The Boomerang-shaped Pectoralis Major Musculocutaneous Flap for Reconstruction of Circular Defect of Cervical Skin

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Summary: We report on a patient with a recurrence of oral cancer involving a cervical lymph node. The patient’s postexcision cervical skin defect was nearly circular in shape, and the size was about 12 cm in diameter. The defect was successfully reconstructed with a boomerang-shaped pectoralis major musculocutaneous flap whose skin paddle included multiple intercostal perforators of the internal mammary vessels. This flap design is effective for reconstructing an extensive neck skin defect and enables primary closure of the donor site. (Plast Reconstr Surg Glob Open 2017;5:e1579; doi: 10.1097/GOX.0000000000001579; Published online 20 November 2017.)

CASE REPORT

A 68-year-old man with oral squamous cell carcinoma had undergone right hemiglossectomy, ipsilateral neck dissection, and tongue reconstruction with a free anterolateral thigh flap. Four months after the first operation, the tumor was found to have recurred in a cervical lymph node and clearly invaded the neck skin. Wide resection of the tumor resulted in a circular neck skin defect 12 cm in diameter (Fig. 1). To reconstruct the defect, right PMMC flap with a boomerang-shaped skin paddle was elevated based on the thoracoacromial vessels. This skin paddle was harvested to include the first to fourth intercostal perforators of the internal mammary vessels (Fig. 2). The flap was transferred to the neck through the subcutaneous route. The 2 wings of the boomerang were bent in a U shape to cover the skin defect (Fig. 3). The donor site was closed primarily without a skin graft. The postoperative course was uneventful except a hematoma of the donor site, which was successfully managed with local anesthesia at his bedside. The bleeding point was easily found at the edge of pectoralis major muscle that was ligated with silk. Fourteen months after the operation, he was alive with no evidence of disease. The aesthetic results of the recipient and the donor sites were satisfactory, and there was no contracture of the neck (Fig. 4).

DISCUSSION

The PMMC flap is mainly fed by the pectoral branches of thoracoacromial vessels. Ariyan had described that the intramuscular course of the branches is along a line from the tip of the shoulder to the xiphoid process. The skin island of the PMMC flap is usually designed along this estimated line. However, the blood supply of the skin islands with this conventional design is known to be unstable, and a significant number of partial necroses have been observed.

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The vulnerability of the PMMC flap stems from the musculocutaneous perforators of the pectoral branches of the thoracoacromial artery being small and inconsistent. Detailed anatomic studies have recently revealed that the skin paddle of the PMMC flap should be designed not on the pectoral branch of the thoracoacromial vessels but on the intercostal perforators of the internal mammary vessels to improve the circulation. Rikimaru et al reported that not only including the fourth intercostal perforator that locates 1–2 cm medial to the nipple but also including first, second, and third intercostal perforators of the internal mammary vessels are important when harvesting the PMMC flap. The concept can be applied to the design of the PMMC flap, which has a large skin island with a complex shape. Miyamoto et al reported a T-shaped PMMC based on these findings for successful reconstruction of circumferential pharyngeal defect.

Our design of a boomerang-shaped PMMC flap was based on the concept described above and totally different from traditional design of the PMMC flap. We ignored the musculocutaneous perforators of the pectoral branch of the thoracoacromial vessels and focused on including multiple intercostal perforators of the internal mammary vessels to the skin paddle. Our design can capture the first to fourth intercostal perforators. Two wings of the boomerang-shaped skin island can be bent or twisted to meet each other into a circular shape without the marginal circulation being compromised. The donor site has an acceptable cosmetic result because it can be closed primarily, and deviation of the nipple can be kept minimal. We believe that this flap design can be a versatile option for the reconstruction of an extensive neck skin defect.

**CONCLUSIONS**

Boomerang-shaped PMMC flaps, based on multiple intercostal perforators, have stable blood supply and enable coverage of a large area without a skin graft. This flap design can be a versatile option for the reconstruction of an extensive neck skin defect in the vessel-depleted neck.
PATIENT CONSENT

The patient provided written consent for the use of his image.

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