

II-Y–Shaped Vascular Anastomosis for Free Flap Transfer in Head and Neck Reconstruction in Vessel-Depleted Neck

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Abstract: In vessel-depleted neck, salvage free flap transfer for head and neck reconstruction is challenging because the difficulty of selecting the recipient vessel and the discrepancy of vessel diameters. Here, the authors describe a novel technique for vascular anastomosis, which allows 2 thin donor veins end-to-end anastomosed with the larger recipient vein. This II-Y–shaped vascular anastomosis for free flap reconstruction were performed at Department of Head and Neck Surgery, Oral and Maxillofacial Oncology, West China Stomatology Hospital, Sichuan University. The patient received anterolateral thigh flap transfer after tumor excision. The ligated stump of external jugular vein was anastomosed to the enlarged accompanying veins of the anterolateral thigh flap. The flap survived completely without complications. The II-Y–shaped vascular anastomosis procedures were easy to perform and no complications were observed. Result suggests this novel technique could be useful in free flap transfer in vessel-depleted neck as an efficient way of adjusting the limited diameters.

Key Words: Blood vessel dissection, flaps, head and neck, reconstruction, surgical anastomosis

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Free flap transfer is one of the reliable methods for head and neck defect reconstruction, particularly after extensive resection of tumor.¹ However, when the salvage free flap reconstruction is required, vessel-depleted neck after regional dissection or radiotherapy can make it more challenging.² Although many anastomosis techniques have been reported to tackle the problem of limited recipient vessel or vessel diameter discrepancy, measure remains to be adjusted to reduce technical difficulties and to reach the ideal outcome. For example, to perform an anterolateral thigh (ALT) flap transfer in a vessel-depleted neck while the ALT flap providing very thin veins, we applied a novel method to enlarge the small diameter of the veins. With similar diameter with that of the only recipient vein, end-to-end anastomosis could be easily finished. We name this novel technique for vascular anastomosis as II-Y–shaped vascular anastomosis, which means to suture 2 thinner vessels into one with larger diameter to perform end-to-end anastomosis. Considering its efficiency in adjusting the unequal diameters, we discuss this novel technique in detail which may provide a solution in future clinical practice.

MATERIALS AND METHODS

First, the blood flow was blocked at the proximal point of the accompanying veins with the vein clamp. Second, using a microscissor, a triangle shape on the side of accompanying veins was cut along the long axis of each vein. The height of the triangle was approximate to the half of sum of diameters of these 2 accompanying veins. Then, these 2 accompanying veins was sutured from the peak to the bottom of the triangle to get the fused vein with a larger diameter. Finally, end-to-end anastomosis was performed with coupler under the microscope. The patency was checked more than twice after the anastomosis (Fig. 1A–E).

Case

A 44-year-old male patient presented to Department of Head and Neck Oncology, West China Hospital of Stomatology with prolonged tongue ulcer. In the previous record, pathological results indicated squamous cell carcinoma. Modified radical neck dissection had been performed while accessory nerve and sternocleidomastoid were preserved. Internal jugular vein was ligated and removed. Salvage radiotherapy and chemotherapy were performed after the first operation. Tongue cancer local recurrence was considered as preoperative diagnosis. The patient would need to undergo ALT flap transfer for the head and neck reconstruction after tumor ablation. Preoperative ultrasound examination found no residual stump of internal jugular vein and other proper veins for vascular anastomosis. During the operation, accompanying veins of descending branch of lateral femoral circumflex artery were relatively thin when harvested. Due to scar formation and tissue adhesion after surgery and radio-

