Original Investigation

Management of Basal Cell Carcinomas: Clinical Experience

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Abstract

Objective: Basal cell carcinomas (BCC) mostly originate from the head and neck region. Main goal in BCC treatment is to achieve both aesthetic and functional results while observing the principles of tumor surgery. We report our experience regarding the clinical, histopathological features and surgical treatment results of head and neck basal cell carcinomas in the light of the literature.

Methods: Files of patients with head and neck BCCs treated surgically in two university hospitals were retrospectively analyzed. Sociodemographic variables, location and size of tumor, pathological subtype, recurrence ratio, complications and technique of reconstruction were evaluated.

Results: We analyzed 119 tumoral lesions in 105 patients of whom 55 (52.4%) were male and 50 (47.6%) were female. Their mean age was 67.3±12 years. The nasal region was the most common location area (n=42, 35.3%). Mean tumor size was 12.6 mm and tumor size range was 2–85 mm. The most commonly used reconstruction techniques were flap surgery, followed by primary closure, and skin grafts.

Conclusion: It is important to remove the tumor with a clear surgical margin at least 4 mm and evaluate the five surgical margins with frozen sections intraoperatively. Operations are often performed under local anesthesia and are well tolerated by patients. The most common flaps used in the reconstruction are not only easy to learn but also sufficient in most cases. Skin grafts are good choices in defects located in the cavum concha and the external meatus.

Keywords: Basal cell carcinoma, skin cancer, pedicled flap, reconstructive surgical procedure

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Introduction

Basal cell carcinoma (BCC) is the most common skin tumor, representing 70% to 80% of all skin tumors (1). It is commonly known that ultraviolet (UV) radiation plays a dominant role as a carcinogenic agent in its development (2). The most common location for BCC are the face and the neck (80%) and the

region most commonly affected in the face is perinasal area (30%) (3). Inspection, dermatoscopic examination and histopathological examination are sufficient for the diagnosis of this tumor. While typical lesions are mostly identified by direct inspection based on common clinical findings, dermatoscopic examination may be required in suspicious cases for diagnosis (4). Numerous histopathological subtypes are known for BCC, which are primarily classified according to their clinical and histopathological characteristics as nodular, superficial, cystic, morpheaform, basosquamous, infiltrative, and fibroepithelioma of Pinkus. The most commonly encountered subtypes are nodular BCCs (2). The morpheaform, infiltrative and basosquamous subtypes of BCC are rare and more aggressive (5). Although mortality related to BCC is low, it still is a significant and costly health problem due to high recurrence rates and destructive local spread may cause significant morbidity (6, 7). The main objectives in BCC treatment are tumor removal with clear surgical margins, thus preventing recurrence, preservation of function and optimal aesthetic outcome (8). BCC treatment mostly involves surgical methods. These methods include surgical excision, micrographically oriented histographic surgery (MOHS) surgery, electrodessication, and curettage. Some low-risk BCC cases can also be managed with topical treatments. If surgery cannot be performed for any reason, radiotherapy is also an option (6).

In this study, the surgical management of the head and neck BCC is discussed based on our 105 patients and in the light of the literature.

Methods

Files of patients with head and neck BCC who were surgically treated between 2015 and 2020 were retrospectively analyzed. Patient data were collected from the two otolaryngology clinics. The study was approved by Kahramanmaraş Sütçü İmam University Faculty of Medicine Clinical Research Ethics Committee (date: 09.09.2020, decision number: 15). Informed consent was obtained from all patients. Sociodemographic variables, location and size of tumor, technique of anesthesia, pathological subtype, recurrence ratio, complications and technique of reconstruction were evaluated. Incisional biopsy samples were obtained for suspicious skin lesions or lesions larger than two centimeters. Local injection anesthesia was the primary anesthesia method used. However, the procedure was performed under general anesthesia (GA) for patients who could not tolerate the procedure under local anesthesia, for patients who preferred GA, and for patients who would recieve GA for another reason. All procedures were performed in the operating room. Surgical excision with 4 mm clean surgical margins was planned after the perimeter of the tumor was defined (9-11). Frozen sections were obtained to verify that all five surgical margins (upper, lower, two sides and base) were clean. If the eyelid was compromised by the tumoral invasion, only three surgical margins (medial, lateral and base) were examined by frozen section. The reconstruction was done simultaneously with tumor resection. Decision for the construction method, namely primary closure, full thickness skin graft or local flap techniques, was based on patient's age, size and location of the tumor, tissue elasticity and patient's preference. The supraclavicular region was the first choice for donor area in the skin graft method. Patients were discharged with oral antibiotics and analgesics on the same or the following day. Sutures were removed on the fifth or seventh postoperative day. The Ophthalmology department was consulted for tumors with periocular location. For patients treated with a flap reconstruction technique, the flap separation procedure was made in the third week for paramedian forehead flap and fourth or sixth week for Hughes flap. Canthotomy and cantholysis were also performed in primary closure for eyelid defects when necessary.

