Chimeric anterolateral thigh free flap for reconstruction of oral cancer

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Abstract

Introduction: In recent years, cancer in the oral cavity has been a fairly common disease in Vietnam. The treatment of this pathology requires the coordination of many different specialties such as wide resection of the tumor, reconstructive surgery, radiotherapy, chemotherapy. Reconstruction of post-excision tumors in the oral cavity is always a challenge with the surgeon. The report aims to provide outcomes and share our chimeric ALT flap experience to cover defects after oral cancer resection.

Patients and Methods: Cross-sectional study on 18 patients who had reconstruction with free flap after wide resection cancer's tumor in the oral cavity. Research randomly selected for age and gender. The results evaluate the flap survival rate, the degree of coverage, function, and aesthetics after surgery, the 5-year survival rates.

Results: 18 patients had the ratio of male/female: 14/4; age ranged from 39 to 62 years old. Pathology's results of 15/18 patients were squamous cell carcinoma; 3/18 is adenoma mucoepidermoid carcinoma. The proportion of patients having chemotherapy before surgery is 4/18, radiation before surgery is 6/18. 100% flap survival rate is 16/18; Partial necrosis of the flap 2/18. 18/18 patients had radiation therapy after surgery. The 5 – years survival rate to the end of the study was 11/18.

Conclusion: Using chimeric ALT flap to cover the defect after cancer tumor removal in the oral cavity is an optimal choice with many advantages: the ability to cover a wide defect so it can be cut broadly, preserving the maximum function of the oral, minimizing morbidity at the donor site. However, the surgery needs teamwork of highly trained, multi-specialist coordination and modern equipment.

Introduction

Oral cavity cancer is currently a common disease globally; according to some studies, the rate of oral cavity cancer in developing countries ranks third after stomach cancer and uterine cancer [1]. Extensive surgical resection of the tumor is one of the prognostic factors in treatment. Therefore, reconstructive surgery for healing as well as aesthetics plays an important role. Many techniques are used, such as direct closure, local flap, or pedicle

flap reported by the authors in the world literature [2-4]. Since the 1970s, microsurgical surgery applications had shown outstanding performance, especially with significant defects, when free flaps were used. The purpose of the article is to present some experiences and advantages, and limitations of using the chimeric anterolateral thing (ALT) free flap to restore function and aesthetics after resection of oral cavity cancer.

Patients and methods

A descriptive, cross-sectional clinical study was performed on 18 patients diagnosed with intraoral cancer. The oral defect has been covered with chimeric ALT flaps or combined flaps from 2016-2021 at Viet Duc Hospital.

All patients were diagnosed with cancer through preoperative biopsy, preoperative CT-scanner, or MRI. ALT flaps are to be used for oral cavity reconstruction in the same phase as cancer resection.

Patients were evaluated according to the survival rate of the flap, function, and aesthetics after surgery, the 5-year survival rate.

Surgical methods:

Tumor removal was conducted by ENT surgeon and subsequent evaluation of surgery-related defects were conducted by the same a plastic surgeon team. The chimeric ALT flap harvesting technique steps are as follows:

1) Design the flap around the perforators identified on Doppler, make sure that the flap has more than one perforator

2) Incise the flap medially to the deep fascia of rectus femoris muscle; preserved fascie latae

3) Identify suitable perforators from the descending branch of lateral femoral artery in intermuscular septum between the rectus femoris and vastus lateralis muscles;

4) Isolated the chosen perforators in a retrograde fashion to the descending branch of lateral circumflex femoral artery.

5) If ALT flap had only one perforator, used the combined ALT-TFL flap. In case, they were not supported by the same pedicle, anastomosed perforator of TFL flap to terminal distance ALT pedicle.

After harvesting, the flap was split into 2 paddles according to the cutaneous, and applied to the defects with vessel anastomosis.