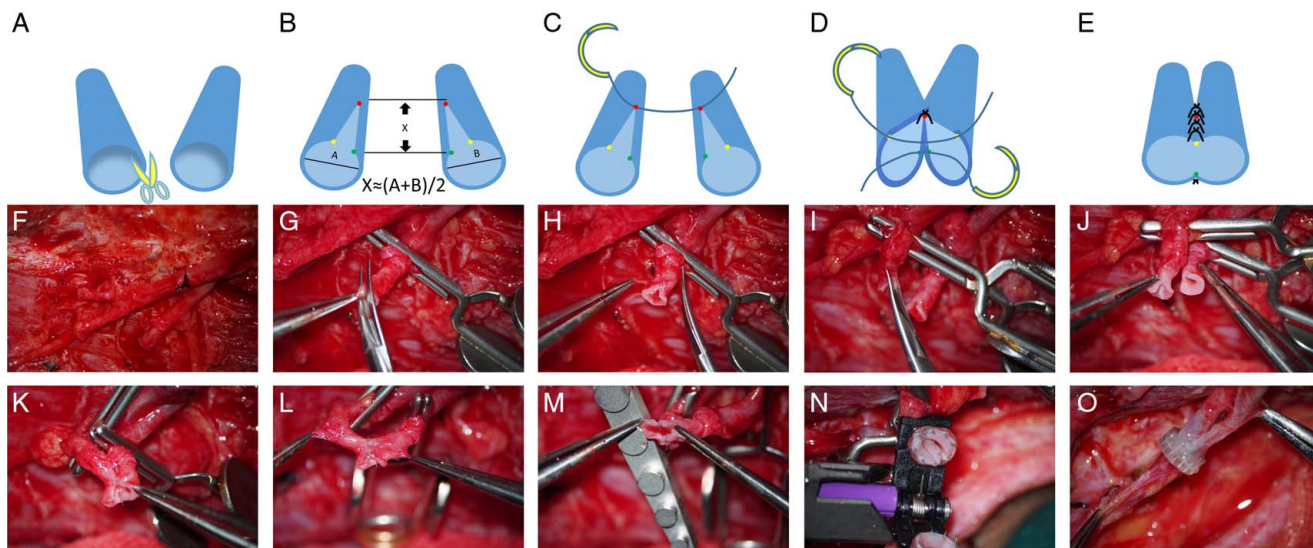


FIGURE 1. Schematic diagram (A–E) and intraoperative images (F–O) of II–Y-shaped vascular anastomosis.

therapy, it was difficult to dissect the appropriate vessels for anastomosis. Luckily, ligated stump of external jugular vein (EJV) was found at lower part of the neck where the transverse cervical artery located nearby. However, the diameter

of the vein is about 3.5 mm, while the diameters of 2 accompanying veins of ALT flaps were 1.5 and 1.7 mm. Using the II–Y vascular anastomosis, 2 accompanying veins were sutured to form a blood vessel with a diameter about 3.5 mm,

