McGregor Flap Reconstruction of Extensive Lower Lip Defects Following Excision of Squamous Cell Carcinoma

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ABSTRACT

Various methods of reconstruction of large defects of the lower lip have been described. However, microstomia, distortion of oral commissure, lip functional problems and sensory loss might be problems with these techniques. The aim of this study is to evaluate McGregor flap reconstruction of large lower lip defects following excision of squamous cell carcinoma (SCC). Eighteen patients with lower lip SCCs were managed with McGregor flap reconstruction. There were no cases of flap ischemia. Following reconstruction, the mouth opening, commissure shape and aesthetic appearance were accepted. Oral competence was satisfactory except in 4 cases (22.22%) and lip sensation was also satisfactory except in 4 cases (22.22%). The overall patient satisfaction was (85%).

Keywords: McGregor flap, squamous cell carcinoma, lower lip defects.

INTRODUCTION

The lips are among the most important organs required for eating and speaking. Deformities of the lower lip can cause serious problems for the patient during speaking, drinking and eating. Lip defects may be due to acquired problems, such as trauma and infectious diseases, or to congenital nevi, hemangiomas and clefts. However, most cases requiring reconstruction result after tumour excision (among which squamous cell carcinoma is the most significant).

Large defects of the lower lip represent a challenging problem to the reconstructive surgeons. The reconstructed lip should retain muscle function, allow sufficient mouth opening, have adequate sensory function and an acceptable aesthetic appearance.

V-excision and primary closure are commonly approved techniques for repairing one-third of the lower lip, whereas reconstructive procedures for defects involving more than one-third of the lower lip can be classified into four groups. The first group uses full-thickness flaps from the opposite lip, such as Abbé flap and Estlander flap. The second group uses local flaps that do not include the vermillion, such as fan-shaped flap, McGregor flap and facial artery musculomucosal (FAMM) flap. The third group uses free flaps, such as the forearm flap. The fourth group uses both free flap with local flaps.

The aim of this study is to evaluate McGregor flap reconstruction of extensive lower lip defects following excision of squamous cell carcinoma of the lower lip as regards the degree of mouth opening, commissure shape, oral competence, lip sensation and aesthetic appearance.

PATIENTS & METHODS

Between November 2006 and November 2009, eighteen patients with squamous cell carcinoma (SCC) of the lower lip were managed with excision and reconstruction utilizing McGregor modification of the Gillies fan flap. The age of the patients ranged from 28-78 years. Thirteen patients (72.2%), were males and five patients (27.7%), were females. Ten cases were T2 (tumour size 2-4cm) and eight cases were T3 (tumour size >4cm) and there were no palpable cervical lymph nodes and no distant metastases in all cases. The defect size after excision of the tumour comprised 60-90% of the lower lip. Supraomohyoid block dissection was done for cases with T3 tumour. The follow-up of the patients ranged between 1-2 years.

Surgical technique:

Marking of the flap dimensions was done as in (Fig. 1) with the width of the rectangular flap made equal to the vertical height of the lip defect and the flap length is equal to the horizontal width of the defect plus the width of the flap.
Excision of the tumour was done with 2cm safety margin and in T3 tumours supraomohyoid block dissection was done. The flap was raised along its borders and then sutured to the remaining part of the lip on the other side. The vermillion was reconstructed by suturing the mucosa to skin at the upper edge of the flap. The donor site of the flap was closed primarily.

Fig. (1): Surgical technique of McGregor flap reconstruction of lower lip defect. a) Marking of the flap, b) excision of SCC of the lower lip with safety margin, c) McGregor flap is raised, (d) suturing of the flap to the remaining part of the lower lip.

RESULTS

Eighteen cases with squamous cell carcinoma of the lower lip were managed with excision and reconstruction with McGregor modification of fan flap. There were no complications such as flap ischemia or venous return disturbances, and all cases healed well. After surgery, the mouth could be opened sufficiently. There were no local recurrences of the tumour during the period of follow-up.

All cases were evaluated postoperatively (Table 1), as regards: (1) Mouth opening, (2) Oral competence, (3) Drinking and feeding problems, (4) Lip sensation, (5) Speech, (6) shape of the commissure, (7) Cosmetic appearance.

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Fig. (2): Male patient, 55yrs old, with multiple lesions of SCCs of the lower lip. (a, b) preoperative views. (c, d, e) postoperative views after excision of SCCs and reconstruction with unilateral McGregor flap.

Fig. (3): Male patient, 39yrs old with SCC of the lower lip, (a, b) preoperative views. (c, d, e, f) postoperative views after excision of SCC and reconstruction with unilateral McGregor flap.
DISCUSSION

Lips are essential organs for normal life, playing an important role in drinking, eating, communication and aesthetic appearance. The main goals of lower lip reconstruction include providing mouth function (mouth opening and oral competence), sensation and aesthetic integrity.

Defects involving less than 30% of the lower lip may be closed primarily.

