

Robotic-assisted lymphovenous anastomosis to treat periorbital lymphedema and systematic review of lymphatic reconstruction of face and neck lymphedema

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Background

Head and neck lymphedema (HNL) is a burdening disease, affecting up to 90% of patients with head and neck cancer. Up to date, diagnostic and therapeutic guidelines remain lacking. Initial management typically consists of conservative methods such as complete decongestive therapy, while surgical methods are mainly considered in persistent HNL. In this study, we reported on the first robotic-assisted lymphovenous anastomosis (LVA) in the face and neck region and systematically reviewed the current literature on surgical lymphatic reconstruction in patients with head and neck lymphedema.

Methods

In an 82-year-old patient presenting with bilateral periorbital lymphedema, a robotic-assisted LVA of a 0.2 mm lymphatic vessel was performed in the lower eyelid on both sides using the Symani® Surgical System. In addition, a systematic review on lymphatic reconstruction in patients with HNL was conducted following the PRISMA guidelines. The main outcomes were lymphedema reduction and improvement of functionality (e.g. eyelid closure). Moreover, subjective improvement of the disease was assessed.

Preoperative diagnostics



Fig. 1 (a) Preoperative high frequency ultrasound (24 MHz) to localize lymphatic vessels and veins, (b) ultrasound image showing a compressible vein (yellow hash) 3 mm next to a lymphatic vessel (yellow asterisk), (c) Indocyanine green (ICG) imaging identifying lymphatic collector

Robotic-assisted LVA

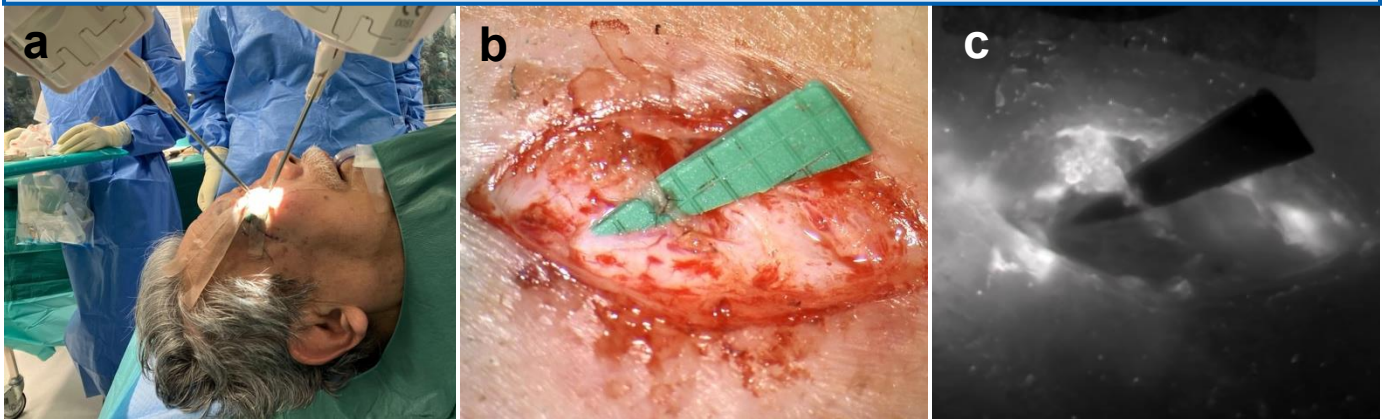
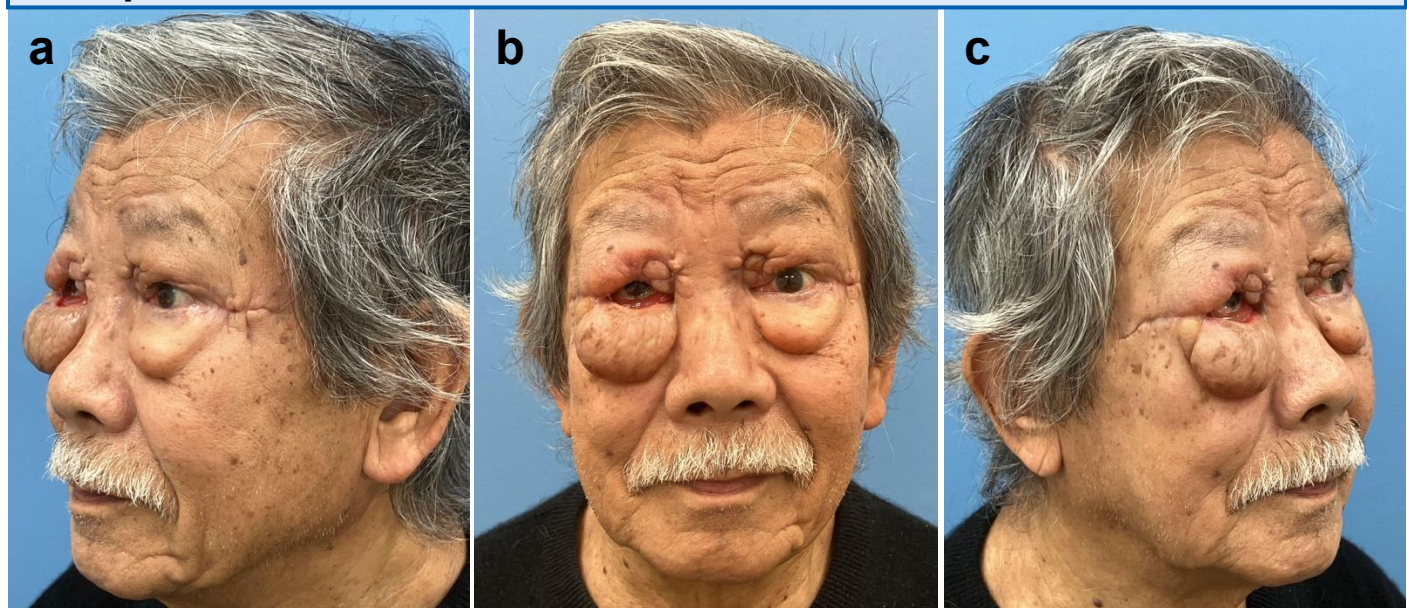


Fig. 2 (a) Intraoperative setup of the Symani Surgical System®, (b) A robotic-assisted LVA of a 0.2 mm lymphatic vessel was performed in the lower eyelid on each side of the face, (c) Intraoperative ICG-angiography showing anastomotic patency

Results

In our 82-year-old patient, bilateral robotic-assisted periorbital LVA led to a reduction of lymphedema, improved eye closure and enhanced physical appearance. The literature search yielded 468 articles, of which 10 studies were included in the systematic review. All included studies reported a reduction of lymphedema; several also described improvements in skin quality and eyelid function. LVA was the most frequently used method (n=8). Other reported techniques included lymph node-to-vein anastomosis (n=2), lymph vessel transplantation (n=1) and the use of a tubed deltopectoral flap as a “lymphatic bridge” (n=1). Additional debulking by tissue excision was described in two studies.

Preoperative



Postoperative (3 months)



Fig. 3 (a-c) Preoperative presentation with bilateral periorbital lymphedema, (d-f) 3 months after robotic-assisted periorbital LVA, eyelid lymphedema and eye closure have substantially improved

Conclusion

Robotic assistance is a feasible approach in lymphatic head and neck reconstruction and may expand technical possibilities by enhancing precision. Especially LVA is a safe and effective treatment method of HNL, showing promising results regarding lymphedema reduction, skin quality and eyelid function. Randomized controlled studies are required to establish clear recommendations for surgical management of HNL.