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Evaluation of Two Uncommon Incisions for Modified Radical Neck Dissection – An Institutional Study

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Abstract

Introduction

The single most important prognostic factor in cancer of the upper aerodigestive tract is dissemination of the disease to regional lymph nodes. Once this occurs, the probability of 5-year survival, regardless of the treatment given, reduces to nearly one half of that seen in earlier staged patients[1]. Hence removal of these regional lymph nodes is of paramount importance in surgical management of patients with oral cancer. There are several types of neck dissection to accomplish this, of which the Modified Radical Neck Dissection (MRND) is the one that is most commonly practiced in most centers. MRND entails removal of lymph nodes and fibro-fatty tissues from levels I – V with preservation of one or more non- lymphatic structures that are commonly removed in radical neck dissection, namely the spinal accessory nerve, the internal jugular vein and the sternocleidomastoid muscle.

Surgical incisions play an important role in neck dissection. They must be placed in such a way that they provide adequate access which helps in accomplishing oncologic clearance without compromising on functional or esthetic outcomes. Ever since George Crile published his technique of radical neck dissection in his landmark paper, in which he uses a Y shaped incision[2], there have been several modifications by various authors. The modified Schobinger incision, Macfee incision and its modification, single transverse incision are some of the most commonly used incisions. The modified Schobinger is said to provide the best access to the neck node levels while the single transverse incision produced the best scar cosmesis as the incision lies on a skin crease. The modified Macfee incision provides a balance between access and scar cosmesis[3]. However, no specific incision or a combination of them have received universal acceptance as it is difficult to provide adequate access for clearance and avoidance of damage to vital structures while at the same time maintaining vascularity of the flap and acceptable cosmesis.

Since there already exist several studies on the effectiveness of the above-mentioned incisions in literature, this paper aims to evaluate two of the less commonly used incisions for MRND that are in practice at our institution, termed the “Lazy S” incision and “Utility” incision. The two incisions will be evaluated based on access provided to neck nodes, duration of

surgery, damage to vital structures, post-operative wound healing and scar cosmesis.

Methodology

Patients who reported to the Department of Oral Oncology at Kidwai Memorial Institute of Oncology, Bangalore were enrolled in the study.

Inclusion criteria

Patients aged between 20 and 70, who were planned for Modified Radical Neck Dissection of the neck for a proven case of Squamous Cell Carcinoma of the oral cavity were included in the study.

Exclusion criteria

- Patients who had undergone neo-adjuvant radiotherapy or chemotherapy
- Those who exhibited clinical and/or radiographic signs of neck skin involvement
- Those who refused to provide written consent were excluded from the study

40 patients were assigned into two groups of 20 each,

Group A: Utility incision – for patients with lesions of tongue for whom extraoral incision is not required on the face to access the primary lesion

Group B: Lazy S incision – for patients with lesions of oral cavity other than tongue for whom extraoral incision is required to access the intraoral primary. This incision is given from the commissure and extended downward to join with the neck incision

Description of the incisions

Utility

The incision begins in the submental region on the ipsilateral side, runs vertically downward and slightly backward till about 2 fingers width above the clavicle and then runs horizontally across the neck for a short distance. From here, the incision runs upward vertically again on the skin overlying the SCM to end in the mastoid region. The incision takes the appearance of a 'U'.

Lazy S

This incision also begins in the submental area on the ipsilateral side, runs vertically and slightly posteriorly till the region of the thyroid cartilage, then extends horizontally for a short distance before dropping vertically downward till about 2 fingers width above the clavicle. The whole incision takes the appearance of a gently curving 'S' and hence the name.

Surgical procedure

The patients were anesthetized through naso-endotracheal intubation. Preparation of the face, neck, chest was performed using savlon, surgical spirit and betadine. Sterile draping of the patient was then done. The incision was marked, and 2% lignocaine was locally infiltrated along the marking. The incision was made using No. 10 BP blade. Skin, subcutaneous fat and platysma were incised, and the flap was raised in the sub-platysmal plane to perform neck dissection. Modified radical neck dissection was performed and the type of MRND that was performed depended upon the extent of involvement of the extra-lymphatic structures, namely the spinal accessory nerve, internal jugular vein and sternocleidomastoid muscle. Reconstruction, if performed, was performed using the Pectoralis major myo-cutaneous flap.