Results

One hundred and five patients who adhered to their follow-up schedules were included in study. Of these 105 patients 50 (47.6%) were female and 55 (52.4%) were male and their ages ranged from 42 to 95 years. Mean patient age was 67.4±10.8 years, male/female ratio was 1.1. Concomitant BCC excision for secondary tumor was done in eight patients, while new BCC was detected in six patients during the follow-up period. One hundred and nineteen tumors were resected from 105 patients. Tumor sizes ranged from 2 to 85 mm with a mean of 12.6±10.86 mm. The nasal region was the most common site (42 lesions, 35.3%), followed by the periocular region (22 lesions, 18.5%), the cheeks and zygoma (22 lesions, 18.5%), the periauricular area (17 lesions,14.3%), the forehead-glabella (6 lesions, 5%) and the scalp (6 lesions, 5%) and others (4 lesions, 3,4 %). Regarding the reconstruction technique, primary closure was used in 45 (37.8%) defects, while local flaps and full thickness skin grafts were used in 53 (44.5%) and 21 (17.6%) defects, respectively. Skin grafts were harvested mostly from the supraclavicular area (Table 1).

Rhomboid flap was commonly used in the cheek and zygomatic region, while the bilobed flap was the technique of choice for nasal area defects. For medial canthal region defects, our preferred method was the glabellar flap. While three different flap techniques (paramedian forehead flap, bilobed flap, nasolabial flap) were used in the nasal area, the glabellar flap, the Hughes flap, and the upper eyelid rotation flap techniques were the flap techniques used in periorbital area defects (Figures 1–6). Of the 119 tumors, 26 (21.84%) were in the low-risk group, and 93 (79.16%) were in the high-risk group (Table 2).

We used general anesthesia (GA) in 22 (21%) and local anesthesia in 83 (79%) patients. Of those operated on under

Table 1. Tumor location and used reconstruction techniques

Tumor location	n	Reconstruction technique	n
Nasal region	42	Primary closure	12
		Skin graft	11
		Bilobed flap	12
		Nasolabial flap	5
		Paramedian forehead flap	2
Cheek-zygomatic region	22	Primary closure	7
		Skin graft	-
		Rhomboid flap	11
		V-Y advancement flap	2
		Rotation flap	2
Periauricular region	17	Primary closure	10
		Skin graft	6
		Local flap	1
Periocular region	22	Primary closure	8
		Skin graft	1
		Glabellar V-Y flap	5
		Hughes flap	7
		Rotation flap (from upper eyelid)	1
Scalp	6	Primary closure	4
		Skin graft	1
		Rotation flap	1
Forehead-glabella	6	Primary closure	4
		Skin graft	-
		Rhomboid flap	2
Temporal-occipital region, chin	4	Primary closure	1
		Skin graft	1
		Rhomboid flap	2

n: Number

GA 19 (86.3%) had high-risk tumors, and the remaining three had other concomitant conditions (thyroidectomy, parotidectomy etc.) that required GA, and BCC excisions were performed simultaneously in these patients. Six patients (5%) had post-operative complications: one had hematoma and was reoperated on for drainage and the flap was resutured. One patient who was treated with a rotation flap for scalp defect had flap necrosis and was allowed to heal by secondary intention. Ectropion developed in one patient with Hughes flap and was managed with lateral strip tarsoraphy. Conservative methods were used for a patient with symblepharon after reconstruction with glabellar flap after removal of a medial canthal region BCC. Skin graft necrosis was seen in two patients with auricular BCC that healed secondarily. Incisional biopsy was performed when the tumor was larger than two cm or there were further suspicions. We performed 26 (21.8%) incisional biopsies in 25 patients preoperatively; tumor size was larger than two cm in 19 of these patients and the remaining patients had suspicious skin lesions. Our pathological specimens revealed

Figure 1. Forehead BCC and rhomboid flap design
BCC: Basal cell carcinoma

Figure 2. View after flap suturation

that our most common subtype was nodular BCC (77 lesions, 65%). Postoperative follow-up period ranged from three to 70 months, with a mean of 35.6±18.3 months. There were no recurrences in any of the patients in the follow-up period.

