Reconstruction of the Oropharynx With Free Posterior Tibial Flap After Tonsillar Cancer Extirpation

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Purpose: Oropharyngeal reconstruction after tonsillar tumor resection is a great challenge for head and neck surgeons. The aim of the present study was to explore the reconstruction efficacy of the free posterior tibial flap in the primary reconstruction of oropharynx defects after tonsillar squamous cell carcinoma (SCC) ablation.

Materials and Methods: From August 2009 to March 2012, 12 patients with tonsillar SCC underwent oropharynx reconstruction with a free posterior tibial flap at the Department of Otolaryngology Head and Neck Surgery, West China Hospital of Sichuan University. Their clinical and surgical data were retrospectively collected and analyzed.

Results: Of the 12 patients, 8 were male and 4 were female (age range 41 to 66 years, mean 55.1). The average size of the free posterior tibial flap was 9.2 × 6.3 cm (range 7 × 5 to 12 × 7), the average flap thickness was 1.1 cm (range 0.9 to 1.3), and the average pedicle length was 10 cm (range 7 to 12). Despite the multistep and time-consuming procedure, all patients tolerated oropharynx reconstruction with the free posterior tibial flap. The transferred free posterior tibial flaps survived well. No donor site complications were observed during the follow-up period. All 12 patients acquired satisfactory swallowing and speech function preservation.

Conclusions: Satisfactory reconstruction results were achieved for all 12 patients, indicating the free posterior tibial flap should be considered a potential treatment option for reconstruction of oropharynx defects. However, additional prospective studies with a larger sample size are required to validate our results.

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Tonsillar squamous cell carcinoma (SCC) is a highly aggressive tumor generally diagnosed at advanced stages. Although several methods have been used to treat tonsillar SCC, extensive ablative surgery plays an important role. However, oropharyngeal reconstruction after tonsillar tumor resection has been a great challenge for head and neck surgeons. It was reported that 70 to 80% of oropharyngeal SCC will be tonsillar SCC.[1] After primary surgical therapy, reconstruction of the oropharynx has always been a great challenge for head and neck surgeons owing to the complex function and anatomy of the oropharynx. The dynamic characteristics of the soft palate have made it very difficult to reconstruct its structure and function. Velopharyngeal incompetence and associated functional deficits related to speech have usually been considered

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the main reasons for reconstruction failure.[2-5] Because the defects will be different sizes and at different subsites, different reconstruction techniques could be required. A great number of reconstruction approaches have been introduced, including primary closure, tongue flaps, buccal fat pads, cheek flaps, myocutaneous flaps, free skin grafts, masseter muscle flaps, and free tissue transfer.[6] For advanced tumors and extensive oropharyngeal defects, alternative reconstruction approaches will be necessary to reconstruct oropharyngeal function.

In 1984, Okada et al[7] reported that satisfactory reconstruction results could be achieved using a free posterior tibial artery cutaneous flap to repair the arm with a deep contact burn. The anatomic basis of the free posterior tibial flap was then reported by Wu et al,[8] Hung et al,[9] and Chan et al.[10] Their studies showed that the posterior tibial vessels could run along the entire length of the tibia without any significant changes and that the septocutaneous perforators will be concentrated in the distal half of the leg and the vascular anatomy will be constant. Therefore, the free posterior tibial flap has attracted wider attention from surgeons.

The purpose of the present study was to investigate the reconstruction efficacy of the free posterior tibial flap in the primary reconstruction of oropharynx defects after the extirpation of advanced tonsillar malignant tumors. The specific aims of the present study were to measure the size, thickness, and pedicle length of the flap; and to estimate the procedural complications, assess the swallowing and speech functions, and analyze the flap survival rate.

Materials and Methods

MATERIALS

The present retrospective case series analyzed the clinical and surgical data from 12 patients with advanced tonsillar cancer, who had undergone free posterior tibial flap reconstruction to treat oropharyngeal defects from August 2009 to March 2012 at the Department of Otolaryngology Head and Neck Surgery, West China Hospital of Sichuan University. All the surgical operations were performed by the same surgeons. The histopathologic diagnosis was conducted by the hospital's pathology department. The TNM classification was in accordance with the International Union Against Cancer (2010). All the patients received postoperative adjuvant radiotherapy. The institutional review board of the West China Hospital (Cheng Du, Sichuan Province, China) approved the present retrospective review of medical records.

Patients for whom the posterior tibial flap could supply an appropriate size and thickness of flap, the recipient vessels could be acquired, and many posterior tibial perforators were present to offer an adequate blood supply as monitored by an ultrasound Doppler scan were considered eligible for the present study. The patients who had presented with severe signs and symptoms of peripheral artery disease of the lower limb and varicose veins of the lower limb on standing were excluded from the present study.

OPERATIVE TECHNIQUE

All patients underwent a preoperative evaluation of the lower limb vessels with an ultrasound Doppler scan. They also underwent dissection of the regional neck lymph nodes. During this procedure, the available recipient vessels were carefully identified and preserved, because these vessels would then be used for microvascular anastomosis. The main recipient vessels of all patients are listed in Table 1. Mandibulotomy was performed according to the position and size of the tonsillar SCC. When the tonsillar SCC mainly involved the tongue root and lateral wall of the hypopharynx, the tumor could not be resected completely through the oral cavity or neck; hence, mandibulotomy was performed (Figs 1, 2). When the tonsillar SCC mainly involved the soft palate, the tumor could be resected completely through the oral cavity without mandibulotomy (Figs 3, 4). Resection with an adequate margin was achieved in 3 dimensions. Tumor-free margins were confirmed by intraoperative frozen section analysis.

After resection of the primary tumor (Figs 5 to 8), the free posterior flap was harvested according to a previous study.[11] The actual size of the harvested free posterior tibial flap was determined by the size of the oropharyngeal defect. After the recipient vessels had been prepared, the posterior tibial artery and veins were transected, and the free posterior tibial flap was transferred to the defect site. The flap was initially sutured, followed by microvascular anastomosis (Figs 9 to 12). Usually, 1 artery was anastomosed, followed by 2 veins. The patency of the anastomosed vessels was evaluated by the skin temperature and color recovery of the harvested flap.

Table 1. ANASTOMOTIC VESSELS

Vessel	Cases (n)
Artery	
Facial artery	7/12
Superior thyroid artery	5/12
Vein	
Common facial vein	9/24
Superior thyroid vein	7/24
Internal jugular vein	3/24
External jugular vein	5/24

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