Bilobed platysma myocutaneous flap in reconstruction of mandibular region cutaneous defect

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Abstract: Reconstruction of large cutaneous defects is a challenging task for plastic surgeons. When the skin defect is only part of the complex defects after expansion resection of oral cancer and neck dissection should be done at the same time, it is a daunting task to obtain a cosmetic post-operative appearance. We designed bilobed platysma myocutaneous flaps to reconstruct the mandibular region cutaneous defects. And at the same time, the incessant of the bilobed flap can be a combined incision of platysma myocutaneous flap and neck dissection and can be used to expose fully the region of neck dissection and to supply a large enough platysma flap to reconstruct the mandibular skin defect. This design has several advantages and worth to be promoted.

Keywords: Bilobed flap; reconstruction; platysma myocutaneous flap; cutaneous defect; mandibular region.

INTRODUCTION

Reconstruction of large cutaneous defects is a challenging task for plastic surgeons (Cahill *et al*. 2015; Lee *et al*. 2015; Söderholm *et al*. 1990; Yung *et al*. 2015; Zheng *et al*. 2015). When the skin defect is only part of the complex defects after expansion resection of oral cancer and neck dissection should be done at the same time, it is a daunting task to obtain a cosmetic post-operative appearance (Baur *et al*. 2014; Capone *et al*. 2002; Dobson *et al*. 2015; Esclamado *et al*. 1994; Ghoneum *et al*. 2015; Mellotte *et al*. 2015; Sandri *et al*. 2015; Smithers *et al*. 2015; Sterling *et al*. 2015). Traditional method of reconstructing these complex defects is using myocutaneous flap to form oral lining and using distant skin flap which usually comes from chest or shoulder to form the cover skin of the defect. Sometimes surgeons use folded pectoralis major myocutaneous flap or trapezius myocutaneous flap to reconstruct the lining inside and the cover outside at the same time. But the color and texture of the skin of the chest, shoulder and back is different with that of the face and neck. So it is difficult to get a good post-operative appearance. Although the skin of neck is similar in color and texture with the facial skin, but it is seldom used in the cover skin's reconstruction of a facial defect after extended cancer resection because of the damage of neck dissection to the facial artery.

MATERIALS AND METHODS

In order to obtain a good postoperative appearance, we designed bilobed platysma myocutaneous flaps to reconstruct the defect of mandible region. We implemented neck dissection and the reconstruction of the cover skin of mandibular region using this technique for three cases who with a large lesion in his or her mandibular region.

RESUTLS

Clinical case report

A 47 years old female had suffered oral squamous cell carcinoma for 3 years. We could see a large outstanding oval lesion with surface damage and purulent secretions out. The lesion was almost 3/4 of the total mandibular side edge and reached up commissure lever and reached 3 cm under the mandible. (fig. 1) A bilobed platysma myocutaneous flap was designed as follows. The first paddle of the bilobed platysma myocutaneous flap was below the lesion with it`s long axis in horizontal direction and it`s size was 15 x 6cm. The pedicle of the first paddle was located at the inside edge of the left sternocleidomastoid muscle. The long axis of the second paddle was 60° with it of the first paddle. The length and width of the second paddle was 2/3 of the first paddle. (fig. 2) Under general anaesthesia, cut open the skin and platysma muscle and then raise the flap in the layer deep the platysma muscle. When the neck dissection and expanded oral cancer resection were completed, make a pectoralis major myocutaneous flap and transfer it to the defect of oral lining. Close the donor site and suture the myocutaneous flap to the defect in layer. After the wound washed, transfer and suture the first paddle of the bilobed platysma myocutaneous flap to the cover skin defect and transfer and suture the second paddle to the secondary defect of the first paddle. Close the donor site of the second paddle directly with 3-0 absorbable suture. Place drainage tube under the flap and tracheotomy was performed. At last the bilobed platysma myocutaneous flap showed partly necrosis at the distal aspect of the flaps (Image 3) and healed by themselves in a few days.

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A 45 years old male who suffered oral squamous cell carcinoma in his lower half ear and soft tissue at the surface of mandibular condyloid process. After a extended resection of 1 cm under general anaesthesia, the defect we could see in image 5 was from the lower edge of the zygomatic arch to the margin of mandible and from the mastoid behind the ear to the cheek. The size of the defect was 7cm×7cm. We designed a bilobed platysma myocutaneous flap whose first paddle was along the margin of the mandible and the second paddle was pointed to suprasternal fossa. The width of the first paddle was 9cm and the length was 11cm. The width of the second paddle was 3cm and the length was 9cm. We harvested the bilobed platysma myocutaneous flap from the surface of myolemma. After the flap was made, unilateral parotidectomy and neck dissection were done. Then we anticlockwise rotated the bilobed flap 90°and inserted the first paddle of the flap into the defect after tumor resection. The defect secondary to the first paddle was reconstructed by the second paddle and the defect secondary to the second paddle was closed directly. Before suture the flap layer by layer, a vaseline qauze was put into the external auditory canal with it`s tail outside as a drain to give us the chance to reconstruct the external auditory canal next time. The flap survived very well and the patient left the hospital 5 days after the surgery.

Fig. 1: The design of the bilobed platysma myocutaneous flap.