Discussion

BCCs are the most common cancers in the fair-skinned population (12). Essentially BCC is a tumor of the elderly

Figure 3. View on postoperative day 14

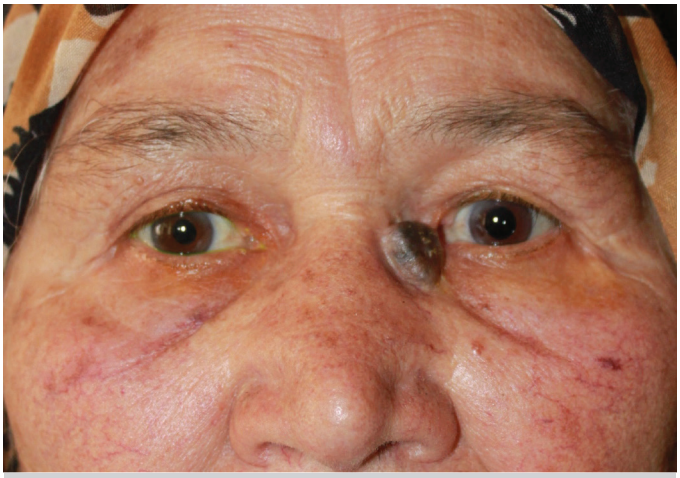

Figure 4. View of medial canthal BCC
BCC: Basal cell carcinoma

and more than 50% of the cases are seen in patients aged 50 to 80 years (3). In our study, mean patient age was 67.4±10.8. Recurrence risk of BCC increases with tumor size when larger than two cm (3). Fifteen percent of our patients had tumors larger than two cm, but none had recurrent disease during the follow-up period. The most common BCC subtype is the nodular ulcerative form and generally affects the head and neck primarily as an isolated lesion (3). According to recent studies, the incidence of nodular BCC varies between 45%–80% (2, 6, 13). In our study, 65% of the tumors of known subtype were nodular type BCC.

Nose, cheek, forehead, ears and periocular regions have the greatest UV exposure in the human body and BCC is most commonly seen in these anatomical areas (14). The nose is the most frequently affected region according to the literature

Figure 5. After tumor excision, intraoperative view

Figure 6. Glabellar V-Y flap, post-operative view

(15-18). In our study, the most affected sites were the nasal, periocular, buccal, and zygomatic, periauricular regions and the forehead. The differences between our study and those in the literature may be related to the fact that we also involved periocular tumors in our study.

Table 2. Risk factors for recurrence (9)

History and physical examination	Low risk	High risk
Location/size	Area M <10 mm	Area M ≥10 mm
	Area H <6 mm	Area H ≥6 mm
Margins	Well defined	Poorly defined
Primary vs. recurrent	Primary	Recurrent
Immunosuppression	(-)	(+)
Site of prior RT	(-)	(+)
Subtype	Nodular, superficial	Aggressive-growth pattern
Perineural involvement	(-)	(+)

Area M: cheeks, forehead, scalp, and neck, Area H: "mask areas" of face (central face, eyelids, eyebrows, periorbital, nose, chin, mandible, preauricular and postauricular skin/sulci, temple, ear), RT: Radiotherapy

Overtreating low risk BCC causes avoidable morbidity for the patient and increased health system expenditures, whereas undertreating aggressive high-risk BCC paves the way for recurrence, metastases and further unnecessary highly morbid treatments (19). Therefore, clinicians must distinguish high-risk lesions from low-risk lesions. Of the lesions in our study, 26 (21.84%) were in the low-risk group, and 93 (79.16%) were in the high-risk group. BCC can be easily treated with surgery, especially, when diagnosed early. Local invasion and destruction constitute the main morbidity, when BCCs are located in the face and neck where aesthetic and functional features are crucial (19).

Surgical excision is less effective for BCCs in the H zone, presumably due to its aggressive histology, increased subclinical dissemination and the restricted margins available for removal of the lesion (20). In our study, 85 lesions were in the H zone (area of mask), and none presented with recurrence during follow-up after surgical treatment. The gold standard treatment for non-melanoma skin tumors (NMSTs) is surgical resection. For patients who are not suitable for surgery or do not want to undergo surgery, however, radiotherapy, cryotherapy, topical immunomodulators or photodynamic therapy can be alternative options (5). Radiotherapy is also a treatment option for patients who are unsuitable for surgery or refuse surgery. It is also used as adjuvant treatment in patients with postoperative surgical margin positivity or perineural invasion (21).

