Original Article

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Evaluation of Treatment Outcomes and Patient Satisfaction in Patients with Head and Neck Cutaneous Cancer: A Cross-Sectional Study

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Abstract

Background and Objectives: Skin cancer represents one of the most prevalent malignancies worldwide. Surgical excision remains the treatment of choice for skin lesions. This study aimed to evaluate patient satisfaction following surgical intervention with local flap reconstruction for head and neck skin cancer.

Methods: In this cross-sectional study, 152 patients presenting with skin cancer lesions in the head and neck region were enrolled. The anatomical location of the lesion and patient-reported satisfaction with the cosmetic outcome of the surgical procedure were documented. Patient satisfaction was assessed using a Likert scale checklist (excellent to dissatisfied). Surgical outcomes, including congruence of the surgical site with adjacent tissue, incidence of surgical complications, and necessity for reoperation due to involved margins, were assessed and recorded by the attending surgeon. Patients were followed for up to two years. The collected data were analyzed using SPSS software (version 26) with one-way analysis of variance and Tukey's post-hoc test. A P value of less than 0.05 was established as the threshold for statistical significance.

Results: The study included 152 patients (61.2% male, mean age 40.65 ± 11.38 years; women were significantly younger, $P<0.001$). Over 90% showed favorable graft integration. Basal cell carcinoma was the most common lesion, mainly on the nose, cheek, and lip. Patient satisfaction was high (90.8% good/very good); none were dissatisfied. Complication analysis showed significant age differences among groups ($P < 0.05$): patients with necrosis had the highest mean age, and patients with wound hematoma the lowest. Post-hoc analysis confirmed significantly higher age in the dehiscence and necrosis groups compared with the hematoma group ($P=0.032$ and $P=0.004$).

Conclusion: While the majority of patients expressed general satisfaction with the postoperative aesthetic results, certain social, demographic, and clinical factors independently predicted lower satisfaction with the aesthetic results. Specifically, lesion location, congruence with adjacent tissue, and surgical complications were significant determinants of decreased patient satisfaction following surgery.

Key words: Basal cell, Carcinoma, Local flap, Patient satisfaction, Plastic, Squamous cell carcinoma, Surgery

Introduction

Skin cancer is one of the most common types of cancer in Iran, and numerous studies within the country have addressed its epidemiology, risk factors, screening methods, and prevention strategies (1, 2). Skin cancer holds the highest incidence rate among cancers in men and ranks second among women. It is the third leading cause of cancer-related mortality and accounts for 20%-40% of all cancer cases (3). Skin cancer is broadly classified into two principal categories: melanoma and nonmelanoma (nonmelanoma skin cancers [NMSCs]). The latter group predominantly comprises basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), with actinic keratosis recognized as a precursor lesion. While

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less common, melanoma is notably more aggressive, originating from melanocytes. In contrast, NMSCs, particularly BCC and SCC, represent the most prevalent forms of skin cancer and are strongly associated with chronic ultraviolet exposure.

With the changes in the social and medical environment, the incidence of facial skin cancer has gradually increased (4). The treatment landscape for skin cancer is highly diverse, tailored to the tumor type, stage, location, and patient-specific factors. Therapeutic strategies range from localized destruction for pre-malignant and early-stage lesions to advanced systemic therapies for metastatic disease.

