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EVALUATION OF THE DIFFERENCES BETWEEN A CHIMERIC ANTEROLATERAL THIGH FLAP AND A REGULAR ALT FLAP FOR RECONSTRUCTING MAXILLA-ALVEOLAR EXCISION IN PATIENTS WITH HEAD AND NECK CANCER

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ABSTRACT

Background: Complex surgical excision is necessary for oral malignant tumors that manifest as a lesion at a locally advanced stage, typically leaving the maxillary cavity open. Concerns including more operations, postponed adjuvant therapy, prolonged hospital stays, flap necrosis, fistula development, and/or poor healing are brought on by the maxilla's continuous production. This has been eliminated using a variety of techniques, each with unique challenges.

Aim: The purpose of this study was to evaluate the conventional ALT flap in comparison to the chimeric anterolateral thigh flap for maxilla-alveolar excision repair in patients with head and neck cancer.

Methods: Eighty participants who had treatment at the Institute throughout the designated trial period were evaluated to determine the benefit of reconstruction for maxillo-alveolar resections using chimeric ALT and VL (vastus lateralis). These 40 individuals were compared to 40 additional age- and gender-matched controls in the research, and reconstruction was carried out using conventional ALT. The length of hospital stay, postoperative secretions, the sufficiency of maxillary sinus fill, the duration of adjuvant treatment, intraoperative ease, and postoperative complications were all analyzed using the modified Clavien-Dindo classification.

Results: The findings of the study demonstrated that chimeric ALT and VL lead to increased mobility for simple maxillary cavity plugging. Chimeric arm participants experience fewer problems and a shorter average length of hospital stay. Adjuvant treatment was administered to the majority of participants during the best time window for them.

Conclusion: chimeric ALT in conjunction with vastus lateralis muscles is a dependable option for reconstructing complicated deformities, especially in cavities like the maxillary sinus that include dead areas. Effective maxillary sinus filling during primary surgery improves patient outcomes and should be done on a regular basis.

Keywords: ALT flap, chimeric anterolateral thigh flap, head and neck cancer, maxilla-alveolar resection, surgical resections

INTRODUCTION

The most prevalent location of cancer in Indian subjects is the head and neck area, accounting for 25% to 30% of all cancer cases, which places a major strain on the Indian healthcare system. Patients typically report to medical professionals with advanced malignant tumors due to prevalent cultural, educational, and socioeconomic circumstances. Surgery constraints in such advanced instances typically result in complicated flaws that must be taken into consideration since the lesion has a three-dimensional structure that allows for the optimal repair.[1]

Maxilla-alveolar resections typically result in a loss of maxillary sinus integrity, and free flaps are seen to be the best option for reconstructing these deficits. Reconstruction of these abnormalities requires careful attention to ensure that the maxillary sinus cavity is effectively obliterated. Otherwise, poor wound healing, fistula development, loss of flap closure, and wound gape would ensue from the maxillary sinus's continuous secretion. Additionally, this will result in a greater strain on the healthcare system, postponed adjuvant treatment, and longer hospital stays.[2]

To produce sufficient maxillary sinus cavity obliteration and prevent any related consequences, a variety of techniques have been employed, each with unique limitations. These techniques include the use of musculocutaneous flaps, deepithelialized flap paddles, and non-vascularized fat. Two vascularized tissue components with autonomous freedom of mobility and the convenience of a single vascular anastomose set were benefits of chimeric flaps.[3]

In India's tertiary healthcare facilities, the maxillary sinus cavity is often obliterated using either flap fat or the de-epithelized flap end. High incidence of complications, such as excessive maxillary discharge from the neck, wound infection, and wound gaping, have also been documented. Flap failures are also a result of these issues.[4]

Many patients experience delayed wound healing and necessitate additional treatments like debridement and suturing, which are performed under general or local anesthesia and further lengthen hospital stays. Regular harvesting of the vastus lateralis (VL) and anterolateral thigh (ALT) flap for maxillary sinus obstruction is necessary to eradicate this. One The goal of the current study was to compare the effectiveness of a chimeric ALT flap with VL to VL alone in reconstructing the etiology of oral cancer in patients who had bialveolar resection with the maxillary sinus left open.

