPRASurg.com](http://www.JPRASurg.com)

## CORRESPONDENCE AND COMMUNICATION

### All-star lymphatic supermicrosurgery: Multiple lymph flow diversion using end-to-end, end-to-side, side-to-end, and side-to-side lymphaticovenular anastomoses in a surgical field



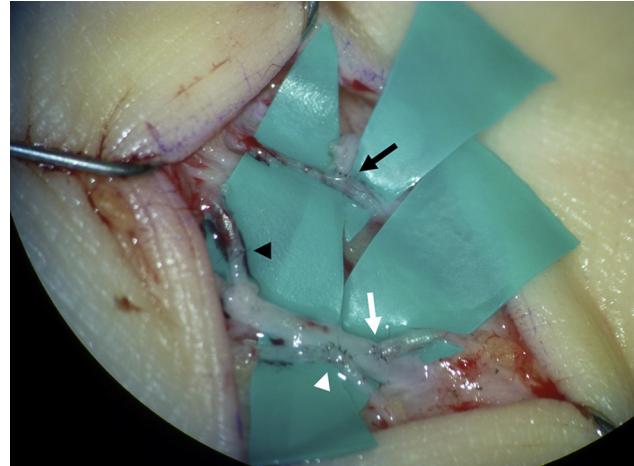
Dear Sir,

Supermicrosurgical lymphaticovenular anastomosis (LVA), or lymphatic supermicrosurgery, is performed to treat obstructive lymphedema. We use four types of anastomosis; end-to-end (E–E), end-to-side (E–S), side-to-end (S–E), and side-to-side (S–S) anastomoses.<sup>1,2</sup> It is important to increase the number of efficient diverts combining these anastomotic configurations according to vessels available in a surgical field.<sup>3</sup> It is very rare that these four anastomoses are applied in a single surgical field. We have experienced only one case in a thousand LVA cases. These anastomoses' collection, "all-star" anastomosis, is a very useful to understand advantages and disadvantages of each anastomotic configuration. We report a case to explain advantages and disadvantages of all four anastomoses.

There were 3 lymphatic vessels (upper, middle, and lower one) and 2 veins (small and large one) in a surgical field (Figure 1). Since the upper lymphatic vessel was less sclerotic and there was a small vein nearby, S–E LVA was performed. As the middle lymphatic vessel was severely sclerotic, an E–E or E–S anastomosis seemed appropriate. Since there was only one branch from the large vein, the proximal end of the lymphatic vessel was anastomosed to the branch of the large vein in an E–E fashion, and the distal end to the vein in an E–S fashion. We found the lower lymphatic vessel showing mild sclerosis and only a large vein close-by. Therefore, the lower lymphatic vessel was anastomosed to the large vein in a S–S fashion.

A S–E or S–S approach is suitable when lymphatic vessel sclerosis is mild, because S–E/S–S anastomosis diverts

both proximal and distal lymph via one anastomosis; time-saving than E–E/E–S. Then we decide which approach to use depending on the position and size of recipient vein.<sup>1,2,4,5</sup> When sclerosis is severe, on the other hand, a S–E or S–S technique is not appropriate because of the difficulty to create a window on a lymphatic vessel. In such a case, an E–E or E–S LVA is a method of choice and we select one of them depending on the position and size of recipient vein.<sup>1,2,4</sup> It is important for a surgeon to choose anastomotic configurations suited for the condition of the vessels for maximization of the number of LVAs in a surgical field.<sup>6,7</sup>



**Figure 1** All-star lymphaticovenular anastomosis. There were 3 lymphatic vessels (upper, middle, and lower one) and 2 veins (smaller and larger one). A S–E LVA was performed between the upper lymphatic vessel and the smaller vein (black arrow). The proximal end of the middle lymphatic vessel was anastomosed to the branch of the larger vein in an E–E fashion (black arrowhead) and the distal end to the sidewall of the larger vein in an E–S fashion (white arrow). A S–S anastomosis was performed between the lower lymphatic vessel and the larger vein (white arrowhead).

**Conflict of interest**

None.

**Funding**

None.

**Ethical approval**

N/A.

**Disclaimers and disclosure of conflicts of interest**

None.

**Sources of support that require acknowledgement**

None.

**References**

1. Yamamoto T, Narushima M, Kikuchi K, et al. Lambda-shaped anastomosis with intravascular stenting method for safe and effective lymphaticovenular anastomosis. *Plast Reconstr Surg* 2011;127(5):1987–92.
2. Yamamoto T, Yoshimatsu H, Narushima M, et al. A modified side-to-end lymphaticovenular anastomosis. *Microsurgery* 2013;33(2):130–3.
3. Yamamoto T, Narushima M, Yoshimatsu H, et al. Minimally invasive lymphatic supermicrosurgery (MILS): indocyanine green lymphography-guided simultaneous multi-site lymphaticovenular anastomoses via millimeter skin incisions. *Ann Plast Surg* 2014;72(1):67–70.
4. Yamamoto T, Yoshimatsu H, Yamamoto N, et al. Side-to-end lymphaticovenular anastomosis through temporary lymphatic expansion. *PLoS ONE* 2013;8(3):e59523.
5. Yamamoto T, Narushima M, Doi K, et al. Characteristic indocyanine green lymphography findings in lower extremity lymphedema: the generation of a novel lymphedema severity staging system using dermal backflow patterns. *Plast Reconstr Surg* 2011;127(5):1979–86.
6. Yamamoto T, Koshima I, Yoshimatsu H, Narushima M, Miura M, Iida T. Simultaneous multi-site lymphaticovenular anastomoses for primary lower extremity and genital lymphoedema complicated with severe lymphorrhea. *J Plast Reconstr Aesthet Surg* 2011;64(6):812–5.
7. Yamamoto T, Koshima I. In situ vein grafting for lymphatic supermicrosurgery. *J Plast Reconstr Aesthet Surg* 2014;67(5):e142–3.

Hitomi Matsutani  
Akitatsu Hayashi  
Takumi Yamamoto

Department of Plastic and Reconstructive Surgery, The University of Tokyo, Tokyo, Japan

E-mail address: [tyamamoto-tky@umin.ac.jp](mailto:tyamamoto-tky@umin.ac.jp)

24 October 2014