DISCUSSION

The carcinomas which always invade the skin of mandibular region partly from the local skin cancer and partly derived from the mucosa of inferior alveolar ridge. There are many methods to reconstruct the out layer skin of the complex defect of mandibular region. Such as free skin graft transplantation, local flaps and folded myocutaneous flaps. Among these, the platysma myocutaneous flap will give us the best cosmetic postoperative result because the skin of the neck is similar with the skin of the cheek in color and texture. Although the platysma myocutaneous flap can provide large area skin similar with the skin of the cheek, the platysma muscle flap is seldom used in the surgery with neck dissection (Apostolakis *et al*. 2015; Baur *et al*. 2002; Bruera *et al*. 2015; Breitenbuecher *et al*. 2015; Dagher *et al*. 2016; Horgan *et al*. 2016; Kowgier *et al*. 2015; Lin *et al*. 2006; Morise *et al*. 2016; Othman *et al*. 2015; Puxeddu *et al*. 2008). There are scholars who do not suggest using platsma myocutaneous flap if the homolateral facial artery should be ligated during neck dissection at the same time.

Fig. 2: The bilobed platysma myocutaneous flap was rotated into the defect.

Fig. 3: The tip of the flap was necrosis and healed itself after a few days.

There is a high rate of lymphatic metastasis in oral cancer patients. In particularly, the patients with oral cancer which has invaded the skin of mandibular region need a ipsilateral neck dissection from I to VI area. Although there are several kinds of neck dissection incision, it is hardly to find a combined incision in the literatures which can be used to complete neck dissection and make a platysma myocutaneous flap which can be used to reconstruct the skin defect after an oral cancer expended dissection. So it is very important to find a combined incision which can fully expose the extent of neck dissection and can make a large enough platysma myocutaneous flap (Imanishi *et al*. 2005).

The first difficulty lies in how we can obtain a large platysma myocutaneous flap on the basis of successful completion of neck dissection. The second difficulty is how we can deal with the secondary defect after harvesting a large platysma myocutaneous flap. Free skin graft transplant is not a cosmetic method. Because the color of the graft is different with the adjacent skin in long term. Some scholars tried to use expander skills to harvest a sufficiently large enough platysma myocutaneous flap. But these expander skills do not apply to patients with oral cancer because a expansion time of 1-3 months is not permitted (Akdemir *et al*. 2014). So the authors tried to use bilobed platysma myocutaneous flap in oral cancer patiens whose skin of mandibular region was invaded.

The bilobed platysma myocutaneous flap incision can fully expose the neck dissection region and can supply a large enough platysma myocutaneous flap to reconstruct the mandibular region skin defect. This incision has the following advantages (Shah and Rosenberg D 2009). The first, there will be a good postoperative appearance. The second, this incision can full expose the neck dissection region from I to VI area. The third, the tips of the bilobed platysma myocutaneous flap which are easily infected and necrotic are not at the surface of the carotid artery. This design can avoid the danger of exposed carotid artery in the cases in which the tip of the bilobed platysma myocutaneous flap was infected or even necrotic. If pectoralis major myocutaneous flap was use to reconstruct the lining of the oral defect, the worry of exposing the carotid artery is unnecessary. The fourth, this incision does not obstruct tracheotomy surgery. The tracheotomy surgery does not affect the blood supply of the platysma myocutaneous flap. The last, platysma myocutaneous flap can tolerate postoperative radiotherapy.

The bilobed platysma myocutaneous flap is significantly different with traditional platysma myocutaneous pedicle flaps (Imanishi *et al*. 2005). There are four design of platysma myocutaneous flap, including superiorly based flap, inferiorly based flap, and posteriorly based flap. The posteriorly based platysma myocutaneous flap which has a blood supply from the transverse cervical artery can not be used to the facial defect reconstructtion. Superior platysma myocutaneous flap is based on the facial artery and it`s branches and does not have explicit venous drainage. So the superior platysma myocutaneous flap can not be used after a neck dissection during which the facial artery is always ligated. Posteriorly based platysma myocutaneous flap has explicit venous drainage, but not known arterial blood supply. So posteriorly based flap more looks like a random flap. When we adopt posteriorly based flap, clinical experience tells us that the tip of the flap should not exceed the midline of the neck. We can not harvest a large enough posterior platysma myocutaneous flap because of the limit of the length of the flap and also because of the lose of the length during the rotation of the flap. Some scholars believe that the platysma myocutaneous flap is not a myocutaneous flap but a fascia flap. This view is just the histological anatomy foundation of our bilobed platysma myocutaneous flap. In the surgery of our first case, the pedicle was designed at the surface of the contralateral medial edge of the sternocleidomastoid instead of the traditional ways to design pedicle of the platysma myocutaneous flap. From the anatomical knowledge of platysma we know that platysma is absent in the region near the axis. Therefore the blood supply of our bilobed platysma myocutaneous flap can only be fascia layer.

The bilobed platysma myocutaneous flap was reported by Ovunc Akdemir, *et al*. in the reconstruction of lower lips. But his design was based on submental vascular which is different with our technique. Our bilobed platysma flap is a fascia flap essentially.

CONCLUSION

There are some caveats in the application of this technique. First, the aspect ratio should be noticed when the bilobed platysma myocutaneous flap was design. The largest aspect ratio of fascia flap is 3:1. Second, the patient should use a special position to relieve the tension of the flap. The position is bowing his neck and rotating his neck toward the pedicle. In short, the combined incision of bilobed platysma myocutaneous flap and neck dissection can be used in neck dissection successfully and the bilobed platysma myocutaneous flap can be used to reconstruct the mandibular skin defect to obtain a cosmetic postoperative appearance. This technique is worth to be promoted. We found that the bilobed platysma myocutaneous flaps can be used to reconstruct the defect of mandible region and the incisions of the bilobed flaps can be used as the incisions of neck dissection at the same time.

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