MATERIALS AND METHODS

to evaluate the chimeric anterolateral thigh flap in comparison to the conventional ALT flap for maxilla-alveolar excision repair in patients with head and neck cancer. The research participants were from the Institute's Department of Plastic Surgery. Before participating in the study, all participants and school officials gave their verbal and written informed consent.

The study evaluated 550 participants who had ALT flap surgery for head and neck reconstruction for oral cancer. Participants who met the following inclusion criteria were deemed eligible: those who were older than eighteen, those who had only soft tissue reconstruction or marginal mandibulectomy, those who had posterior segmental mandibulectomy for mandibular defects, and those who were having surgery for the first time as their first treatment option (Brown class IIb maxillectomy with or without a mandibular defect).

Participants with defecations requiring either a large flap or two free flaps requiring skin grafting at the donor site, patients who had previously undergone surgery for head and neck pathology, those who had received neoadjuvant chemotherapy, those who had previously been exposed to radiation, and recurrent cases were excluded from the study.

Depending on the flap type employed for repair, the participants were subsequently split into two groups: the chimeric group and the ALT alone group. Chimeric ALT was performed as usual.

40 people were ultimately enrolled in each group, which consisted of 78 subjects in the ALT alone group and 52 subjects in the chimeric group. These subjects were matched for age, comorbidities, defect type, and defect size. Data from department case files, hospital computerized medical records, and interviews and examinations were gathered using a premade proforma.

Using the modified Clavien-Dindo Classification for free flaps in head and neck reconstruction, information was collected and analyzed regarding the length of hospital stay, the duration of adjuvant therapy, the length of postoperative secretions from the neck and suture lines, the sufficiency of maxillary fill, the ease of intraoperative procedures, etc. Five In preparation for surgery, the thigh perforator was preoperatively defined with a Doppler device at the typical location using a circle with a radius of 3 cm in the middle of the line connecting the anterior superior iliac spine to the patella's superolateral border. The main tumor was removed, the flap was lifted, and the neck nodes were dissected. In order to allow for both proximal and distal extension depending on the perforator's availability, a linear primary incision was performed around 2.5 cm medial to the perforator marking.

Following identification, the perforators were dissected according to conventional procedure until the pedicle was adequately dissected. The VL and rectus femoris nerves were carefully preserved. On the basis of the distal runoff to the VL muscle, which was maintained throughout chimeric flap harvesting, the necessary chimeric muscle was harvested. The maxillary sinus mucosa was carefully removed with a scoop. For maxillary sinus obliteration, the flap's margin or fat may be de-epithelialized in the ALT-only group. To obliterate dead space in the maxillary sinus, the chimera group employed VL muscle as filler. After measuring the size of the defect, the number of muscles extracted was determined by

the filler's requirement. Suturing was used to secure the muscle in the maxillary sinus after the maxillary wall and surrounding tissues were punctured.

A microvascular anastomosis was performed after the inset. In every case, a single-tube French suction drain was positioned behind the sternocleidomastoid muscle. Using a pinprick every two hours on the first postoperative day and every six hours for the next five, the flap was clinically evaluated. With the exception of prophylactic treatment for deep vein thrombosis, no subjects were administered regular blood thinners or anticoagulants. Every day, neck secretions were released, and the quantity gathered was measured in gauzes. While serous discharge was seen as a mild occurrence and a typical postoperative phenomenon, any discharge that did not decrease, increase, or change in nature as purulent, mucoid, or salivary was regarded as a complication and treated as such.

Subjects were routinely moved on the first postoperative day, and oral liquids were initiated on the fifth day. On the seventh postoperative day, all individuals were released from the hospital without any difficulties. When the output was less than 20 milliliters per day for two days in a row, the drain was removed. After being discharged, the subjects were monitored in the outpatient department twice a week for two weeks, then once every 15 days for a month, and finally once every three months.

