

Outcomes of Infra-auricular Modified Facelift Incisional Approach to Neck Dissection without Endoscopic or Robotic Assistance: A Prospective Case Series

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ABSTRACT:-Introduction: Although there is increased emphasis on the need for improved cosmesis and functional outcomes after neck dissection nowadays, it often becomes difficult to prioritize and balance oncologic control, functional results, quality of life, and cosmetic outcomes in treating patients. Hence, the modified incisional facelift approach was put into practice. Majority of the studies conducted in the past are based on postauricular facelift approach and may or may not require endoscopic or robotic assistance.

Aim: To check the feasibility of performing the neck dissection using infra-auricular modified facelift incision without endoscopic or robotic assistance for the treatment of patients with oral cancer.

Materials and Methods: After approval from the Ethical Committee, a prospective case series study was conducted from February 2023 till December 2023 on histopathologically proven cases of cT1-T3N0 oral squamous cell carcinoma, who reported to the Department of Surgical Oncology of Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India. The patients underwent infra-auricular modified facelift incision without endoscopic or robotic assistance. Postoperative complications (discomfort, paresthesia, lymphedema, infection, hematoma and salivary fistula) and cosmetic outcomes were assessed postoperatively and during follow-up.

Results: A total of six patients with a mean age of 47.3 ± 7.6 years, who met the inclusion criteria underwent infra-auricular facelift neck dissection. Mean follow-up was 5.5 ± 1.61 months. Postoperative complications were limited to lingual (present in two patients) or auricular nerve weakness (present in two patients), but these resolved with time. Minor bleeding from suture site on the operated neck was observed in one patient, but it got easily controlled without the need of neck exploration. Cosmetic outcomes were favourable with a mean score of 1.33 ± 0.95 on the Vancouver scar scale.

Conclusion: Modified facelift incision is feasible and safe to perform neck dissections in patients with oral cancer. Infra-auricular facelift incision is better than postauricular facelift incision that is described in the previous studies, in terms of achieving adequate retraction to the distant levels of the neck, without robotic or endoscopic assistance and without the use of complex retractor system. Although the cosmetic outcomes of this approach are not good as preauricular approach, they are better than the incision that extends to the anterior part of the neck. However, practice is required to make efficient use of this approach.

KEYWORDS:- Facelift incision, cosmesis, neck dissection, oral cancer

I. INTRODUCTION

Oral squamous cell carcinoma (OSCC) comprises of more than 90% of all the malignant neoplasms of the oral cavity, and is the 17th most common cancer globally. In India, it is the third most common cancer overall (both genders combined) and the most common cancer among males, and also ranks third among the various cancer types contributing to mortality in the country [1]. Cervical lymph node status is the most

important tumour related prognostic factor for head and neck cancer patients. The presence of metastatic lymph nodes at initial presentation is the strongest predictor for recurrence of nodal metastases and eventual distant metastases [2,3]. Regardless of the primary tumor site, the presence of even a single metastatic lymph node in head and neck squamous cell carcinoma reduces overall survival by approximately 50%[4]. The management of clinically negative(cN0) neck remains a matter of controversy. There is general agreement that elective treatment of the neck should be done when the likelihood of occult, clinically undetectable, lymph node metastases is high, when the neck needs to be entered for surgical treatment of the primary, or when the patient likely to be unavailable for regular follow-up. The rationale for elective treatment is based on the premise that occult metastases will certainly progress into clinically manifest disease and that treatment at an earlier N-stage will help achieve better oncological outcome. The main arguments against elective treatment of the neck are that a large proportion of patients are subjected to overtreatment and morbidity[5]. There is increased emphasis on the need for improved cosmetic and functional outcomes nowadays. Also, there is no role of more radical or invasive treatment for effective oncologic control. Minimally invasive surgery benefits patients with reduced trauma and healing time[6-12].

Often it becomes difficult to prioritize and balance oncologic control, functional results, quality of life, and cosmetic outcomes in treating patients, and hence modified facelift incision for neck dissection was brought into play. Virtually all previously described techniques utilizing modified facelift approaches have required the assistance of robotics or endoscopes[13]. Also majority of the studies conducted in the past are based on postauricular facelift approach. Hence a prospective case series study was conducted to check the feasibility of performing the neck dissection using infra-auricular modified facelift incision without any endoscopic or robotic assistance. The objective of the study was to check the functional and cosmetic outcomes of this technique.

