CASE REPORT

Lymphaticovenous anastomosis for facial lymphoedema after multiple courses of therapy for head-and-neck cancer

Makoto Mihara *, Gentaro Uchida, Hisako Hara, Yohei Hayashi, Hisashi Moriguchi, Mitsunaga Narushima, Takuya Iida, Takumi Yamamoto, Isao Koshima

Department of Plastic Surgery and Reconstructive Surgery, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8655, Japan

Received 1 October 2010; accepted 11 January 2011

KEYWORDS
Facial lymphoedema; Lymphaticovenous anastomosis; Supermicrosurgery; Lymphoedema therapy; Head-and-neck reconstruction; ICG; Intra-operative lymphography

Summary Lymphaticovenous anastomosis (LVA) is a treatment for lymphoedema that can improve lymph circulation by the anastomosis of lymph vessels and veins. A therapeutic effect of LVA for lymphoedema has been shown in limbs, but efficacy for other regions has not been shown. Lymphoedema in the head-and-neck region following cancer resection and radiotherapy is mainly treated with manual lymphatic drainage. However, there is no alternative when this treatment is ineffective because application of compression treatment using a bandage is difficult in this region. We used LVA for lymphoedema in the head-and-neck region and achieved a good outcome. Functional and dilating lymph vessels were identified using pre- and intra-operative fluorescent lymphography, and a lymph vessel with a diameter of about 0.2–1.0 mm was anastomosed with a vein using supermicrosurgery. The outcome of this case suggests that LVA is applicable for treatment of lymphoedema in the head-and-neck region.

© 2011 Published by Elsevier Ltd on behalf of British Association of Plastic, Reconstructive and Aesthetic Surgeons.

There are approximately 150–300 lymph nodes in the head-and-neck region, accounting for one-third of all lymph nodes in the body and suggesting a large volume of lymphatic drainage from this region.1 The volume of latent lymphatic flow is so large that it can supplement lymph even when many of the lymphatic pathways are lost. In many cases, swelling after surgery and radiotherapy for head-and-neck cancer is transient oedema that alleviates inflammation and then remits and disappears over a several-month course. However, serious conditions may occur that cannot be handled within the lymphatic system and that progress from simple oedema to lymphoedema.2

* Corresponding author.
E-mail address: mihara@keiseigeka.name (M. Mihara).
Local oedema can be improved by conservative treatment of the skin, prevention and treatment of infection and massage for dilation of collateral lymph vessels, but, once lymphoedema develops, the symptoms are difficult to treat. Lymphoedema in the four limbs and faciocervical lymphoedema both slowly aggravate. Manual lymphatic drainage is the most effective method to reduce oedema in the limbs, and is also often effective for the head-and-neck region. However, there is no alternative approach for head-and-neck oedema when this treatment is not effective, as compression therapy with a bandage or stocking is not applicable for the face and neck.

Lymphaticovenous anastomosis (LVA) is effective for lymphoedema in the limbs. Herein, we describe the case of a patient with faciocervical lymphoedema in whom LVA resulted in a successful outcome.

Case report

The patient was a 59-year-old man, who had previously developed five tumours in the head-and-neck region and had undergone total resection of cervical lymph nodes and radiotherapy. These procedures included radiation for laryngeal cancer 10 years ago, tumour resection and right neck dissection for hypopharyngeal cancer 8 years ago, resection of an esophageal tumour 7 years ago, resection of an oropharyngeal tumour 6 years ago and tumour resection and left neck dissection for laryngeal cancer 5 years ago. Consent for publication of the photographs in this study was obtained from the patient.

Facial lymphoedema developed after the surgical procedures and slowly aggravated. The patient was concerned that aggravation of upper eyelid oedema may impair eyelid opening and that aggravation of swelling of the cheek may cause dysarthria, in addition to aesthetic deformity. On physical examination, oedema of the upper eyelid and cheek was of the non-pitting form and was diagnosed as stage 2 lymphoedema. We instructed the patient to perform self-lymphatic drainage once a day and followed up the course for 3 months, but oedema did not improve. Compression using a bandage was tried, but still there was no improvement. Thus, after obtaining informed consent