In cases of defects of about 1/3-1/2 of the lower lip, procedures which use the upper lip such as the Abbé and Estlander flaps (which are of similar construction to the lower lip), are useful and widely used. However, in Estlander flap which is often used for defects near the oral commissure, sometimes there is difficulty in maintaining symmetry of oral commissures.

Defects involving more than 1/2 of the lower lip are usually reconstructed by flaps utilizing the adjacent tissues in the face, distant or free flaps. Von Bruns\(^{(8)}\) original technique in (1857), consisted of the use of nasolabial flaps for reconstruction of lower lip defects. Gillies\(^{(9)}\), described the fan flap in (1957). Karapandzic\(^{(10)}\) put an emphasis on oral sphincter reconstruction by using an innervated orbicularis oris myocutaneous flap. However, lower lip reconstruction using the classic fan flap or Karapandizic flap commonly end with microstomia.

McGregor\(^{(4)}\), suggested a rectangular modification of Gillies fan flap in (1983) with the aim of reconstruction of full thickness lip defects even up to the entire lip. The McGregor flap pivoted around the oral commissure with the aim of preserving the oral commissure and avoiding microstomia. Nakajima et al.\(^{(9)}\), proposed a modification for McGregor's flap, based on the facial artery instead of the labial artery and also with attempts at preservation of the motor and sensory innervation to the flap.

Larger defects, which may include lip, chin and mandible, must be reconstructed with distant or free flaps such as deltopectoral flaps or radial forearm flaps. Yamauchi et al.\(^{(15)}\), reported temporalis muscle transfer with radial forearm flap. Ueda et al.\(^{(13)}\) and Ninkovic et al.\(^{(13)}\), described the use of combined forearm flap with the gracilis muscle transfer, the motor nerve of the gracilis was repaired with the buccal branch of the facial nerve. However, distant or free flaps are often bulky and have a bad colour match with possible donor site problems.

Sarukawa et al.\(^{(14)}\), used an upper lip island flap for reconstruction of the lower lip defect with good result. The flap was 20mm wide, and its cranial side extended along the nasal ala to include the facial artery. However, the flap can reconstruct lower lip defects between 1/3-1/2 of the lip and it has an advantage over cross lip flaps in that it does not have a pedicle across the mouth.

Yamauchi et al.\(^{(15)}\), managed four cases with lower lip defects involving the commissure, with Estlander flap combined with an extended upper lip flap. After dissecting the Estlander flap, a transverse incision is done along the upper border of the lip below the columella of the nose and then around the other ala of the nose. The defect in the lower lip was between 1/2-2/3 of the lip. The results were good and sensation returned within 3 months, contraction of the lips appeared within 6 months and symmetry of oral commissures was maintained.

Turgut et al.\(^{(16)}\), managed 18 patients with lower lip defects with local neuromusculocutaneous advancement flap from the labiomental area, the edges of the lip defect were extended to the chin by following the natural mental skin creases, followed by bilateral advancement of the labiomental area. The results were good but microstomia was found in three cases (16.6%) and mental nerve damage in two cases (11.1%).

Murat\(^{(17)}\), presented a case of lower lip defect following excision of malignant lesion which was reconstructed with modified McGregor flap, in which the orbicularis oris muscle is dissected in an attempt to improve motor innervation and provide adequate oral competence. Motor function and innervation of the lips after reconstruction were documented clinically.

In this study, 18 patients with lower lip defects following excision of squamous cell carcinoma were reconstructed with unilateral McGregor flap. The lip defect size was between 60-90% of the lip. All flaps healed well without ischemia or venous return problems.

Following reconstruction, the mouth opening was very good in 10 cases (55.55%), good in 6
cases (33.33%) and satisfactory in 2 cases (11.11%). This signifies that microstomia is rare with this flap reconstruction due to the versatility of McGregor flap which can be used either unilateral or bilateral and can reconstruct defects involving up to the whole lower lip.

The commissure shape was very good in 12 cases (66.67%), good in 4 cases (22.22%) and satisfactory in 2 cases (11.11%). This signifies that McGregor flap is a very good flap in reconstruction of lower lip defects as regards preservation of the oral commissure as the flap rotates around the corner of the mouth without altering this point.

The oral competence was evaluated by asking about sialorrhoea or drooling, and it was a good oral competence on only 2 cases (11.11%), satisfactory in 12 cases (66.67%) and bad in 4 cases (22.22%). This may be due to motor denervation of the orbicularis oris muscle during dissection of the flap.

The lip sensation was good in 4 cases (22.22%), satisfactory in 10 cases (55.55%) and bad in 4 cases (22.22%). However, some improvement in sensation occurred in the 4 cases with bad sensation as time passed postoperatively.

The aesthetic appearance was very good in 10 cases (55.55%), good in 5 cases (27.77%) and satisfactory in 3 cases (16.67%) and the overall patient satisfaction was (85%).

In conclusion, McGregor flap is a good reconstructive technique for extensive lower lip defects (from 1/2 up to whole lip defects), following excision of squamous cell carcinoma. Attempts to preserve the motor innervation of the orbicularis oris muscle during its dissection and avoiding complete transection of the muscle may lead to more improvement of the oral function.

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