Findings to compare the chimeric anterolateral thigh flap to the conventional ALT flap for maxilla-alveolar excision repair in patients with head and neck cancer. Eighty participants who had treatment at the Institute throughout the designated trial period were evaluated to determine the benefit of reconstruction for maxillo-alveolar resections using chimeric ALT and VL (vastus lateralis).

RESULTS

These 40 individuals were compared to 40 additional age- and gender-matched controls in the research, and reconstruction was carried out using conventional ALT. The research participants' mean ages in the ALT and chimeric groups were comparable at 62 and 64 years old, respectively. In the chimeric group, there were 75% (n=30) males and 25% (n=10) females, whereas in the ALT, there were 80% (n=32) males and 20% (n=8) females. A total of 60% (n=40), 90% (n=36), 5% (n=2), 5% (n=20, 0, 0, 45% (n=18), and 25% (n=10) of the ALT subjects and 50% (n=10), 80% (n=32), 0, 10% (n=4), 0, 5% (n=2), 30% (n=12), and 20% (n=8) of the study subjects, respectively, had alcohol use, tobacco use, underweight, morbid obesity, pulmonary disease, cardiac disease, hypertension, and diabetes mellitus (Table 1).

In terms of the research participants' mandibular defect characteristics, 16 individuals from the ALT and chimeric groups each had a Brown classic I c mandibular defect. Six individuals from each of the ALT and chimeric groups had a brown classic II c mandibular defect, six from the ALT group and eight from the chimeric group had marginal mandibulectomy, and twelve from the ALT group and ten from the chimeric group had no defect (Table 2).

According to the study's findings, six ALT participants and four chimeric participants had Grade I problems, as determined by the Modified Clavien-Dindo classification of complications.

Six participants in the ALT group and two in the chimera group were in grade II. Two and four subjects in the ALT and chimeric groups, respectively, had grade IIIa, six in the ALT group, and four in the ALT group had grade IIIb. Without any subjects from the ALT or chimeric groups, grade IV a and IV b were seen (Table 3).

When the postoperative features of the trial participants were evaluated, the mean length of hospital stay after surgery was 18.5 days for the ALT group and 12.1 days for the chimeric group. The average length of stay in the hospital ranged from 10 to 33 days for the ALT group and from 5 to 18 days for the chimeric group. In 85% (n=34) of the ALT individuals and 100% (n=40) of the chimeric group, adjuvant RT was completed adequately and successfully (Table 4).

DISCUSSION

In order to evaluate the benefit of reconstruction for maxillo-alveolar resections with chimeric ALT with VL (vastus lateralis), the current study evaluated 80 patients who had treatment at the Institute over the specified study period. These 40 participants were compared to 40 additional age- and gender-matched controls in the research, and reconstruction was carried out using conventional ALT. The research participants' mean ages in the ALT and chimeric groups were comparable at 62 and 64 years old. In the ALT group, there were 80% (n=32) males and 20% (n=8) females, whereas in the chimeric group, there were 75% (n=30) males and 25% (n=10) females.

A total of 60% (n=40), 90% (n=36), 5% (n=2), 5% (n=20, 0, 0, 45% (n=18), and 25% (n=10) of the ALT subjects and 50% (n=10), 80% (n=32), 0, 10% (n=4), 0, 5% (n=2), 30% (n=12), and 20% (n=8) of the study subjects, respectively, had alcohol use, tobacco use, underweight, morbid obesity, pulmonary disease, cardiac disease, hypertension, and diabetes mellitus. These findings were in line with those of earlier research by Dandekar M et al. and Han Y et al, in which the

authors evaluated participants undergoing maxilla-alveolar reconstruction using demographic data comparable to the current study.