Surgical excision remains the cornerstone of treatment for most primary skin cancers, particularly melanomas and high-risk NMSCs (5). Mohs micrographic surgery offers superior tissue preservation and the highest cure rates for tumors in cosmetically sensitive or functionally critical areas (e.g., face), as well as for recurrent, ill-defined, or high-risk BCC and SCC. According to many reports, the most common area for skin cancers is the head and neck area because it is more exposed to UV radiation. Among the different parts of the face, it is also the most common area for nasal involvement (25.5%). The usual treatment methods for malignant and premalignant lesions of the facial area include surgery, electric cautery, curettage, cryotherapy, and radiation therapy. However, surgery is reported as the best way to treat and prevent recurrence of these lesions (4). In the face of a patient with skin cancer, the most important therapeutic goal is to reach a tumor-free patient. Therefore, during the surgery, in addition to removing the cancerous tissue, it is necessary to cut and remove the margin to ensure safety. For example, after removing a 2 cm lump of initial BCC with a clear margin, it is recommended to remove a 4 cm margin to achieve a 95% definitive treatment rate. Also, in SCC, it is estimated at 4 mm for low-risk tumors and 6 mm for high-risk tumors. There are four main methods for skin regeneration: Secondary intention, primary closure, skin grafting, and local and free flaps. Surgery to reconstruct defects after surgery should be performed selectively, and the following points should be considered: Surgical method, location of the lesion, size and type of the tumor, probability of recurrence, patient's age, health status, and functional and aesthetic aspects (4). Since head and neck surgery, especially facial surgery, is of great importance in terms of aesthetics and patient satisfaction and the facial area is the most affected area by skin cancers, we decided to conduct a study to investigate patient satisfaction in terms of appearance (directly at the next visit or by telephone) and examining the treatment results by the physician in patients with head and neck skin cancer who underwent surgery with a local flap in the Plastic Surgery Department of Kowsar Hospital, Semnan, Iran. Flaps are used to treat skin cancer and to cover the tissue defect created after complete excision. In fact, the flap is part of the treatment and is used instead of a simple suture at the site of tumor excision, which is often not possible, and the two edges of the defect do not meet. This study aimed to evaluate patient satisfaction and surgical complications (wound dehiscence, wound infection, and hematoma) following local flap reconstruction for head and neck skin cancer at Kowsar Hospital, and to examine the relationship between satisfaction and demographic/clinical factors including age, gender, lesion type, lesion location, and lesion size.

Materials and Methods

Study Design

In this cross-sectional study, 152 consecutive patients presenting with cutaneous tumors of the head and neck region were enrolled.

Participants

These patients were recruited from the Plastic Surgery Center of Kowsar Hospital between 2018 and 2020.

The inclusion criteria included patients of any age or gender who underwent surgical reconstruction using a local flap (e.g., advancement, rotation, transposition, or interpolation flaps) for any indication (e.g., trauma, tumor resection, pressure ulcer, or chronic wound), surgery performed at Kowsar Hospital, Semnan, Iran, surgery carried out during the study period (2018-2020), and availability of complete preoperative and postoperative medical records, including operative reports and at least one follow-up note.

The exclusion criteria included patients who declined to provide written informed consent for participation in the study, patients who were unable or unwilling to cooperate with follow-up assessments (e.g., wound check, flap viability evaluation), medical records with missing key data, such as operative details, flap type, complications, or follow-up outcomes, and patients who underwent local flap surgery but also had simultaneous major

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reconstructions (e.g., free flap) that could confound outcomes, unless the analysis accounts for this separately.

Sample Size

The sample size was calculated based on the following formula for estimating a proportion in a finite population (since the total number of eligible patients undergoing local flap surgery at Kowsar Hospital during the study period was limited):

n = [N * Z^2 * p * (1-p)] / [(N-1) * d^2 + Z^2 * p * (1-p)]

n = [210 * (1.96)^2 * 0.25 * 0.75] / [(209) * (0.07)^2 + (1.96)^2 * 0.25 * 0.75] = 152

Therefore, the required sample size was 152 patients. Consecutive sampling was used to include all eligible patients meeting inclusion criteria until the target sample size was achieved. The total number of patients who underwent local flap surgery during the study period was 210, and the final analysis included 152 patients who met all inclusion criteria and had complete data.

Data Sources/Measurement

The following patient demographic and clinical data were collected using a standardized questionnaire: age, gender, type of cutaneous malignancy (melanoma, SCC, BCC, or other skin tumors), lesion size, and anatomical location (frontal, cheek, chin, nose, neck, scalp, or ear).

Additionally, data were collected via the questionnaire regarding the patient-reported aesthetic outcome following surgery, graded using a 5-point scale (very good, good, average, poor, and bad). The surgical result was also documented, encompassing: the alignment/contour of the surgical site relative to the surrounding tissue, the occurrence of postoperative complications, and the necessity for re-excision in the event of involved surgical margins being identified. The integration of the surgical site with the adjacent tissue, which was evaluated on a 3-point scale (good, moderate, and poor), was assessed by the treating physician, as this individual is uniquely positioned to compare the postoperative outcome with the pre-operative condition.

Patient satisfaction was measured using a Likert-scale checklist (excellent to dissatisfied) after local anesthesia surgery for cutaneous tumor lesions at Hospital. Written informed consent was obtained from all participants. They were assured of data confidentiality and informed that participation was voluntary and that they could withdraw at any time without penalty. No harm or cost was incurred by the participants.