II. MATERIAL AND METHODS

A prospective case series study was conducted from February 2023 till December 2023 at the Department of Surgical Oncology of Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India, after approval from the Ethical Committee. Work done was in line with the principles of the Declaration of Helsinki.

Inclusion criteria was histopathologically proven cases of cT1-T3N0 oral squamous cell carcinoma. Patients with advanced oral cancer with palpable neck nodes or those with thyroid and parotid cancers were excluded from the study. Subjects with pre-existing nerve dysfunction where intentional nerve sacrifice was indicated or those with musculoskeletal dysfunction were also excluded. Demographic data, past medical history, clinical history, operative details and postoperative course were recorded. Patients were selected considering patient preference and at the surgeon's discretion based on extent of disease and preoperative status.

Surgical Technique: Patients were positioned, prepared and draped in the usual sterile fashion. After injection with local anesthesia, an incision was marked from below the earlobe, and it was slightly curved a few distance down the earlobe, having convexity facing the occipital hairline, but at a distance from it. The incision was ended about 2-3cm superior to the clavicle(Figure 1). Skin and subplatysmal flaps were raised. Appropriate neural and vascular structures were preserved. Lymph nodes from different levels were removed. Deaver retractor along with Langenbeck retractors was used to retract the subplatysmal skin flaps(Figure 2,3). Dissection was performed using electrocautery. Apart from neck dissection, all cases of oral tongue cancer underwent primary closure after hemiglossectomy. Case of buccal mucosa cancer also underwent nasolabial flap reconstruction with wide local excision and neck dissection. In one of the cases where retromolar trigone was involved, supraclavicular flap reconstruction of the defect was done after wide local excision and marginal mandibulectomy. The pedicle was successfully tunneled into defect inside the oral cavity inspite of performing modified(infra-auricular) facelift neck dissection. Romovac 16 number drains were placed in all cases and removed 2-3 days postoperatively after meeting the criteria of <20cc per 24-hour period. The skin was closed using 3-0 nylon sutures. Operative outcomes such as duration of surgery, total number of lymph nodes removed, and length of postoperative hospital stay were assessed and their mean values were calculated. Postoperative complications and cosmetic appearance were the primary outcomes.



Figure 1:Infra-auricular modified facelift neck



Figure 2: Deaver retractor

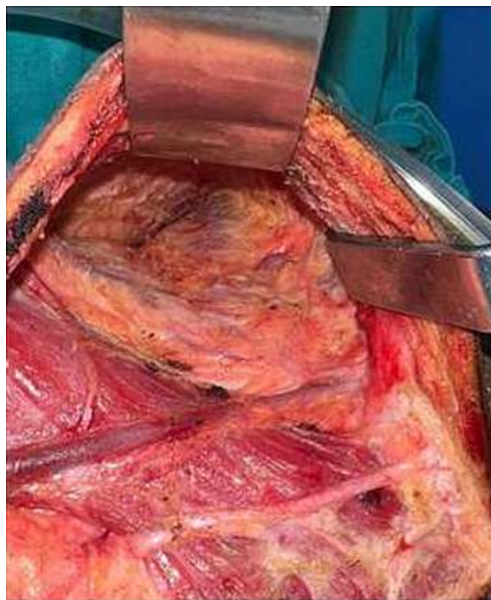


Figure 3: Retraction during surgery using Deaver and Langenbeck retractors

Assessment of Postoperative Complications: Discomfort and paresthesia in the operated neck were evaluated by questionnaire on 1 day, 1 week, 1 month, 3 months and 6 months after surgery. Questionnaire to assess paresthesia in the tongue, lower lip, ear and the surrounding area, and shoulder dysfunction and weakness were prepared. Grading was done as 0(none), 1(mild), 2 (moderate), 3(severe), and 4(very severe)(Table 1). Lymphedema was assessed by M. D. Anderson Cancer Center head and neck lymphedema (MDACC HNL) rating scale, which is based on the traditional Foldi rating scale for extremity edema, but splits Foldi Level 1 into 1a and 1b to reflect the presence of soft non-pitting edema in patients with head and neck lymphedema(Table 2)[14].Infection at the surgical site was assessed by looking for signs such as erythema, warmth, edema, pain or abscess. For assessment of hematoma, presence of discharge of blood from the operated

site was also looked for apart from swelling and edema. Salivary fistula was assessed by looking for the presence of opening with salivary secretions at the surgical site.