According to the findings of the study, 16 participants from the ALT and chimeric groups each had a Brown classic I c mandibular deformity. Six participants each from the ALT and chimeric groups had a brown classic II c mandibular defect, six from the ALT group and eight from the chimeric group had marginal mandibulectomy, and twelve from the ALT group and ten from the chimeric group had no defect. These findings aligned with those of Gong ZJ et al. and Silva AK et al, who revealed comparable mandibular defect features in participants undergoing maxilla-alveolar repair in their respective investigations.

It was observed that six ALT study participants and four chimera study participants had Grade I problems, as determined by the Modified Clavien-Dindo grading of complications.

Six participants in the ALT group and two in the chimera group were in grade II. Two and four subjects in the ALT and chimeric groups, respectively, had grade IIIa, six in the ALT group, and four in the ALT group had grade IIIb. There were no ALT or chimeric group subjects with grade IV an or IV b. These results were consistent with those of Simsek T et al. (2017) and Lin YT et al. (2006), whose assessments of study subjects' complications using the Modified Clavien-Dindo classification of complications revealed by the authors in their investigations were similar to the findings of the current study. In relation to the evaluation of the postoperative features in research participants. The average length of stay in the hospital after surgery was 18.5 days for the ALT group and 12.1 days for the chimeric group. The ALT group saw a mean hospital stay of 10–33 days, while the chimeric group experienced a mean hospital stay of 5–18 days. 100% (n=40) of the chimeric group and 85% (n=34) of the ALT group underwent adequate and effective adjuvant RT, respectively. The findings of Scaglioni M.F et al.12 and Cannady SB et al, where the authors also reported postoperative characteristics in research subjects similar to the current investigation, were consistent with these results.

CONCLUSION

Despite its limitations, the current study finds that chimeric ALT in conjunction with vastus lateralis muscles is a dependable option for reconstructing complicated deformities, especially in cavities like the maxillary sinus that include dead regions. For the primary operation, effective maxillary sinus plugging improves patient outcomes and should be done on a regular basis.

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Characteristics	**ALT only n= 40**	**Chimeric group (n= 40)**
Mean age (years)	62 (30-74)	64 (28-71)
Gender		
Males	32 (80)	30 (75)
Females	8 (20)	10 (25)
Medical morbidities		
Alcohol use	40 (60)	20 (50)
Tobacco use	36 (90)	32 (80)
Underweight	2 (5)	-
Morbid obesity	2 (5)	4 (10)
Pulmonary disease	-	-
Cardiac disease	-	2 (5)
Hypertension	18 (45)	12 (30)
Diabetes mellitus	10 (25)	8 (20)

Table 1: Demographic and disease characteristics in two groups of study subjects

Characteristics	**ALT only n= 40**	**Chimeric group (n= 40)**
Brown classic I c	16	16
Brown classic II c	6	6
Marginal mandibulectomy	6	8
None	12	10

Table 2: Characteristics of mandibular defects in study subjects

Grade	**Definition**	**ALT only n= 40**	**Chimeric group (n= 40)**
I	**Any deviation from the normal postoperative course WITHOUT the need for pharmacological or surgical, endoscopic, or radiological treatment**	6	4
II	**Requiring pharmacological treatment (blood transfusions/TPN)**	6	2
IIIa	**Requiring surgical, endoscopic, or radiological intervention NOT under GA**	2	4
III b	**Requiring surgical, endoscopic, or radiological intervention under GA**	6	-
III c	**Partial/ total flap failure**	4	-
IV a	**Life-threatening complication—single organ failure**	-	-
IV b	**Life-threatening complication—multiorgan failure**	**-**	**-**

Table 3: Modified Clavien-Dindo classification of complications in two groups of study subjects

Characteristics	**ALT only n= 40**	**Chimeric group (n= 40)**
Postoperative hospital stay duration		
Mean (days)	18.5	12.1
Range (days)	10-33	5-18
Adequate and successful adjuvant RT n (%)	34 (85)	40 (100)

Table 4: Postoperative characteristics in two groups of study subjects