

Surgical and functional outcome of extensive resection of upper lip carcinoma

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Abstract

Objectives: To evaluate aesthetic and functional outcome of ipsilateral fan flap for upper lip reconstruction after extensive excision of cancerous lesions

Patients & methods: The study included 17 patients; 11 males and 6 females with mean age of 64.2±7.1 years; 12 patients had basal cell carcinoma and 5 patients had squameous cell carcinoma and 8 patients had associated morbidities. Surgical resection was performed with safety margin adjusted according to intraoperative print cytology performed for all cases; fan flap was fashioned so as to include the angle of the mouth as the pivot for flap rotation, upper labial advancement flap was prepared for completion of closure of the resultant defect and cheek advancement flap was fashioned for closure of the defect that resulted after fan flap fashioning. All patients underwent functional and aesthetic evaluation including the ability to whistle, blow the cheek and to suckle the tube, and their satisfaction with the circumference of the mouth when fully opened and with the commissural appearance.

Results: All patients had primary surgical excision and immediate repair. Operative data included mean safety margin distance of 6.9±1.6 mm, mean resultant defect in relation to lip size was 56±6%, mean operative time was 146.2±18.8 min and mean operative blood loss was 266.5±49.7 cc. Five patients had postoperative (PO) surgery-related morbidities for a rate of 29.4%; 3 patients had wound infection with small length wound dehiscence in one patient and 2 patients developed microstomia. Mean PO follow-up period was 27.9±10.7 months. No cancer or surgery-related mortalities were reported. Mean PO satisfaction score was 10.8±2.4; 5 patients had score <10, while 12 patients had score >10.

Conclusion: Ipsilateral fan with contralateral advancement flaps for upper lip reconstruction after extensive resection for upper lip carcinoma provides acceptable functional and aesthetic outcome.

Key words: Cancer lip, reconstruction, fan flap, functional, aesthetic outcome.

Introduction:

The upper and lower lips are prominent facial features of significant importance for esthetic and functional reasons. Defects of the lips are typically caused by either trauma or neoplasm; however, lip reconstruction poses a particular challenge to the surgeon in that the lips are the dynamic center of the lower third of the face. Their role in aesthetic balance, facial expression, speech, and deglutition is not replicated by any other tissue substitute.

Therefore, proper restoration of lip form and function post-injury is of paramount importance.^{1,2}

Both lips, but especially the lower lip, are at risk for cutaneous malignancy because of their prominent location. Lip cancer is second only to skin cancer in terms of frequency in the head and neck region. Both squamous cell carcinoma and basal cell carcinoma were commonly seen in the upper lip. Surgery is the treatment of choice for most of these cancers;

however, treatment of such malignancies creates a spectrum of defects that must be meticulously addressed by the reconstructive surgery. These defects can be classified as small, medium, and large, and the optimal reconstructive method is typically based on this distinction. Depending on the size of the defect and the patient characteristics, reconstructive options include primary closure, local tissue transfer, and free tissue transfer.^{3,4}

The goals of lip reconstruction are both functional and aesthetic, and the surgical techniques employed are often overlapping. The aesthetic goals of lip reconstruction are to provide adequate replacement of external skin while maintaining the aesthetic balance of the vermilioncutaneous junction and lip aesthetic units. The functional goals of lip reconstruction are to maintain intraoral mucosal lining and to preserve the surface area of the oral aperture. The competence of the orbicularis muscle sphincter must also be maintained, as this is critical to achieving a functional recovery. Ideally, cutaneous sensation is preserved or reestablished to provide proprioceptive feedback for speech, animation, and management of secretions.^{5,6}

Established methods of reconstruction yield good results, but often involve multiple steps, which can be cumbersome in certain populations; hence, efforts have been made to improve and simplify reconstructive techniques.⁷

The current study aimed to evaluate the aesthetic and functional outcome of ipsilateral fan flap for upper lip reconstruction after extensive excision of cancerous lesions

Patients and methods:

The present study was conducted at General Surgery Department, Benha University hospital since Jan 2006 to March 2010 to allow a minimum follow-up period of at least 6 month for the last case operated upon. The study was assigned to include patients with extensive upper lip squamous or basal cell carcinoma involving $\geq 40\%$ of the surface area of the upper lip and approved by preliminary histopathological biopsy examination.