Assessment of Cosmetic Outcomes: Neck scarring in all patients were assessed at three months after surgery because by this time a wound regains maximum breaking strength[15]. Assessment was done using the Vancouver scar scale (Table 3), which was originally developed to assess burn scars and is now widely used for assessing other types of scar[16]. This scale consists of four variables: vascularity, pigmentation, pliability, and height. Scores range from 0 to 13, with 0 corresponding to normal skin. Mean value of the scar score was calculated.

Statistical Analysis:

Data was entered in the microsoft excel spread sheet. Descriptive statistics like percentage and frequency distribution as well as mean scores were calculated using SPSS (Statistical Package for the Social Sciences) version 23. Any other necessary tests were dealt with at the time of analysis based on data distribution.

III. RESULTS

There were a total of six male patients with mean age of 47.3 ± 7.6 years who met the inclusion criteria and underwent facelift incisional neck dissection for oral cancer. The clinico-demographic details of the patients are depicted in Table 4. All the patients had a history of tobacco chewing (100.00%), while two of these patients had a history of tobacco smoking (33.33%). Three patients had a history of excessive alcohol intake (50.00%). The subsites involved by oral squamous cell carcinoma were tongue in four patients, buccal mucosa in one patient and retromolar trigone in the remaining one patient. Five patients presented with clinical stage II while 1 presented with clinical stage III. None of the patients had any comorbidities present. Mean duration of operation was 810 ± 675.2 minutes. Level I-III neck dissections were performed in one patient, level I-IV neck dissections were performed in two patients while level I-V neck dissections were performed in three patients. Mean total node count was 21.2 ± 9.92 . Mean length of hospital stay was 3.7 ± 1.16 days.

Mean follow-up was 5.5 ± 1.61 months. Postoperative complications are depicted in Table 5. Two patients of oral tongue cancer who underwent level I-V neck dissection had paresthesia in the ipsilateral tongue due to injury to the lingual nerve. One of these patients also had paresthesia in the preauricular region due to auricular nerve injury, that persisted for 6 months. No paresthesia was present in the other two patients of oral tongue cancer, out of which 1 had undergone level I-V neck dissection while the other had level I-IV neck dissection. Operated case of carcinoma involving the buccal mucosa who underwent level I-III dissection did not develop any paresthesia, while the operated case of retromolar trigone who had undergone level I-IV dissection along with supraclavicular flap reconstruction of defect developed paresthesia on the ipsilateral tongue and preauricular region that persisted for six months. There were no injuries to the marginal mandibular nerve, hypoglossal nerve, vagus nerve or the spinal accessory nerve. As a result, none of the patients had paralysis of the lower lip, difficulty in moving the tongue or soft palate, or shoulder dysfunction or weakness. There were no injuries to the internal jugular vein or common carotid artery. However, mild oozing of blood due to injury to some minor blood vessel was evident from the suture site on the neck on first postoperative day in a case of oral tongue cancer in which modified facelift neck dissection was performed for the first time at our institute, but it got controlled by packing with gauze piece secured with micropore and there was no need for neck re-exploration. None of the patients developed postoperative lymphedema. Infection or salivary fistula were absent in all cases. Cosmetic outcomes were favourable (Figure 4) with a mean score 1.33 ± 0.95 on the Vancouver scar scale.