Figure 1 In the top row, condition before lymphaticovenous anastomosis (LVA). Stage 2 facial lymphedema was observed in the bilateral upper eyelids and cheeks. In the bottom row, condition at 8 months after LVA. CT, subcutaneous fat of cheek, changed before and after LVA.
from the patient, we performed LVA with the aim of control of aggravation and improvement of symptoms. Surgery was initiated under local anaesthesia. Lymph vessels in the right preauricular and buccal regions were identified by intra-operative fluorescent lymphography using indocyanine green dye for near-infrared fluorescence labelling. Incisions of 2–3 cm in length were made in the bilateral preauricular and buccal regions, and lymph vessels and subcutaneous veins were searched for in the shallow fat layer Figures 1 and 2. Lymph vessels were found in the right preauricular and left buccal regions, and LVA was performed under a microscope. The diameters of the lymph vessels in the right preauricular and left buccal regions were 0.2 and 0.6 mm, respectively Figures 3 and 4. In the right preauricular, LVA had three interrupted sutures using 12/0 nylon. In the left buccal region, LVA had eight interrupted sutures using 12/0 nylon. We diagnosed the thickness of subcutaneous oedema with a computed tomography (CT) scan before operation and 1 year after operation. Surgery was completed without any problems, and there were no particular issues in the postoperative course. Lymphoedema did not improve rapidly after surgery, but

Figure 2 Condition of the patient at 8 months after surgery, showing marked improvement of oedema in the bilateral upper eyelids and cheeks.
slowly remitted over 6–10 months. Oedema of the bilateral upper eyelids and cheeks was markedly improved, and there has been no recurrence of cancer. Before LVA, CT showed that the thickness of subcutaneous fat in the cheek region was nearly 20 mm. After LVA, CT showed that the thickness was nearly 6 mm, indicating the thickness was reduced. Further, hardness of the cheek and neck region was getting increasingly softer after LVA on subjective symptom and manipulation test by the patient’s attending doctors.

Discussion

Lymphoedema of the bilateral eyelids and cheeks was the characteristic feature in this patient. Palpebral lymphoedema causes blepharoptosis or complete eyelid closure in rare cases, and may reduce visual acuity.8 Extended lymphoedema in the head-and-neck region thickens and hardens the skin, and deformity of appearance and large swelling in the mouth interferes with food intake. Moreover, hearing loss occurs secondarily to oedema of the external acoustic meatus and may markedly impair quality of life (QoL). Thus, there is a major need for effective treatment for lymphoedema.

As far as we are aware, this is the first example of a case in which LVA was effective for facial lymphoedema. This case had a favourable indication for LVA for the following three reasons: symptoms had aggravated and other treatments were ineffective; the patient was young (59 years of age) and marked impairment of QoL after cancer therapy was likely due to aggravation of oedema, and there had been no cancer recurrence for 5 years after cancer therapy. LVA is a curative treatment in which a new drainage pathway is prepared by artificially constructing a lymph vessel–vein bypass.5,6 In this patient, lymph circulation was bypassed by anastomosis of subcutaneous veins with congested superficial lymph vessels, which retained the blood flow and reduced the invasiveness of the procedure.

The important points in LVA are identification of a functioning and dilating lymph vessel by pre- and intra-operative fluorescent lymphography using indocyanine green dye for near-infrared fluorescence labelling7 and reliable anastomosis of the lymph vessel with the venous circulation. The supermicrosurgical anastomosis technique is very important in this procedure because the diameters of the lymph vessel and vein are approximately 0.3–0.5 mm.3 Capillary lymph vessels in the head-and-neck region have fewer valve structures, compared with lymph vessels in the limbs, and lymph flows relatively freely and is transported. Thus, promotion of cancer metastasis is of concern in preparation of an artificial shunt by LVA. Therefore, surgery should be performed after establishing that local recurrence and lymph node metastasis are unlikely by following up the course for a specific period after surgery for head-and-neck cancer. In our patient, LVA was performed after a 5-year follow-up after the final surgery (confirming the absence of cancer recurrence). Follow-up of 8–12 months after LVA is needed to investigate changes in the postoperative course, as the therapeutic effect may not appear rapidly. These points need to be kept in mind, but LVA has the advantages of being a low-invasive procedure
that is effective for treatment of lymphoedema in any region. This suggests that wider application of LVA to all types of lymphoedema is likely in the future. This case was not completely cured of facial lymphoedema. If this patient wants complete cure, lymph node transfer may be the next treatment. Lymph node and lymph duct transplantation is the new treatment of lymphoedema after lymph node dissection.9,10

Financial disclosure

Funding was from Departmental sources only.

Conflict of interest

None declared.

Funding

None.

References