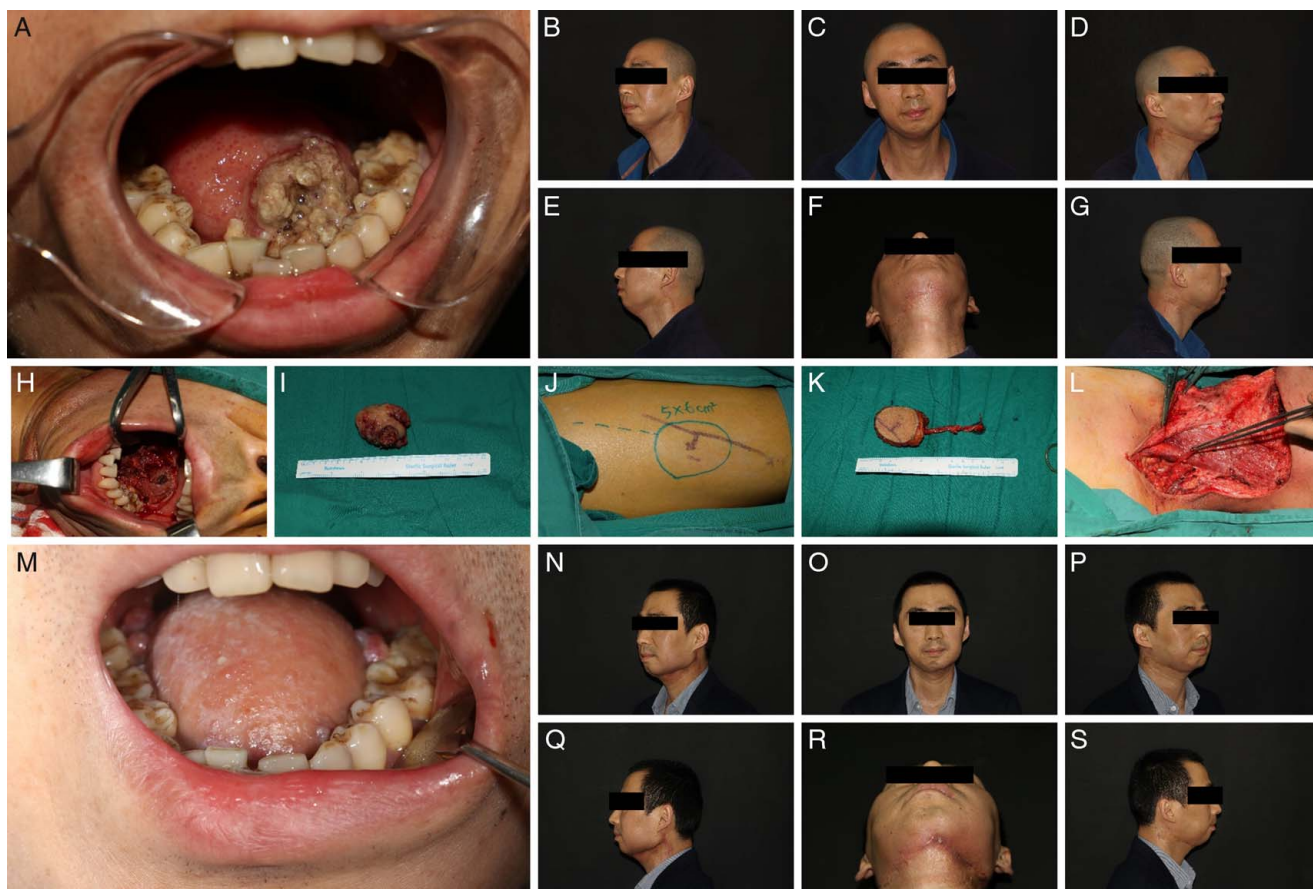


FIGURE 2. Preoperative (A–G), intraoperative (H–L), and postoperative (M–S) of the patient.

and then anastomosed with the ligated stump of EJV through a microvascular coupler. The flap survived without complications 30 days after the operation (Fig. 2M).

DISCUSSION

The main obstacle in the operation was discrepancy of number and diameter between recipient vessel and accompanying vessels. In regular flap transfer after neck dissection, veins with suitable diameters will be dissected and retained for selection. However, radiotherapy caused scarring and tissue fibrosis.³ Prior surgery distorted surgical landmarks and brings higher chance of tissue damage.⁴ Both impeded dissection of potential recipient vessels, especially when the sternocleidomastoid was preserved. The ligated stump of EJV was the only choice near the transverse cervical artery. Neither accompanying vein of the free flap (1.5 mm, 1.7 mm) was appropriate to anastomose to the ligated stump of EJV (3.5 mm) in the common end-to-end way, for the reduced venous blood velocity at anastomotic stenosis may lead to thrombosis formation.⁵ And the usage of 2 veins could significantly reduce the rate of venous congestion.⁶ Therefore, we chose to fuse the 2 veins to harvest the proper diameter. Under this circumstance, Y-shaped vein graft may be an alternative, while multiple anastomosis consumed operation time and increased operational injury.⁷ End-to-side anastomosis to ligated internal jugular vein could be a good choice,^{8,9} if it was preserved in the last operation (the ligated stump may be drew back to thoracic cavity).

The II-Y-shaped vascular anastomosis procedures were easy to perform and no complications were observed. Results suggested that this novel technique could be useful in free flap transfer in vessel-depleted neck.

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