Figure 4: Satisfactory cosmetic outcome at 3rd month follow-up

IV. DISCUSSION

Rhytidectomy, also known as facelift surgery is a procedure used to counteract the effects of aging by tightening the tissue beneath the skin of the cheek, jaw and neck[17]. Elliptical skin excisions formed the basis of earliest descriptions of rhytidectomy. Although these early aesthetic surgery techniques were often done secretly, Julien Bourguet described his innovative approach to cervical rhytidectomy in 1919 in an address to the Academy of Medicine in Paris. He recommended extensive undermining into the neck through incisions that extended behind the ear and into the hairline. He followed these contributions by describing the treatment of submental platysma banding by excision of offending platysma edges in 1936[18,19]. In 1974, Skoog described a subplatysmal flap that elevated the platysma muscle of the neck and lower part of the face without detaching the skin.[20] Facelift incision is now being used to perform neck dissection for cancers at various sites in the head and neck, apart from thyroid. Tae et al. reported about robotically assisted facelift approach to MRND type III for clinically node positive necks in patients with cancer of supraglottis, tonsil and base of tongue, and a case of unknown primary[21]. Koh et al. described a case of early stage oral tongue cancer with clinically negative neck where SOHND was performed via modified facelift incision using robot[22]. Byeon et al. have described endoscopically assisted SOHND via modified facelift approach in early stage cancers of the oral tongue, hard palate and parotid gland, having clinically negative neck[23]. These studies have reported facelift incisional approach to be technically feasible and safe in selected patients with head and neck cancers, especially the early stage oral cancers, with excellent postoperative cosmesis[21-24]. Albergotti et al. presented a retrospective case series of patients with cancer involving oral tongue, base of tongue, tonsil and epiglottis, where anterolateral neck dissection was performed for cancer involving the tonsil, base of tongue and epiglottis, and SOHND was performed in a case of oral tongue cancer while remaining two cases of oral tongue cancer underwent ESOHND. All the neck dissections in this study were also robotically assisted and performed via modified facelift approach which was considered to be feasible for levels I-IV[24].

Endoscopically assisted, minimally invasive techniques to regions without a natural cavity may require insufflation with carbon dioxide, but in the neck region this may impair hemodynamics, blood gas homeostasis, cerebral blood circulation and increase the intracranial pressure[25]. Also, use of endoscopic or robotic instruments is expensive and require additional time, complexity and skill. Very few studies have demonstrated the outcomes of facelift neck incision technique using standard instrumentation, without robotic or endoscopic assistance[6,13]. Melvin et al. conducted a prospective study in which cadavers and live subjects underwent neck dissection using a facelift incision, with and without endoscopic assistance. Three patients with cancer of the tonsil and one with that of lower lip underwent neck dissection through this approach in their study. MRND Type I, classic radical neck dissection and anterolateral neck dissections were performed in cases of tonsillar cancers, while case of lower lip cancer underwent endoscopically assisted ESOHND, and it was concluded that it is feasible and safe to perform neck dissections, whether selective or radical, through a facelift incision[6]. Ostrander et al. conducted a retrospective cohort study on patients with head and neck cancers, where neck dissection was performed through facelift incisional approach on patients with cancers involving the oral cavity, oropharynx, skin and parotid, as well as melanoma and other salivary cancers. Most of the patients in the facelift group underwent SOHND(sixteen), followed by MRND(eight), anterolateral neck dissection(six), posterolateral neck dissection(three), ESOHND(one) and others(one). Outcomes were compared with those of standard neck dissection group and it was found that a facelift approach to neck dissection using standard instrumentation without robotic or endoscopic assistance achieves acceptable clinical and oncologic outcomes compared to the standard incisional approach[13].

Majority of the studies have used post-auricular facelift incisional approach for head and neck cancers, be it endoscopically or robotically assisted[21-24] or not[6,13], to achieve better cosmesis apart from acceptable functional and oncologic outcomes. Literature has also reported about the use of standard preauricular curvilinear incision that continues as postauricular incision for robot-assisted sialadenectomy[12]. In this article, a prospective case series of six patients is presented, where oncologic neck dissections performed using extremely new technique of infra-auricular modified facelift incision for oral cancers with clinically negative necks. No robotic or endoscopic assistance was required, and this was in accordance with Ostrander et al[13]. However, Melvin et al. reported the use of endoscopic assistance in a case of lower lip cancer due to inadequate direct visualization of level I, for which a zero degree rigid endoscope was used, with a surgical assistant holding and directing the scope[6]. Both these authors reported the use of lighted retractors (General Thompson retractor system with Thompson ultra-blades) for exposure and providing static retraction, which was especially useful in the dissection of levels I and IV. These levels, most distant from the incision, were the most difficult to dissect using the facelift approach but were still accessible with proper retraction and lighting[6,13]. In the prospective case series presented here, Deaver retractor was used instead of lighted Thompson retractor system and still it was possible to achieve adequate access to the distant levels, probably because the incision used here was not postauricular.

