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ORIGINAL ARTICLE

Evaluating the Surgical Outcomes of Free Flap Repair in Patients with Carcinoma of the Head and Neck

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ABSTRACT

Objective: This research examined the risk factors for complications and the efficacy of free flap repair in early and recurrent head and neck cancer patients.

Methods: A retrospective study of 160 head and neck cancer patients was conducted at different Hospitals of Pakistan. Free flap repair was performed on male and female primary and recurring cancer patients. After informed written agreement, detailed demographic information regarding enrolled cases was recorded. Group A had 80 recurrent cancer patients and group B had 80 primary cancer patients. Outcomes were compared.

Results: In both groups, tumor stage 4 was the most common. The most common causes found in all cases were smoking, betel nut, and drinking. As far as flap types, the two most prevalent in both groups are anterior medial thigh (AMT) and anterior lateral thigh (ALT). In the initial tumors group, we observed 76 cases (95% success rate) with free flap repair, compared to 70 cases (87.5%) in the recurrent cancers group (p value <0.004). Concerning problems that arose after surgery, there was no discernible difference between the two groups.

Conclusion: The results of this study indicate that the recurrent group had a higher failure rate for free flap reconstruction when compared to the primary group. However, it is possible that these differing patient characteristics are to blame for this outcome.

Keywords: Surgical Outcomes, Free Flap Repair, Carcinoma, Head and Neck

INTRODUCTION

Microvascular free flap repair has emerged as the gold standard for the treatment of complex cancer resections, particularly those that involve the head and neck. Over the course of the past several decades, the surgery has undergone significant advancements, and free tissue transfer has become increasingly successful[1] Despite having a success rate of 91-99%, there are still instances in which things do not go as planned. In order to obtain high success rates, it is of the utmost necessity to adhere to exact surgical procedure. This is a terrible situation for both the patient and the surgeon, since it can force them to have to endure another surgery, spend more money, and deal with emotional and mental anguish. Even in very capable hands, it is still possible for the flap to fail in either a partial or complete manner[2] In light of this, it would appear to be of the utmost importance to determine the factors that contribute to the increased chance of flap failure. It is only after that that we will be able to take measures to reduce this risk and improve patient selection. During the process of free tissue transfer, it has been demonstrated that flap loss is associated with a number of different parameters. There are a number of preoperative risk factors that have been reported, including a higher body mass index (BMI), smoking, diabetes, hypertension, smoking, previous radiation, and surgery at the recipient site[3]

It has been discovered that high-volume centers yield better results than small-volume centers when it comes to undertaking complicated procedures such as free flap surgery[4] On the other hand, the number of surgical procedures carried out is not a satisfactory predictor of the outcomes for patients. Not the center volume, but the level of experience of the surgeon is a more important factor in determining the outcomes of surgical procedures.8. Furthermore, there is a growing body of research suggesting that a low-volume center may be capable of successfully doing head and neck surgeries, including free flap reconstruction, provided that the appropriate surgical team is in place[5]

Patients older than 70 years old account for around 25 percent of all occurrences of head and neck cancer (HNC), despite the fact that the disease is more prevalent in persons in their 50s and 60s[6]. When it comes to the question of whether or not older people are suitable candidates for extensive reconstructive surgery, there is a dearth of data and an ongoing argument. Other authors suggest that older patients should be handled in a manner that is comparable to that of younger patients[7,8], despite the fact that multiple studies have shown that older patients are less likely to get standard treatment. When in their later years, a significant number of individuals opt for less invasive kinds of treatment rather than having extensive surgical procedures in order to achieve a cure[9,10]. It is essential to take into consideration both the frequency of post-operative complications and the clinical repercussions of those complications in order to ascertain whether or not an elderly patient is eligible for major surgery.

Therefore, the purpose of this study was to investigate, with the use of a sample that was matched according to the propensity score, the efficacy of free flap reconstruction after cancer resection being performed on patients who were suffering from primary or recurrent head and neck cancer.