All patients underwent full history taking, complete clinical examination with special regard to head and neck examination for cervical nodal involvement. All patients underwent MRI examination of head and neck with examination of the upper chest for nodal involvement. Patients who had nodal involvement, distant metastasis and those who had lesions extending for $<40\%$ of the surface area of the upper lip were excluded of the study. Laboratory investigations including complete blood count, liver and renal function tests were performed. All patients were referred to complete otorhinolaryngological and dental examination. Patients with systemic comorbidities including hypertension, diabetes mellitus and chest diseases were adjusted preoperatively and were maintained on their medication postoperatively.

Local examination of the lesion included site, size, margins and encroachment on the vermilion line or the angle of the mouth. Also, infiltration of the inner labial mucosa was also documented.

All surgeries were conducted under general inhalational anesthesia with oral cuffed endotracheal intubation with the tube inserted through the contralateral angle of the mouth and the tube cuff was inflated maximally to completely obstruct the airway passages. All patients had upper pharyngeal and oral packing and received 40 mg ondansetron to prevent postoperative vomiting and 8 mg dexamethasone to prevent airway and vocal cords edema. Preoperative intravenous broad spectrum antibiotic was given and continued 2 days after surgery.

Surgical procedure:

Surgical resection was performed with safety margin adjusted according to result of intraoperative print cytology performed for all cases; excision involved the full thickness down to the mucosa. Preservation of the neurovascular supply of the lower lip was hardly tried to maintain supply for fan flap. Then, fan flap was fashioned so as to include the angle of the mouth as the pivot for flap rotation. Upper labial flap was prepared to be used as advancement flap for completion of

closure of the resultant defect through edge approximation started by suturing both edges of the mucosa using interrupted 3/0 PDS suture, followed by muscle approximation with tension free suturing as much as possible and lastly the skin was closed using interrupted sutures. Cheek advancement flap was fashioned for closure of the defect which resulted after fan flap fashioning. Pharyngeal packs were removed prior to completion of skin closure to allow the anesthetist to assure that no accumulated blood was around the tube because after wound closure and jaw fixation with head bandage the tube and suction will be performed blindly.

All patients received adequate postoperative analgesia and anti-inflammatory drugs to minimize edema that may endanger the suture line. All patients received their immediate postoperative care at ICU to guard against breathing problems until they were stable and transferred to the

wards. Patients were allowed oral fluid and homogenized foods using suction few hours after surgery and up to 5-days later. On the 3rd postoperative day wound was exposed and vitality of the flaps was assessed and patients were discharged and asked to dress the wound using povidine iodine daily till complete wound healing.

All patients underwent functional and aesthetic evaluation including the following items: the ability to whistle, the ability to blow the cheek, the ability to suckle the tube, their satisfaction with the circumference of the mouth when fully opened and with the commissural appearance. Each item was graded using 4-point scale with 0 indicating inability or poor satisfaction, 1 indicating poor ability or partially satisfied, 2 indicating acceptable outcome and 3 indicating full ability and high satisfaction and a total score was calculated ranging between 0 and 15.



Figure (1): Preoperative appearance of upper lip SCC showing areas of necrosis and fungations. Areas of hemorrhage were noticed. Preoperative incision marks for ipsilateral fan flap and contralateral advancement flap. Both angles of the mouth are preserved.



Figure (2): Mass excised with safety margin with preservation of the ipsilateral angle of the mouth.



Figure (3): Both designed flaps were prepared with assurance of preservation of the ipsilateral angle of the mouth.



Figure (4): Fan flap was positioned.



Figure (5): Immediate PO appearance showing positioning of both flaps to cover the excision area and ipsilateral advancement-rotational flap to close the defect resulted from fan flap fashioning. Ipsilateral angle of the mouth is preserved with adjustment of the vermillion line..



Figure (6): PO appearance 3 months after surgery, both angles of the mouth were preserved and on line without narrowing of the oral commissural opening allowing excellent functional and satisfactory aesthetic outcomes.

Results:

The study included 17 patients; 11 males and 6 females with mean age of 64.2 ± 7.1 ; range: 53-74 years. Nine patients were ASA grade I, 5 patients were ASA grade II and 3 patients were ASA grade III. Twelve patients had basal cell carcinoma and 5 patients had squameous cell carcinoma. Eight patients had

associated morbidities; 5 patients were type-2 diabetics and 2 of them had previous cardiac attack, 3 patients were hypertensive and one of them had renal function impairment. Six males were chronic heavy cigarette smokers. No patient had cancer elsewhere in the body or had history of surgery for similar lesions, **Table(1)**.