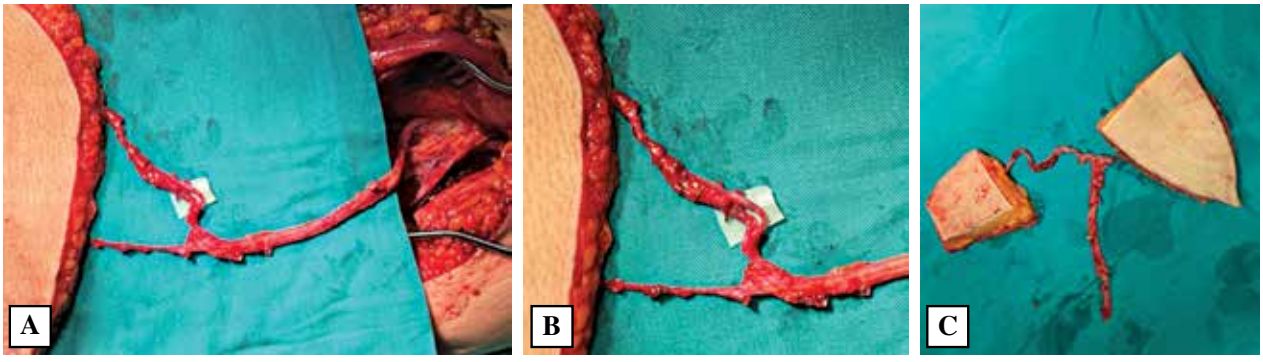

Fig 1. A, B: Anastomosed perforator of TFL flap to terminal distance ALT pedicle. C: Combined ALT-TFL flap.

Postoperative treatment

All patients were maintained on nasogastric feeding tube, and also received wound care, airway management, anticoagulants drugs, anti-biotic drugs and anti-inflammatory drugs. Their flaps were monitored by handle held Doppler postoperatively.

Results

From 2016-2021, 18 patients with cancer of oral soft tissue were enrolled in our study. The age of patients between 39 and 62 years old, male/Female ratio: 14/4; aged 39-62 years old, 18/18 patients had radiotherapy after surgery. The survival rate over five years to the end of the study was 11/18 (Table 1)

Table 1. Patient details

		No of patient	Total
	Male Female	14 04	18
Tumor's location	Maxillary sinus-palate Tounge, floor of the mouth Retromolar trigone extending to the tonsillar area	6 8 4	18
Pathology	Squamous cell carcinoma (SCC) Adenocarcinome	15 3	18
Flap survival	100 % Partial necrosis	16 2	18
Flap design	Chimeric ALT Combined ALT-TFL flap (02 island)	13 3	18
Radiotherapy postoperative		18	18/18
05-years survival		11	11/18

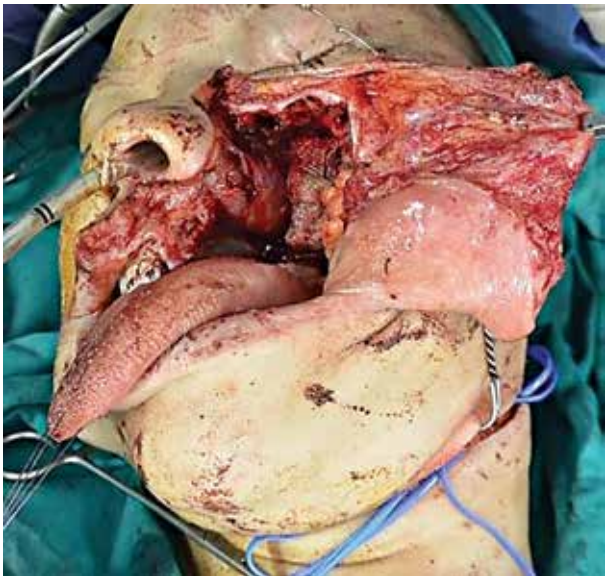

Fig 2. Multi defects including palate, maxillary bone, orbital floor after resection of accessory salivary carcinoma

All surgeries were performed by the same team. All patients had at least 2 defects.

Asking about chewing, swallowing, and speech to assess functional outcomes and the quality of life after surgery: Good is 9/18; Moderate is 7/18; Fair is 2/18..

Evaluation of aesthetic function after surgery: Good, 12/18; Fair score 4/18; Average 2/18.

Discussion

Large soft, bone, and skin defects after tumor resection in oral cancer have always been a challenge for oncologists and plastic surgeons. Therefore, restoring shaping is necessary to promote wound healing and optimize function and aesthetic appearance. The pectoralis major muscle flap (PMMF), based on the dorsal thoracic artery, was described by Ariyan in 1979 [1]. For a long time, the PMMF has been one of the most used flaps in the head, face, and neck cancer surgery due to simple technique and proximity to the head and neck area [5]. Although free flaps for head and neck reconstruction were introduced earlier than pedicle flaps, they are not immediately popular, and seamless pedicle flaps still dominate in head and neck reconstruction surgery over a decade. However, in the last decade, free flaps have shown advantages in the functional and cosmetic improvement and minimal sequelae where donor flaps are minimal compared with PMMF for head and neck cancers. Hsing et al. had a comparative study between PMMF and free flaps, found that with a limited area of PMMF, extensive resection of cancer is very difficult. cause loss of aesthetics [1]. The short pedicle also affects flap migration to the defect. Many authors also report these disadvantages [5], [6], [7]. In this study, we also found that a flexible free flap with comprehensive coverage can insert into a deep position such as the nasopharynx and floor of the mouth to reconstruct the defect. Therefore, the use of free flap restores the patient's chewing function quite well. Free flaps provide versatility of choice when selecting the

most appropriate reconstruction. They support the option of incorporating any tissue type, skin, fascia, muscle, tendon, or bone. The flap can be designed for the specific defect, and the choice of donor site allows further customization. Furthermore, these flaps can frequently be reinnervated [6, 8, 9].