MATERIAL AND METHODS

This retrospective study was conducted at different hospital of Pakistan; Burn and Plastic Surgery Center Hayatabad, Peshawar, Avicenna Hospital and Ghurki Hospital, Lahore, Dow University of Health Sciences and Ziauddin University Hospital of Karachi and Bolan University of Medical and Health Sciences of Quetta during April 2020 to April 2023 and comprised 160 patients of neck and head cancers. Extensive demographic data regarding the patients who were enrolled was recorded. Each patient's medical records were reviewed to obtain information on the following factors: Furthermore, it is important to think about the type of flap (e.g., ALT, AMT, freestyle, MSAP, fibula, or forearm), the vein grafts, the stage of malignancy, and the location of the tumor. "Comorbidities" (hours) include conditions like diabetes mellitus, hypertension, stroke, cardiovascular disease, renal disease, and liver disease. After taking pictures of the wound using echocardiographic signals in that area, randomly harvested flaps, also known as "freestyle" flaps, were obtained. The success of the flap was the most important outcome, although complications like wound infections, fistulas, hematomas, and complete flap necrosis were also possible.

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A total of 80 patients with primary cancer and 80 patients with secondary cancer were included in the comparison. We employed IBM SPSS Statistics version 24 for the purpose of data analysis and comparison. To compare the two nominal groups, the two-tailed Fisher's exact test and the two-sample Pearson Chi-square test were utilized. The Mann-Whitney U-test was employed for comparisons due to the fact that the non-normal data was only presented as a median. To address the potential influence of clinical populations on outcome assessment, we utilized the Greedy technique in R software to create a 1:1 propensity score-matched study population. We calculated using a 0.2 calliper width to avoid the introduction of clinical populations introduced by the nonrandomized assignment. Following the estimation of propensity scores, researchers frequently employ matching algorithms such as the Greedy technique to produce a new set of instances with similar treatment condition probabilities. To achieve this, it selects one subject from the primary group and then uses the highest-scoring individual from the recurring group to act as a control subject. In a 1:1 ratio, only one participant will be randomly selected if there are multiple participants with recurring tumors that are all located within the same relative distance of the main tumor. All data is presented using median and interquartile range (IQR) or n, % displays. A p-value of less than 0.05 was considered to indicate statistical significance.

RESULTS

Majority of the patients were males. The patients mean age was 45.7±8.53 years in group A and in group B mean age was 50.14±10.33 years. The most common causes found in all cases were smoking, betel nut, and drinking. As far as flap types, the two most prevalent in both groups are anterior medial thigh (AMT) and anterior lateral thigh (ALT). In both groups, tumor stage 4 was the most common. (Table 1)

Table-1: Demographics of the enrolled cases

Variables	Group A (n=80)	Group B (n=80)
Sex		
Male	65 (81.3%)	66 (82.5%)
Female	15 (18.7%)	14 (17.5%)
Mean age (years)	45.7±8.53	50.14±10.33
Causes		
Smokers	45 (56.3%)	40 (50%)
Usage of Betel nut	25 (31.3%)	18 (22.5%)
Usage of alcohol	10 (12.5%)	22 (27.5%)
Types of flap		
ALT	63 (78.8%)	60 (75%)
AMT	5 (6.3%)	8 (10%)
Freestyle	4 (5%)	3 (3.8%)
MSAP	3 (3.8%)	4 (5%)
Fibula	3 (3.8%)	1 (1.3%)
Forearm	2 (2.5%)	4 (5%)
Tumor stage		
4	55 (68.8%)	52 (65%)
3	15 (18.8%)	18 (22.5%)
2	5 (6.3%)	4 (5%)
1	5 (6.3%)	6 (7.5%)