Statistical Analysis

The collected data were analyzed using SPSS software (version 26). Following assessment of data normality using the one-sample Kolmogorov-Smirnov test, the comparison of means between groups was conducted using analysis of variance (ANOVA). A *P* value of less than 0.05 was established as the threshold for statistical significance.

Results

A total of 152 patients were included in the study, with a clear male predominance (n=93; 61.2%) compared to female patients (n=59; 38.8%).

The mean age (± standard deviation (SD)) of the study cohort was 40.65±11.38 years, with ages ranging from 24 to 89 years. A statistically significant difference in age was observed between genders, with the mean age in women being lower than in men ($P<0.001$)

Regarding integration of the surgical site with adjacent tissue, most patients demonstrated favorable outcomes. Specifically, over 90% of patients achieved tissue coordination rated as "very good" or "good" by the treating physician.

Table 1 presents the frequency distribution of patients by lesion type.

The majority of the lesions were related to BCC, followed by SCC.

The anatomical distribution of the lesions is presented. The three most frequently involved sites, in descending order of occurrence, were the nose, the cheek, and the lip (Table 1).

Regarding integration with the surrounding tissue, more than 90% of the patients demonstrated excellent or good integration. Histological evaluation revealed a high degree of graft compatibility, with over 90% of patients exhibiting "very good" or "good" grades on the established assessment scale.

Table 2 presents patient satisfaction outcomes. The vast majority of patients (90.8%) reported "good" (43.4%) or "very good" (47.4%) satisfaction levels. A minority (9.2%) described their outcome as

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"moderate," while no patients reported being "dissatisfied."

Among the few dissatisfied cases, the reasons provided included minor contour deformities in the nasal or periorbital region (n=2) and disease recurrence after two years in the presence of underlying comorbidities (diabetes and hypertension) (n=4).

Table 1. Summary of Patient Characteristics (n=152).

Characteristic	Subgroup	No	%
Graft tissue integration	Very Good	70	46.1
	Good	74	48.7
	Moderate	8	5.3
Lesion site	Nasal	47	30.9
	Cheek	43	28.3
	Lip	25	16.4
	Scalp	14	9.2
	Frontal	11	7.2
	Ear	6	3.9
	Chin, neck, eyelid	2 each	1.3 each
Lesion type	BCC	113	74.3
	SCC	24	15.8
	Other lesions	13	8.6
	Melanoma	2	1.3

Table 2. Frequency Distribution of Patient Satisfaction Level with the Procedure.

Satisfaction	No	%
Very good	72	47.4
Good	66	43.4
Moderate	14	9.2
Total	152	100

Table 3 presents the distribution of mean patient age across different surgical complications. A one-way ANOVA test revealed a statistically significant difference in the mean age of patients among the various complication groups ($P<0.05$). Patients with the complication of necrosis had the highest mean age, while those with wound hematoma had the lowest.

Post-hoc analysis using Tukey's test indicated significant pairwise differences between the complication groups. A significant difference in mean age was found between patients with wound dehiscence and those with wound hematoma. Specifically, the mean age of patients with wound dehiscence was significantly higher than that of patients with wound hematoma ($P=0.032$). Furthermore, the mean age of patients with surgical site necrosis was also significantly higher than that of the wound hematoma group ($P=0.004$).

No other pairwise comparisons between the different surgical complications yielded statistically significant differences in mean patient age.

Table 3. Distribution of Mean Patient Age by Surgical Complication.

Complication of Surgery	Number	Mean	SD	*P*-value
No complications	132	64.83	11.08	0.003
Wound Dehiscence	7	72.28	11.39	
Wound infection	5	62.60	6.46	
Wound hematoma	4	52.25	13.20	
Necrosis	4	80.00	1.15	

Discussion

Of the 152 patients evaluated in this study, 93 were male, and 59 were female, with a mean age of 40.65 (±11.38) years (range: 24–89). The frequency of skin lesions demonstrated no significant gender difference ($P=0.233$), suggesting that sex is not a determinant of lesion development.

A statistically significant difference ($P=0.001$) was observed in the anatomical distribution of lesions between genders across various head and neck regions. Male predominance was noted in the forehead, neck, scalp, auricular, labial, and palpebral areas, whereas female patients exhibited a higher lesion frequency in the malar, mental, and nasal regions.