Table (1): Patients' enrollment data.

Data		Findings
Age (years)	50-60	6 (35.3%)
	>60-70	6 (35.3%)
	>70	5 (29.4%)
	Total	64.2±7.1 (53-74)
Sex	Males	12 (70.6%)
	Females	5 (29.4%)
ASA grade	ASA I	9 (52.9%)
	ASA II	5 (29.4%)
	ASA III	3 (17.7%)
Co-morbidities	No	9 (52.9%)
	Diabetes mellitus	3 (17.7%)
	Diabetes & Cardiac lesion	2 (11.8%)
	Hypertension	2 (11.8%)
	Hypertension & renal impairment	1 (5.9%)
Smoking		6 (35.3%)
Preliminary histopathology	Basal cell carcinoma	11 (64.7%)
	Squameous cell carcinoma	6 (35.3%)

Data are presented as mean±SD & numbers; ranges & percentages are in parenthesis.

All patients had primary surgical excision and immediate repair. Operative procedures were completed smoothly without intraoperative problems or complication. All lesions were excised with arbitrary safety margin that was extended according to the result of the immediate frozen section if required. Mean safety margin distance was 6.9±1.6; range: 5-10 mm. Mean resultant

defect in relation to lip size was 56±6.4; 45-65%. Three patients had defect area <50% of the lip size, 9 patients had defect area which ranged between 50 and 60% of lip size and 5 patients had defect area >60% of lip size. Mean operative time was 146.2±18.8; range: 120-185 min and mean operative blood loss was 266.5±49.7; range: 200-350 cc. No patient required blood transfusion, **Table(2)**.

Table (2): Operative data.

Data		Findings
Safety margin (mm)	5	4 (23.5%)
	6	3 (17.7%)
	7	4 (23.5%)
	8	4 (23.5%)
	10	2 (11.8%)
	Total	6.9±1.6 (5-10)
Size of resultant defect in relation to lip size	<50%	3 (17.7%)
	50-60%	9 (52.9%)
	>60%	5 (29.4%)
	Total (%)	56±6.4 (45-65)
Operative time (min)		146.2±18.8 (120-185)
Operative blood loss (cc)		266.5±49.7 (200-350)

Data are presented as mean±SD & numbers; ranges & percentages are in parenthesis.

All patients received their immediate postoperative care at ICU for a mean duration of 3.4±1.3; range: 2-6 hours. Oral fluid intake was allowed after a mean duration of 5.4±0.8; range: 4-7 hours. All patients were discharged after wound exposure on the 3rd postoperative day and assurance of flap viability. Patients were asked for daily twice dressing with povidone iodine and to continue their treatment for associated co-morbidities in addition to broad spectrum antibiotics and anti-inflammatory drugs. Patients or near relative were asked to notice any change of color, wound dehiscence, difficulty of breathing and to take oral fluid diet using small spoon for five days and to attend to the outpatient clinic on the 6th PO day unless no complications occurred.

Five patients had postoperative surgery-related morbidities for a rate of 29.4%. Two patients had mild wound infection that responded to conservative treatment and did not affect flaps viability. One patient had small length wound dehiscence in relation to the contralateral advancement flap and

the patient was re-admitted to the hospital for control of diabetes and wound associated infection and after subsidence of infection wound repair was undertaken successfully. Microstomia was reported in two patients who had large lesions that required wide excision with wide safety margin because of their squamous cell carcinoma.

Mean postoperative follow-up period was 27.9±10.7; range: 6-45 months. Throughout follow-up period two patients died, the first was a diabetic female patient who developed hyperglycemic hyperacidotic coma that precipitated cardiogenic shock that failed to respond to treatment and patient had died three days after developing coma. The second patient was diabetic cardiac patient who had acute myocardial infarction but unfortunately she died. However, no cancer related mortalities were reported.

Mean postoperative satisfaction score was 10.8±2.4; range: 6-14. Five patients had score ranged between 5 and 10, 7 patients had score more than 10 but less than 12 and 5 patients had score more than 12, **Table(3)**.

Table (3): Postoperative functional and aesthetic score.

Data		Findings
Differential scores	<5	0
	5-10	5 (29.4%)
	>10-12	7 (41.2%)
	>12-14	5 (29.4%)
	>14	0
Total score		10.8±2.4 (6-14)

Data are presented as mean±SD & numbers; ranges & percentages are in parenthesis.