In our study, the most used flap was the anterolateral thigh flap (ALT). Song and Koshima first reported the ALT flap in 1984 [10] has shown many advantages of flap such as constant pedicle, flexible length, large flap size. In particular, with many anatomical studies on flaps, it has been shown that the flap can be used in many different forms, such as adipocutaneous flap, an adipofascial flap, skin-fat-muscle complex flap. In a variation of anatomical, when the flap has many perforator branches, the flap can also be divided into many units (Chimeric flap), so the flap can be covered in many different defects. Therefore, the flap can be used flexibly; besides restoring function, it also returns aesthetics to the patient [11-13]. Reconstruction of the oral cavity defect is always a challenge due to the narrow oral cavity, the three-dimensional structure of the jawbone, the floor of the mouth or the tongue, the unique tissue organization. So when transferring the flap, need an experienced surgeon with a clear plan for the best results. In a report by Liu with a batch of patients who were reconstructed after surgery for tongue cancer, the author used the technique of pre-positioning sutures with sutures waiting in the oral cavity, and then the flap was lowered like a parachute to ensure told to close the flap in the narrow oral cavity [14]. In 18 patients, we used 13 Chimeric ALT flaps divided into units to cover multiple defects in the same patient, such as the floor of the tongue, lateral nasal septum, maxillary sinus, and ½ tongue or palate with very positive functional and aesthetic results. 03 cases we used the combined ALT-TFL flap. Unfortunately, they were not supported by the same pedicle; we decided to anastomose perforator of TFL flap to terminal distance ALT pedicle. Then the flap was divided into two islands to cover the defect of oral (Fig 1).

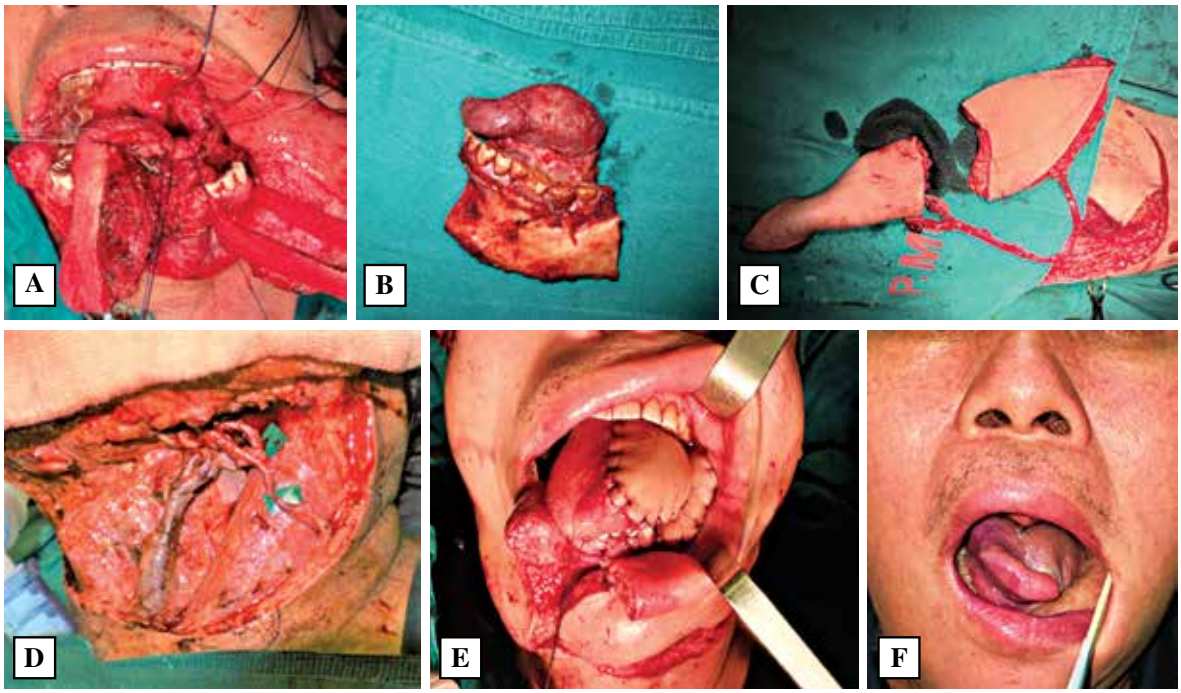

Fig 3. A: Patient after resection for SCC of the tongue, floor of mouth, tonsil. B: Tumor. C: Chimmeric ALT flap. D: Anastomosis artery and veins. E,F: Result postoperative

According to epidemiological surveillance data and the U.S.

