Lymphatic malformation (LM) can occur in the head and neck regions and cause cosmetic problems in adults. Sclerotherapy and surgical resection have been frequently applied; however, both are far from being minimally invasive in terms of aesthetic satisfaction, including the aesthetic downtime. We performed a less-invasive treatment using the venous anastomosis technique, named the lymphatic malformation–venous anastomosis (LMVA), mainly in pediatric patients with intractable microcystic lesions, in whom general anesthesia was required because the pediatric patients could not remain still. Here, we report the case of a 35-year-old man with a cystic submandibular LM successfully treated with LMVA under local anesthesia. He presented with a gradually enlarging LM on the neck. For improving aesthetics, LMVA was planned under local anesthesia. Lymphography by injecting indocyanine green revealed no inflow or outflow connection to the malformation; thus, we created an outflow bypass using the sidewall of the LMVA technique. The patient was discharged on the following day of the operation without any postoperative complications. A volumetric analysis 6 months later showed a 43.5% reduction of the malformation, with the patient being completely satisfied with the result. To the best of our knowledge, there has been no previous report on performing LMVA under local anesthesia in an adult. LMVA can be a novel treatment of choice when other options are less feasible. (Plast Reconstr Surg Glob Open 2020;8:e2974; doi: 10.1097/GOX.0000000000002974; Published online 24 July 2020.)

**CASE REPORT**

A 35-year-old Japanese man complained of a gradually enlarging left submandibular tumor over a 7-year period, with uncertain etiology. Magnetic resonance imaging (MRI) showed a polycystic lesion 61 mm in diameter attached to the left parotid gland (Fig. 1). He was diagnosed with LM, but no treatments were applied. When he complained of gradual enlargement of the tumor (72 mm in diameter on MRI) 6 years later, he was transferred to our department.

We first suggested treating the disfigurement using sclerotherapy; however, he was apprehensive about any postoperative complications. Therefore, the LMVA was planned. The patient provided informed consent for the publication of this report.

**PREOPERATIVE ASSESSMENT AND SURGICAL PROCEDURE**

For preoperative assessment, 0.02 ml of the fluorescent dye indocyanine green (ICG, Diagnostgreen; Daiichi Pharmaceutical, Tokyo, Japan) (0.25 mg/ml) was injected subcutaneously at the root of the nose and at the midpoint of a hair edge. The ICG flow was observed under an infrared camera system (PDE system; Hamamatsu Photonics, Shizuoka, Japan). The ICG injected at the hair edge flowed rapidly into the cervical lymph nodes on the
LM-affected side (Fig. 2). The ICG injected at the root of the nose flowed slowly toward the LM.

No apparent lymph flow into the malformation was observed. Thus, we planned to create an outflow bypass by LMVA and an additional bypass from the lineage lymph vessel to the venous system.

The operation was performed under local anesthesia. Two 2-cm skin incisions were made below the left earlobe and on the ICG linear pattern. Below the left earlobe, a sidewall of the LM and a subcutaneous vein of diameter 0.6 mm were anastomosed with a 11-0 nylon suture (Fig. 3). At the linear pattern, a lymph vessel of diameter 0.65 mm and a vein of diameter 0.7 mm were anastomosed in an end-to-end fashion with an 11-0 nylon suture. We did not confirm the patency in an objective way. Both the anastomoses were performed under a microscope (OPMI KINEVO 900; Carl Zeiss, Tokyo, Japan). The operation time was 1 hour and 52 minutes, and no intraoperative bleeding occurred. We used 1% lidocaine with epinephrine as local anesthesia, and the total amount was 1.6 ml.

**POSTOPERATIVE COURSE**
On the following day of the operation, the patient was discharged, without any swelling. Two months later, the LM showed gradual shrinkage, and 6 months later, it was remarkably reduced.

For objective analysis, the LM size was measured by MRI and 3-dimensional volumetric analysis. The MRI image 6 months after the operation showed apparent shrinkage of the cysts (Fig. 4). The volumetric data were acquired using

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**Fig. 1.** Preoperative coronal MRI of the LM. A polycystic lesion attached to the left parotid gland can be observed.

**Fig. 2.** Intraoperative findings of ICG lymphography. Linear patterns from the parietal region to cervical lymph nodes are observed. No apparent inflow or outflow connection to the malformation was observed. A dotted circle indicates the lesion location, with clinical swelling. The black line indicates left angle of mandible.

**Fig. 3.** A microscopic photograph demonstrating the LMVA. Blue arrow indicates LM sidewall. Yellow arrow indicates a subcutaneous vein.

**Fig. 4.** Coronal MRI 6 months after the operation at the same level as in Figure 1. The cysts showed apparent shrinkage.
In the presented case, no recurrence or intra-cystic bleeding was observed 9 months after the operation, and the malformation remarkably became less conspicuous. In adult cases, cosmetic downtime must be considered more than that in pediatric cases because of their social life. LMVA has the potential to become a treatment option due to its less-invasive nature. Further cases of LMVA are expected.

CONCLUSIONS

A case of submandibular LM was successfully treated by LMVA. LMVA is a minimally invasive surgery, without temporal swelling seen in sclerotherapy or possible damage due to surgical excisions, and can be a novel treatment of choice when other options are less feasible.

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