No statistically significant gender differences were observed in the incidence of postoperative complications ($P=0.609$) or in the frequency of reoperation causes ($P=0.456$). Similarly, margin status (clear/involved) showed no significant association with gender ($P=0.431$).

In contrast, tissue compatibility varied significantly by both gender ($P=0.049$), with better outcomes observed in females, and by age group ($P=0.003$), with generally better compatibility in younger patients. A significant difference in tissue compatibility was also observed among patients

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with different lesion types (P=0.048), with relatively poorer compatibility noted in SCC cases. No significant differences in tissue compatibility were found among patients with lesions in different head and neck regions or between patients with lesions of different sizes (P=0.322).

Postoperative patient satisfaction was assessed, revealing no significant difference between genders (P=0.828). However, younger patients reported significantly higher satisfaction levels (P=0.001). Neither lesion type nor location had a significant effect on satisfaction (P=0.553 and P=0.065, respectively). In contrast, the presence of surgical complications (e.g., infection, hematoma, and necrosis) was associated with significantly lower satisfaction (P<0.001).

Among the reported reasons for dissatisfaction, two patients cited minor deformities in the nasal, ocular, and palpebral regions. Disease recurrence was reported in four cases after two years, all of which had underlying comorbidities of diabetes and hypertension.

The need for reoperation was significantly associated with advanced age (P=0.020) and poorer tissue compatibility (P=0.042). In patients with clear surgical margins, the most frequent indications for reoperation were tumor recurrence, debridement, scar revision, or hematoma evacuation. In cases with involved margins, the primary reason for reoperation was positive margin status.

Regression analysis identified lesion location, poor tissue compatibility, and surgical complications as significant factors reducing patient satisfaction. Overall, postoperative satisfaction was influenced by patient age, surgical complications, and tumor characteristics, whereas the need for reoperation was more strongly associated with clinical factors, such as surgical margin status and tissue compatibility.

Some healthcare systems now use patient satisfaction metrics to assess quality of care and determine performance-based reimbursements (6). While satisfaction with reconstructive procedures remains understudied – particularly in our national context, where most research has focused on promotional aspects – some studies have addressed this issue, especially among oncology patients (7). Sarwer et al. reported an 85% satisfaction rate post-cosmetic surgery, whereas our study found even higher satisfaction, with >90% of patients rating their outcomes as excellent or good (8). Claflam et al. and Lee et al. (2017) demonstrated superior patient satisfaction with local flaps (4.3/5) compared with skin grafts (3.5/5) for facial skin cancer reconstruction, with BCC (56.8%) being the most prevalent (4). The tumor distribution was as follows: BCC (74.3%), SCC (15.8%), melanoma (1.3%), and other tumors (8.6%). This pattern of tumor prevalence and patient satisfaction with skin flap procedures was consistent with the findings of Lee et al. Patient satisfaction following reconstructive surgery with skin flaps is influenced by multiple factors, including tissue compatibility, surgical complications, tumor recurrence, and need for reoperation. In our study, tumor recurrence occurred in 12 cases (7.9%), with an overall complication rate of 13% (including wound dehiscence 4.6%, infection 3.3%, hematoma 2.6%, and necrosis 2.6%). In the study by Yasser Helmy Ali (2020), the incidence of non-melanoma skin cancer was reported as 98.4%, while cutaneous melanoma accounted for 1.6% (9). These findings are consistent with our study results showing 98.7% prevalence for non-melanoma skin cancer and 1.3% for cutaneous melanoma.

Our study encompassed all types of skin cancer and evaluated patient satisfaction and complications following reconstructive surgery with skin flaps, including cases of melanoma. In our study, only two melanoma cases were observed, neither of which experienced postoperative complications, and patient satisfaction with skin flap reconstruction was reported as 'good'. Huo et al. (2020), in their evaluation of outcomes following immediate reconstruction after wide local excision using the adjacent tissue transfer technique, reported this method to be safe, with the lowest complication rate (10).

Multiple factors can influence patient satisfaction with reconstructive surgery, including anatomical location, type of reconstruction, and individual characteristics. Findings from our multivariate regression analysis identified lesion site, tissue match with the surrounding area, and postoperative complications as predictors of lower satisfaction with postoperative facial appearance.

