A New 30-µm Needle for Lymphatic Supermicrosurgery

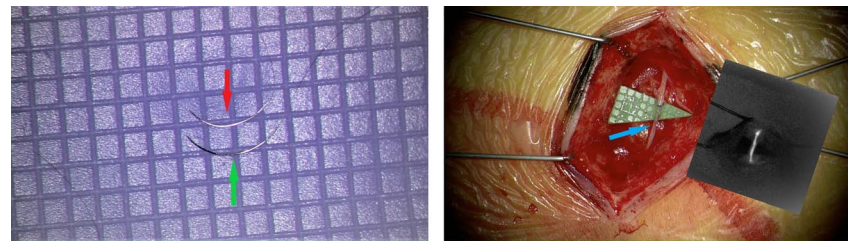

FIGURE 1. The newly introduced 30-µm needle (red arrow) and a 50-µm needle (green arrow) at the left panel. Supermicrosurgical LVA between a 0.2-mm lymphatic vessel (blue arrow) and a 0.3-mm vein performed with use of the 30-µm needle. The insert shows the patency of the LVA checked intraoperatively by ICG lymphography. full color online

Dear Editor:

We would like to comment on the article "Advanced Technical Pearls for Successful Supermicrosurgical Lymphaticovenular Anastomosis" recently published by Chen et al[1] in your journal.

We fully agree with the authors that proper instrumentation/equipment is of paramount importance (Technical Pearl 7) for successfully performing lymphovenous anastomoses (LVAs). It is indeed well-known that lymphatic vessels range between 0.1 and 0.6 mm. Lymphatic vessels harvested for LVA average 0.3 to 0.6 mm in size, and 50-µm needles will generally be adequate, as mentioned by Chen et al.[1] But nowadays small (0.1–0.3 mm) lymphatic vessels are increasingly being visualized with novel devices.[2] As a result, even these small-sized lymphatics can now be subjected to lymphovenous anastomosis. However, any needle unavoidably causes tissue damage including endothelial lesions and platelet aggregation, the extent being directly related to needle size.[3] Fine needles are therefore preferable, especially when dealing with small and thin-walled lymphatics.

Starting in April 2020, Regulation 2020/561 of the European Union has imposed stricter criteria regarding the medical use of microsutures manufactured outside Europe. While most approved companies still produce larger (50–80 µm) needles, alternatives for smaller needles needed to be explored. A new 30-µm needle (3R23 12-0 N; Keisei, Tokyo, Japan), with CE mark for use in Europe, features a tapered tip, 2-mm chord length, a 10-cm nylon thread, and suture size 12-0 (Fig. 1). Its characteristics (slender tip, limited curvature) render it extremely suitable for use in lymphatic microsurgery.

We report on the use (December 2020–February 2021) of this new 30-µm needle in 20 LVAs in 10 patients with lymphedema of the limb. As previously described,[4] lymphatic pathways visualized by indocyanine green (ICG) lymphography were marked on the skin. Intima-intima coaptation LVA was performed using a dedicated needle holder. Lymphatic vessels and veins had diameters of 0.2 to 0.4 mm and 0.3 to 0.8 mm, respectively. In total, 18 end-to-end and 2 end-to-side anastomoses were performed. All LVAs were patent as verified intraoperatively by ICG lymphography (Fig. 1).

Until recently, we used 30- and 40-µm needles (12-0 and 12-0S) manufactured by Crownjun, Chiba, Japan, for anastomosis of vessels 0.3 mm across or smaller.[5] For larger vessels, various 50-µm needles (suture size 11.0) are available. Compared with the formerly available 30- and 40-µm needles, the new 30-µm needle has a longer chord length. While advantageous to the operator because it is easier to handle, the needle's longer chord length, comparable to that of larger needles, is more traumatic to the vessel wall. Nevertheless, the new needle is more robust and less prone to bending and breaking after multiple penetrations in comparison with the previously used 30- and 40-µm needles. Furthermore, with the new microneedle even fragile, transparent ectasis-type lymphatics could be anastomosed to venules, an important benefit because flow is usually preserved in such lymphatics, thus favoring the good outcome.[6] This is also in agreement with Chen et al,[1] who prefer healthy and ectatic (mild injury) vessels in creating LVA (Technical Pearl 8).

The new microneedle is currently the only available and approved option in Europe for performing LVA on lymphatic vessels of below-average size. As the actual lymphatic vessel diameter can be assessed only perioperatively, we suggest that a variety of microneedles be at the surgeon's disposal to create the appropriate anastomotic configuration. This is line with the recommendations by Chen et al[1] (Technical Pearl 7) and will ensure optimal results including for patients with small lymphatic vessels.

Although microneedles can undoubtedly be developed further, for instance, a reduction of the chord length, our initial experience suggests that the new 30-µm needle will benefit thousands of patients with lymphedema. Unfortunately, its cost (>150€ apiece) and the required skills may limit its widespread availability and use. The latter could be overcome, thanks to the use of simulation models, which offer the full spectrum of supermicrosurgery from 0.1- to 0.8-mm vessels, as suggested by Chen et al[1] (Technical pearl 6).

We congratulate the authors for sharing their "tips and tricks" and are convinced that these are very helpful for supermicrosurgeons when performing LVA.

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