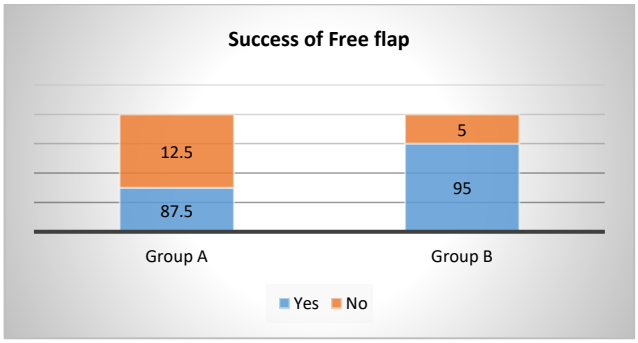

Figure-1: Success of free flap among both groups

In the initial tumors group, we observed 76 cases (95% success rate) with free flap repair, compared to 70 cases (87.5%) in the recurrent cancers group (p value <0.004).(fig 1)

Wound infection was the most common complication in both groups followed by partial necrosis and hematoma.(table 2)

Table-2: Post-operative complications

Variables	Group A (n=80)	Group B (n=80)
Complications		
Wound infection	14 (17.5%)	13 (16.3%)
partial necrosis	8 (10%)	11 (13.8%)
Hematoma	6 (7.5%)	9 (11.3%)
Fistula	7 (8.8%)	5 (6.3%)

DISCUSSION

Patients with reoccurring tumors in this study underwent repair using a variety of flap designs, both before and during statistical model matching. Patients whose cancer returned after ALT flaps had been previously used were less likely to undergo this procedure. Though it can be obtained from the contralateral thigh, surgeons are hesitant to employ the anterolateral thigh flap because of its reputation as the standard for free flap reconstruction after recurrent cancer excision[11,12]. Support for this concept is provided by the greater rates of AMT flap usage and freestyle flap probability in patients with recurrent malignancies.

Fifteen hundred people with head and neck cancers participated in the study. Of the patients we looked at, more were male than female. The average age of the patients was 50.1 years. In every single case, smoking, betel nut, and alcohol consumption were the leading reasons. Comorbidities were present in most individuals with cardiovascular disease, renal sickness, diabetes, and hypertension. In most instances, tumors were found to be in Stage 4. Previous studies found similar results[13] Cosmetic and functional improvements, shorter hospital stays, lower treatment costs, and fewer postoperative complications (POCs) are all associated with early flap reconstruction after cancer resection[14]. On the other hand, the increased risk of postoperative complications (POCs) linked to microvascular free flap reconstructive surgery's ability to sustain longer operating durations and more blood loss makes it a significant challenge[15] Thus, it is difficult to assess how free flap repair affects the prognosis and development of complications in HNSCC patients[16].

Patients with primary or recurrent cancers were not different in their use of venous grafts when propensity score matching was applied. Free flap repair by contralateral microanastomosis remained more common among patients with recurrent malignancy even after propensity scores were controlled for. One possible factor is that the patient has already had surgery to heal the region around the underlying cancer[17]. Since surgeons may have avoided utilizing a vein graft due to concerns about using the same side's vasculature from prior procedures or radiation, vascular microanastomosis is a crucial component of free throw flap transfers. Contra microanastomosis might have been their alternative[18]. This revealed that primary and secondary tumors can be different, which could affect the options for reconstructive therapy.

Our study found that with free flap surgery, the success rate was 95% for patients with initial malignancies and 87.5% for patients with recurring cancers. According to our study, the rate of free-flap reconstructive failure was 5% in the original cancer group and 12.5% in the recurrent group. No statistically significant difference was found between the two groups with regard to postoperative complications. Propensity score-matching analysis, a powerful tool for reducing bias in covariate studies, was employed in this study. However, there are certain limitations to this study. From the very beginning, you need to think about the biases that come with using historical data. Surgeons could disagree on the best course of action and whether or not to utilize a flap[19]. Equalizing the number of unmeasured confounders in the main and secondary groups is likewise highly improbable. In

certain instances, the disease may have reappeared because the nutritional status or immunocompromised state of patients with recurrent tumors was worse than that of individuals with original malignancies[20]. People who have cancer that comes back at least a few times may also have problems with their blood vessels and bleeding control.

CONCLUSION

The results of this study indicate that the recurrent group had a higher failure rate for free flap reconstruction when compared to the primary group. However, it is possible that these differing patient characteristics are to blame for this outcome.

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