Melvin et al. reported the duration of surgery to be on average 1 hour longer than that of neck dissections through a traditional incision. Longer time duration was to some extent due to the use of additional equipment and lack of familiarity with the operating setup. These are issues related to inefficiency that occur with most novel surgical approaches and are expected to decrease with increased repetition[6]. Ostrander et al. also reported longer case duration in the facelift group as compared to standard neck dissection group (598.3 ± 374.4 vs 460.3 ± 312.4 minutes, $P=0.001$)[13]. In the case series presented here, the mean duration of surgery was 810 ± 675.2 minutes. The time taken to complete neck dissection was two hours initially, but with practice and familiarity with the instruments and technique, it got shortened to one and a half hour. In the case series of Melvin et al., two patients were discharged on first postoperative day while the other two were discharged on second post-operative day due to inadequate early oral intake following transoral robotic resection[6]. Ostrander et al. reported mean length of stay as 2.1 ± 2.0 days. Shorter length of stay after surgery suggests more rapid postoperative recovery and potentially lower morbidity surgery[13]. In the case series presented in this article, two patients were discharged on third post-operative day while four were discharged on fourth postoperative day. The mean length of stay was 3.7 ± 1.16 days. Days of stay were longer in comparison to the patients of Melvin et al.[6] and Ostrander et al.[13] because all the patients were discharged only after the drains were removed.

Postoperative complications in this case series was in the form of mild oozing of blood through the incision site of the operated neck, that was present only in one case which was operated with modified facelift neck dissection approach for the first time at our institute, but it got controlled easily without any need for neck exploration. Melvin et al. did not report any hematoma or seroma in any of their patients[6]. Ostrander et al. reported hematoma(5.0%), infection(3.8%), and salivary fistula(3.0%) as the most common complications, though they all occurred at low rates[13]. In the case series presented here, there was no incidence of infection or salivary fistula. Postoperative lymphedema was also absent. Ostrander et al. reported the incidence of postoperative lymphedema as 38.2%[13], while Melvin et al. did not comment about this complication[6]. In the case series presented here, apart from minor bleeding, other postoperative complications were lingual or auricular nerve paresthesia that resolved with time. Melvin et al. reported mild temporary marginal mandibular (cases 1 and 3) or spinal accessory (cases 2 and 3) nerve weakness[6]. Ostrander et al. too reported transient marginal mandibular nerve weakness in two subjects and transient spinal accessory nerve weakness in two, but these resolved[13]. In the case series presented here, none of the patients had weakness of these two nerves. There was no injury to the hypoglossal or vagus nerve as well. Internal jugular vein or carotid artery were also not injured.

Previous studies where facelift incisional neck dissection was performed using endoscopic or robotic instruments demonstrated an additional benefit of improved cosmesis[21-24]. Same was the case with Melvin et al. and Ostrander et al. even without the use of these instruments[6,13]. Similarly, we also found cosmetically favorable outcome with the use of infra-auricular facelift incision. Thus, though this approach is feasible and safe to perform neck dissections for oral cancer. Also, infra-auricular facelift incisional approach to neck dissection precludes the need of complex retractor system.

Limitations: Very small number of patients is a limitation of this study, and also, efficient use of this technique requires practice. The cosmetic result is not good as that of post-auricular incisional approach. Hence, prospective studies with larger sample size are required to help examine oncologic efficacy and to understand the limitations and indications of this technique, as well as the long-term oncologic outcomes.