National Cancer Institute's results, there was a significant improvement in oral cancer survival when compared with patients treated in the period 1984–1986 (5-year survival rate 55%) with patients treated during 1999–2005 (5-year survival rate 69%). Early diagnosis and wide excision, selective management of regional lymph node metastases, and implementation of adjuvant radiation therapy or chemotherapy have all contributed to improved survival of patients with oral cancer.[4]. The high success rate and improved functional outcome with free flap transfer have made the free flap one of the first indications for post-resection defects in the oral cavity. Despite the advantages of functional and aesthetic rehabilitation, surgeons have suggested that free flaps should not be the sole condition in patient prognosis but should combine multiple therapies. Whether our study aimed to address the fundamental question of the role of free flaps in cancer reconstruction (including extensive resection to the margins and reducing the risk of recurrence). , functional, esthetic) and 5-year survival outcomes in patients with advanced oral cavity cancer. With the 5-year survival rate of the study results of 52%, this is consistent with the authors' studies in recent years when using microsurgery flaps for patients with oral cancer [15], [16].

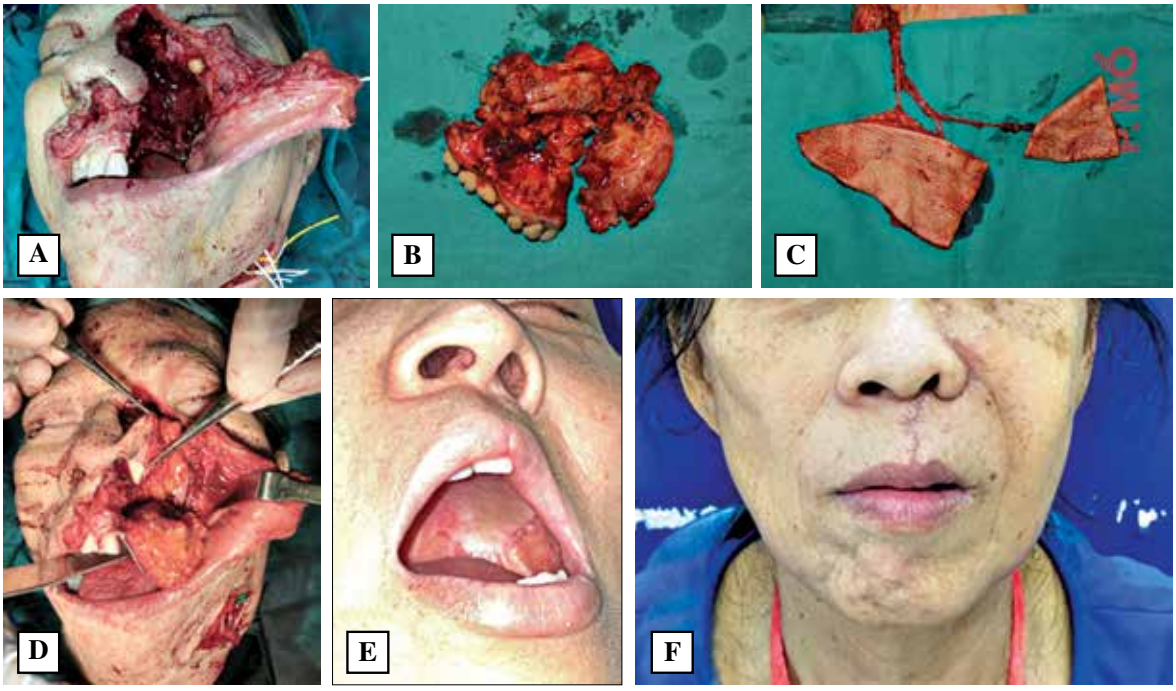

Fig 4. A: Patient after resection for Adenocarcinome of the maxillary sinus, palate, lateral nasal wall. B: Tumor. C: Chimmeric ALT flap. D: Insert flap into defect of oral. E,F: Result postoperative.

Conclusion

Chimeric ALT flaps in defect reconstruction after resection of oral cavity cancer is a step forward in cancer treatment. It is the best choice because the flap can restore the best function and aesthetics to the patient with a high success rate (90.4%). The flap can provide multi-units and a complex flap consisting of soft tissue.

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