Discussion:

Seventeen cases of squamous and basal cell carcinoma of upper lip were collected throughout the study period; there were 11 basal cell carcinoma and 6 squamous cell carcinoma, a finding indicated increased frequency of basal cell carcinoma in upper lip which is different from the frequency reported in the lower lip and could be attributed to the difference in the predisposing factors for both localities pathology. In hand with such frequency, Czerninski et al.⁸ reported that of 4337 new cases, the dominant tumor type was squamous cell carcinoma at the external lower lip and intraoral lip mucosa and basal cell carcinoma on the upper lip. Moreover, the study included 12 males (70.6%) and 5 females (29.4%), a similar gender-dependent frequency was reported by Czerninski et al.⁸ who found most cases of cancer lip were found among men (61.4%).

The study design relied on selective basis to include only patients free of nodal or distant metastasis so as to avoid the need for neck block dissection which may endanger flap blood supply. Also, the flap fashion was based on performing ipsilateral labial artery-based fan-flap including the ipsilateral angle of the mouth to safeguard it and upon rotation of the fan considering its pivot for rotation was the angle of the mouth so inducing no site change for that angle. Moreover, the contralateral advancement flap of the upper lip allowed maintenance of the site of the ipsilateral angle of the mouth and provided symmetry of both angles.

The applied technique provided acceptable

results manifested as symmetrical angles of the mouth maintained on the same level without dropping or elevation. Microstomia was reported by 2 patients with a frequency of 11.8% and was unavoidable because the extensive resection of a large squamous cell carcinoma and necessity for wide safety margin. However, such microstomia was acceptable functionally and both patients found no difficulty to acclimatization to their oral commissural orifice without need for second stage augmentation. Three patients developed wound infection that caused short-segment wound dehiscence in one of them, all of the three patients were diabetics but responded well to extensive control of diabetes and dressing with antibiotic therapy and patient who had wound dehiscence had successful wound repair, for a total PO surgery-related complications rate of 29.4%.

Evaluation of PO functional and satisfaction outcome revealed acceptable outcome with a total score of 10.8; 12 patients had score of >10 while the other 5 had score of <10, these 5 patients included the two patients developed microstomia and the other 3 were less satisfactory by functional outcome with special regard to the ability to blow their cheek, or to whistle, however, they were satisfied with the aesthetic appearance and such functional defect could be attributed to weakness of orbicularis oris due to aging process because inquiry of preoperative data revealed the presence of such complaint preoperatively and they attributed it to the presence of the lesion.

The obtained results coincided with that

previously reported in literature concerning lip reconstruction after cancer lip excision. Rifaat⁹ reported four patients with microstomia of 7 patients with squamous cell carcinoma of lower lip primarily reconstructed with the Karapandzic technique in which defects were greater than one half of the lip and 3 cases were intolerant to their microstomia and required augmenting the lower lip with bilateral paraphiltral lip switch flaps from upper lip in a second stage. However, in the same series of cases, Rifaat⁹ reported no microstomia after bilateral fan flap performed in two cases, a finding which supported our obtained results.

Ethunandan et al.¹⁰ provided a series of seven patients who underwent Karapandzic flap reconstruction after resection of 3 upper lip tumors and 4 lower lip tumors giving rise to lip defects ranging from 40% to 75% of the lip circumference and reported reduced circumference of oral stoma in all cases but did not lead to any functional compromise and esthetic outcome was considered excellent/good in 85% of cases with symmetrical commissure reported in all except 1 patient.

Tuna et al.,¹¹ reported normal lip sensibility in 89%, nasolabial asymmetry was detected in 6%, apparent mentolabial scar tissue in 11% and the new vermilion was of equal width to the upper lip vermilion in 83% of their series of patients with 50-70% defects after labial squamous cell carcinoma excision and who underwent defect reconstruction using modified Bernard technique.

Throughout postoperative follow-up period ranging between 10 and 45 months, there were no cancer or surgery related mortalities. Such finding goes in hand with Sargeran et al.¹² who reported that the 1- to 5-year overall survival rate was 91% to 62% and the tumor stages at the time of diagnosis and the treatment modality were associated with survival and concluded that lip tumors are curable, and early detection, diagnosis, and treatment lead to even higher rates of survival.

It could be concluded that ipsilateral fan with contralateral advancement flaps for upper lip reconstruction after extensive resection for upper lip carcinoma provides

acceptable functional and aesthetic outcome

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