V. CONCLUSION

Modified facelift approach has good functional results, quality of life, cosmetic outcomes and decreased morbidity in patients who undergo neck dissection, whether selective or radical. Although infra-auricular facelift incision does not provide cosmetic result as good as that provided by postauricular incision, majority of the scar can be hidden behind the collar of the dress, or even hair in females. Hence, it is still better than the incision that extends to the anterior part of the neck, in terms of cosmesis. Also, it precludes the need for complex retractor system that is required while using postauricular incision, while performing neck dissection without endoscopic or robotic assistance. However, practice is required to make efficient use of this approach.

CONTRIBUTIONS

All authors have read and approved the manuscript.

Dey, M.:data collection and writing the article.

Saifi, A, M.:did surgeries.

Agarwal, A.:compilation of data.

Mishra, B, P. and Elizabeth, T.:revision of manuscript

COMPLIANCE WITH ETHICAL STANDARDS

Conflict of Interest:The authors declare that they have no conflict of interest.

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Ethical Approval:The study was approved by the Ethical Committee of Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India. Work done was in line with the principles of the Declaration of Helsinki.

Informed Consent:All patients gave written informed consent.

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Table 1: Subjective discomfort and sensory impairment questionnaire with grading

Questionnaire					
1.Do you have discomfort in your operated neck area?					
2.Do you have decreased sensation in your operated neck area?					
3.Do you have decreased sensation in your ear which is towards the operated side, or its surrounding areas ?					
4.Do you have decreased sensation in half of the lower lip which is towards the operated side?					
5.Do you have decreased sensation in half of the tongue which is towards the operated side?					
6.Do you have difficulty in moving your tongue?					
7.Do you have discomfort in your soft palate?					
8.Do you have weakness or difficulty in moving your shoulder which is on the same side were operation was done?					
Grading	None	Mild	Moderate	Severe	Very severe
(Score 0)	(Score 1)	(Score 2)	(Score 3)	(Score 4)	

Table 2:M. D. Anderson Cancer Center head and neck lymphedema(MDACC HNL) rating scale

Levels	Description
0	No visible edema but patient reports heaviness
1a	Soft visible edema which is non pitting and reversible
1b	Soft pitting edema which is reversible
2	Firm pitting edema which is not reversible, and there are no tissue changes
3	Irreversible with tissue changes

Table 3:The Vancouver scar scale for assessment of cosmetic outcome

Pigmentation	Vascularity	Pliability	Height
Normal(Score 0)	Normal(Score 0)	Normal(Score 0)	Normal (Score 0)
Hypopigmented(Score 1)	Pink(Score 1)	Supple(Score 1)	<2mm(Score 1)
Hyperpigmented(Score 2)	Red(Score 2)	Yielding(Score 2)	2-5mm(Score 2)
Mixed pigmentation-Rated according to the most significant pigmentation change	Purple(Score 3)	Firm(Score 3) Banding(Score 4) Contracture(Score 5)	>5mm(Score 3)

Scale in millimeter

Table 4: Depiction of clinico-demographic details of the patients

Pigmentation	Vascularity	Pliability	Height
Normal(Score 0)	Normal(Score 0)	Normal(Score 0)	Normal (Score 0)
Hypopigmented(Score 1)	Pink(Score 1)	Supple(Score 1)	<2mm(Score 1)
Hyperpigmented(Score 2)	Red(Score 2)	Yielding(Score 2)	2-5mm(Score 2)
Mixed pigmentation-Rated according to the most significant pigmentation change	Purple(Score 3)	Firm(Score 3)	>5mm(Score 3)
		Banding(Score 4)	
		Contracture(Score 5)	

Table 5: Postoperative complications of infra-auricular modified facelift neck dissection incision

POSTOPERATIVE COMPLICATIONS(N=6)		
	ABSENT	PRESENT
NERVE WEAKNESS		
Lingual nerve	4	2
Auricular nerve	4	2
Marginal mandibular nerve	6	0
Hypoglossal nerve	6	0
Vagus nerve	6	0
Spinal accessory nerve.	6	0
ADVERSE EVENTS		
Injury to minor blood vessel	5	1
Injury to internal jugular vein	6	0
Injury to common carotid artery	6	0
Infection	6	0
Salivary fistula	6	0
Flap thrombosis	6	0
Lymphadema	6	0