In the study by Vaidya et al. (2019), younger age and female sex were independently associated with lower satisfaction with postoperative facial aesthetics (11). Younger age has been identified as a negative predictor of satisfaction in patients seeking facial cosmetic surgery and may require more thorough preoperative and postoperative counseling (12).

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Among facial anatomical sites, the lips and nose are associated with the lowest satisfaction regarding postoperative aesthetics and scarring. The lip is a critical facial feature for both aesthetic and functional reasons. Large lip and buccal mucosal defects resulting from extensive cancer resection are particularly challenging to reconstruct due to the loss of skin, muscle, and mucosa (13). Lip surgery also affects facial expression, which may contribute to reduced overall satisfaction with facial aesthetics.

Nasal skin lacks elasticity and often requires flap reconstruction. Nasal flaps are more likely to result in scar thickening and erythema. The increased dissatisfaction with scars observed one year postoperatively is largely attributable to the nose's prominent central position, making scars more visible. Among these patients, those who underwent nasal tip surgery reported the lowest satisfaction with their scars. Previous studies indicate that patients undergoing rhinoplasty are typically least satisfied with their nasal tip appearance preoperatively. Even minor irregularities in this highly convex area may be noticeable to both patients and observers (14).

Marital status and history of anxiety and/or depression show significant associations with postoperative facial satisfaction. Studies have demonstrated that married status predicts lower willingness to undergo cosmetic procedures (15), suggesting this group may have greater baseline satisfaction with their appearance compared to single individuals. A history of anxiety and/or depression is significantly associated with lower facial satisfaction. Excessive body image dissatisfaction is a hallmark of several psychiatric disorders and may influence patients' perception of postoperative aesthetic outcomes. Patients with psychiatric histories may initially have lower aesthetic expectations, contributing to reduced postoperative satisfaction. These findings align with the oncology literature indicating that psychosocial factors, independent of the disease itself, significantly impact treatment outcomes (16).

This study has several limitations. First, the sample size was relatively small for certain complication subgroups, particularly wound infection (n=5), wound hematoma (n=4), and necrosis (n=4), which limits the statistical power and generalizability of comparisons involving these groups. Second, the single-center design may limit the external validity of the findings. Third, the mean age was significantly lower in women than in men (P<0.001), introducing potential sex-related bias in outcome comparisons, although this difference was not the primary focus of the study. Fourth, the study lacked a control group or randomization because it was observational. Fifth, the assessment of graft tissue integration and patient satisfaction was subjective, despite being performed by both clinical and histological evaluations. Sixth, long-term follow-up data on recurrence rates or late complications were not available. Finally, the predominance of BCC (74.3%) and specific anatomical sites (nose, cheek, lip) may limit the applicability of the findings to other lesion types or locations.

Conclusion

This study analyzed factors affecting outcomes in head and neck skin lesion surgery. Patient satisfaction was primarily linked to younger age and the absence of complications. Conversely, the need for reoperation was independently associated with older age, poorer tissue compatibility, and positive surgical margins. While lesion location varied by gender, it was not a significant predictor of complications. Aesthetic dissatisfaction was most common with eyelid and scalp lesions. These results highlight a dual pathway: satisfaction is driven by procedural morbidity, while reoperation risk depends on biological and pathological factors, guiding personalized surgical planning.

Ethics Approval and Consent to Participate

The study was approved by the Ethics Committee of Semnan University of Medical Sciences, Semnan, Iran.

(ethics code: IR. SEMUMS.REC.1399.327). All research procedures were performed in accordance with the ethical principles of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to their enrollment in the study.

Consent for Publication

Not applicable.

Data Availability Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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Author's Contribution

Substantial contributions to the conception or design of the study, or the acquisition, analysis, or interpretation of data: A.M., Sh.I., F.YA., HR.H.;
Drafting the manuscript or revising it critically for important intellectual content: M.E;
Final approval of the version to be published: Sh.I;
All authors have read and approved the manuscript.

Conflict of Interest

The authors declared no conflicts of interest.

Declaration of Generative Artificial Intelligence in Scientific Writing

The authors confirm that no generative AI was used to write, analyze, or interpret data. AI was used only for language polishing and formatting the reference in English. The authors take full responsibility for the accuracy and originality of the study.

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