Time required to raise the flap, accessibility to neck nodes, damage to vital structures, and the time required to close the flap were analyzed. The time required to raise the flap was calculated from the start of the incision to the point of starting the dissection. The time required to close the flap was calculated from the time of approximation of the flap to completion of the last skin suture. Wound healing was postoperatively assessed at the time of

discharge of the patient from the hospital and at monthly follow-ups for 3 months. Scar cosmesis was evaluated using the Stony Brook Scar Evaluation Scale[4].

Statistical Analysis

Descriptive statistics including mean and standard deviation were done for all variables by entering the data into spreadsheets on Microsoft Excel. The data was then analyzed using SPSS software version 25 for Microsoft Windows. Unpaired *t* test was used for comparison of two parameters between the two groups – time taken to raise the flap and the time taken to close it.

Results

The study included 40 patients (23 male and 17 female) between the ages of 20 and 70. The mean age of the patients was 46.6 (SD 11.7) years.

Time required to raise the flap – In Group A (Utility incision) it took an average of 19.64 ± 3.08 mins to raise the flap, which was quicker when compared to the time taken to raise the flap in Group B (Lazy S incision), 24.69 ± 4.13 mins. The mean difference between the two groups is –5.055 (95% confidence interval - -6.679 to –3.431). The two tailed P value was < 0.0001, which is considered to be extremely statistically significant.

Access to the different lymph node levels was assessed by the operating surgeon on table. Both incisions provided optimal access for the removal of all lymph nodes and fibro-fatty tissue from levels I-V without much difficulty in retraction or any damage to vital structures such as the internal jugular vein and spinal accessory nerve. One incision did not provide any significant advantage over the other in terms of accessibility.

Time required for closure of flaps – In Group A, it took an average of 31.85 ± 3.71 mins to close in layers, which was slower when compared to the time it took to close the flap raised in Group B, an average of 27.39 ± 2.65 mins. The mean difference between the two groups is 4.463 (95% confidence interval – 3.026 to 5.899). the two tailed P value was < 0.0001 i.e. statistically significant.

Wound healing was assessed during discharge of the patients. Five out of twenty patients showed wound contraction in Group B (25%). Wound contraction was not noted in Group A patients. However, this group exhibited marginal necrosis in the inferior portion of the flap in three out of twenty patients (15%). In Group B, two out of twenty patients exhibited marginal necrosis superiorly (10%). The contraction of the wound persisted in the five patients in Group B even during the follow up period. Both groups exhibited wound infection followed by dehiscence – Group A –three out of twenty (15%), Group B – five out of twenty (25%).

The Stony Brook scar evaluation scale, tabled below was used to evaluate scar cosmesis. The score ranges from 0 (worst) to 5 (best) scar. Although both groups differed on the basis of the scores obtained, there was no significant difference between the two groups at all follow up points.

Table 1:

Category		Points
Width	>2mm	0
	<2mm	1
Height	Elevated/depressed with respect to surrounding skin	0
	Flat	1

Colour	Darker than surrounding skin	0
	Same colour/lighter than surrounding skin	1
Suture marks/Hatch marks	Present	0
	Absent	1
Overall appearance	Poor	0
	Good	1

Discussion

Surgical incisions arguably form the most important aspect of any surgery, more so in neck dissection. A good incision helps the surgeon by providing good access to the neck, which in turn makes it easier to harvest the fibro-fatty tissues. This eliminates gross disease and also helps the pathologist by providing adequate number of lymph nodes for examination. Several factors influence the choice of incision. This includes location of the primary lesion, type of neck dissection to be performed, choice of reconstruction, tracheostomy, patient factors like neck flexibility, length and girth. The ultimate deciding factor is the surgeon's preference as long as the incision provides adequate exposure while maintaining vascularity of the raised flaps, does not result in damage to vital neurovascular structures and results in a cosmetically acceptable outcome for the patient.[5-9] This study was undertaken to evaluate two of the less frequently used incisions in standard practice to see if they meet the criteria for a good incision and if they are compatible with modern practice. Both intraoperative parameters like time taken to handle and repair the flaps and ease of performing surgery and post-operative parameters like wound healing and scar appearance were taken into account for this study.