Essentially, three methods are used in the evaluation of surgical margins in BCC treatment: histological analysis with frozen sections, micrographic MOHS surgery, and staged-surgery with permanent pathology (5). The recurrence rate after traditional surgical excision can vary between 3 to 42%. Considering that BCC can extend farther than it appears clinically, normal appearing skin should also be removed at tumor excision (22). In our clinic, we routinely evaluate margins from four quadrants and base with frozen sections during the surgical procedure. Although the accuracy of frozen sections is controversial, multiple studies have confirmed its utility (23). When immediate surgical margin assessment is not possible, staged excision with delayed reconstruction should be the choice (23). The National Comprehensive Cancer Network (NCCN) recommends that clean surgical margins of four mm should be obtained for low-risk tumors (9). Wolf and Zitelli (10) reported that in 95% of their patients a clean surgical margin of at least four mm had to be obtained in the removal of tumors smaller than two cm to achieve tumor eradication. In another study, it was recommended to obtain a three mm clean surgical margin for tumors smaller than 10 mm, and a five mm clear surgical margin for tumors sized 10–20 mm for superficial and nodular BCCs on the face (24). Most cases referred to our clinic were < 2 cm and we routinely excised the tumor with a surgical margin of at least four mm. In larger tumors and for aggressive subtypes, the tumor is excised with wider surgical margins after biopsy. Recurrence is rare (<2%) in non-melanoma skin cancers where clear surgical margins are obtained (5). In our study none of the patients had recurrent disease.

Mohs micrographic surgery is also an appropriate surgical option for high-risk BCCs, as it allows for surgical margin analysis during surgery (9). As an alternative to this technique, all circumferential surgical margins and the base can be examined with frozen sections during surgery after excision (9). Before reconstructing the surgical defect, clinicians must ensure that the tumor has been excised completely and with clear surgical margins (19). In our clinic, we routinely work frozen sections from the four quadrants and with deep margins after excision. After ensuring clear surgical margins, the defect is repaired with primary closure, skin graft, or local flaps in the same session. Lack of good communication and cooperation between surgeons and pathologists can impact the success of the operation.

The surgical defect after tumor excision can be reconstructed with regional, local or free flaps, or skin grafts (25). In a study by Bertozzi et al. (16) on head and neck BCCs, 72.5% of the defects were repaired with primary closure and 26.1% with local flap. In our study, the most commonly used closure method was local flap (n=53, 44%) followed by primary closure (n=45, 37.8%), and skin graft (n=21, 17.6%). We believe that these differences could be related to the location of the tumor, the surgeon's preference, and the size of the tumor.

We most commonly used a rhomboid flap in the cheek area, and a bilobed flap in the nasal region. The bilobed flap is easy to plan, aesthetically acceptable and a one-step procedure. The paramedian forehead flap was our technique of choice whenever the bilobed flap and the nasolabial flap were insufficient to repair nasal defects. The most common

repair methods used in eyelid defects are the Hughes flap and primary closure. In the medial canthal region defects, the glabellar v-y flap was the most preferred technique. Skin grafting was mostly preferred when local flaps were not suitable or in the presence of large defects; however, grafts were used as the first choice in defects located in the cavum concha and the external meatus.

Because of the slow growth of BCCs, patients with recurrent disease are usually diagnosed after five years (26). This information shows that unlike conventional head and neck SCCs, relapses occur after a long time. This suggests that we should follow-up patients for longer periods. In our study, new tumor was identified outside the primary region and excised in six patients during the follow-up period. So far, we had no relapsing patients during their follow-up period. This may be related to the shortness of the average follow-up period. Additionally, we believe that removing the tumor with clear surgical margins of at least four mm and evaluating the surgical margins with frozen section may have contributed to this outcome.

Conclusion

It is important to remove the tumor with clear surgical margins of at least four mm and to intraoperatively evaluate the five surgical margins with frozen sections. Procedures are often performed under local anesthesia and well tolerated by patients. The most common flaps used in the reconstruction are not only easy to learn but also sufficient in most cases. Skin grafts are a good choice in defects located in the cavum concha and the external meatus.

Ethics Committee Approval: The study was approved by Kahramanmaraş Sütçü İmam University Faculty of Medicine Clinical Research Ethics Committee (date: 09.09.2020, decision number: 15).

Informed Consent: Informed consent was obtained from all patients.

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Authorship Contributions

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Main Points

- It is safe to remove the tumor with clear surgical margins of 4 mm and evaluate the surgical margins with frozen sections.
- Local anesthesia is well tolerated by patients.
- Skin grafts are a good choice in defects located in the cavum concha and the external meatus.
- Local flaps used in head and neck defect reconstruction are easy to learn and apply.

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