There was a statistically significant difference in the average time it took to raise the flap between groups A and B. A flap can be raised with a utility incision faster because of the relatively straightforward dissection, whereas in the lazy S incision, the flap has to be raised in parts along the nearly vertically oriented incision. The amount of dissection to achieve the same access as the utility incision is more. These factors significantly slow down the speed of flap raising. However in practice, this does not prove to be a significant drawback as a good flap with adequate access will actually decrease the time taken to complete the neck dissection, thus compensating for the small increase in time it took to raise a proper flap.

Similarly there was a statistically significant difference in the average time it took to close the flap as well, between the two groups. Interestingly, it took lesser time on average to close the lazy S flap. This can be attributed to the nearly linear incision which makes it easier to suture, whereas the utility incision has to be sutured along its three limbs, thus increasing the time taken for closure. If the time taken to raise the flap and to close it are considered together, it would not result in much difference in operating time between the two groups. Also the slight increase in time taken to provide a cosmetically good closure will ultimately benefit patient aesthetics.

Access provided to all the lymph node stations in the neck is perhaps the most vital aspect of planning a neck incision [10]. There is no benefit in reducing operating time or providing a cosmetically good scar if gross disease in the neck is not completely removed. The primary goal of oncosurgery is complete elimination of disease followed by secondary goals such as restoration of function and

form. Although the saying, "leaving behind tumor tissue, microscopically or macroscopically or having positive margins is only equivalent to performing a large biopsy" applies to resection of primary tumors, it is prevalent to the current discussion of clearance of neck nodes as well. Both of the above discussed incisions provided good access to all five lymph nodes levels that are removed in an MRND. The access was also good enough to prevent damage to vital structures such as the IJV, thoracic duct and spinal accessory nerve. Although complete clearance of nodes was achieved in all cases, it proved a little difficult to access level IA using the lazy S incision in a few cases, based on the location of the primary tumor and the extent of involved skin that was going to be resected.

Although both groups had complications such as marginal necrosis, infection and dehiscence, none were so severe as to cause vessel exposure or warrant secondary repair under general anesthesia. Management was done with systemic antibiotics based on culture and sensitivity testing of the pus sample, regular local dressings and debridement followed by secondary closure under local anesthesia once the infection subsided. Wound contracture was exclusively noted only in Group B. Vertical incisions tend to intersect the natural folds of the skin of the neck and its vascular supply. The contracture tends to occur along the long axes of the incision, leading to deformity and restricted motion [11]. Neither of the two incisions provide the best scar cosmesis especially when compared to horizontally oriented incisions like the single transverse incision or the Macfee incision as they lie along or parallel to the resting skin tension lines of the neck thus leading to uneventful healing.

This study does have certain limitations technically and statistically. The data on wound healing and scar cosmesis was not subject to statistical assessment because one group did not exhibit all the complications that was being noted. Hence, significance cannot be stated on a statistical basis. Also, a follow up period of 3 months might not be enough to sufficiently assess complete wound healing and scar cosmesis, especially with confounding factors like post-operative adjuvant therapy such as radiation and chemotherapy. Thus, a similarly designed study but on a larger patient sample and with a longer follow-up period is required.

Conclusion

This institutional study evaluated two less commonly employed incisions, Utility and Lazy S for Modified Radical Neck Dissection. Both incisions provided adequate access to all cervical lymph node levels with no significant compromise in oncological safety or safety of vital structures. The Utility incision demonstrated advantages in terms of quicker flap elevation, while the Lazy S incision allowed faster closure. Complications such as marginal necrosis, wound infection, and contracture were observed in both groups but were manageable. Although scar cosmesis did not significantly differ between groups, neither technique outperformed the gold standard incisions commonly used for aesthetic outcomes. However, disease clearance should take priority over aesthetics in cancer surgery and so these two incisions strike a balance between the surgeon's desire for adequate access and the patient's desire for acceptable cosmesis after a major ablative surgery. Given the limitations in sample size and follow-up duration, the findings suggest that both the Utility and Lazy S incisions are viable options in select clinical scenarios. However, larger, multi-centric studies with extended follow-up are needed to further validate their use in modern surgical practice.

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