ORIGINAL ARTICLE

Unmasking nasal basal cell carcinoma: Strategies for defect coverage

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ABSTRACT

Introduction: Many reconstruction methods have been introduced for the reconstruction of basal cell carcinoma (BCC) post excision however no study has described the preferred reconstruction method in the Malaysia setting. Variations in resource availability and surgical training between regions may affect reconstructive choices. This study intends to find out our preferred method for reconstruction in nasal BCC patients post excision in our centre.

Materials and Methods: We conducted a retrospective chart review of patients undergoing different reconstruction methods and assessing outcomes for a series of patients with BCC post-resection, conducted in Hospital Universiti Sains Malaysia (HUSM) and Hospital Raja Perempuan Zainab II, Kelantan, from 2012 to 2024.

Results: A total of seven patients were identified in this retrospective study, comprising five females and two males. The ages of these seven patients range from 60 to 77 years old. All seven patients who underwent excision postoperatively underwent immediate soft tissue reconstruction with either a local or regional flap, a free flap, or a combination of flaps. Among those seven patients, only one developed flap-related complications. All patients were followed up for at least 3 months, with a range of 3-38 months. Functional and cosmetic assessments over the resected area post-reconstruction were good.

Conclusion: Local flaps remain the preferred option for small and medium nasal BCC defects, while forehead flaps and free flaps are reserved for larger or complex defects. In Asian patients, thicker skin and pigmentation influence flap design and thinning to optimize outcomes.

KEYWORDS:
Basal cell carcinoma, nasal reconstruction, local flap, wide local excision

INTRODUCTION

Basal cell carcinoma (BCC) is the most common cancer in the United States, and increasing incidence rates have been noted worldwide. An annual incidence of 2 million BCC cases has been reported in Americans.[1-2] BCC is the most common cancer among non-melanoma skin cancers, followed by squamous cell carcinoma. The increased incidence rate of BCC also poses an increase in healthcare burden in terms of expenditure. An estimated $2-4 billion annual cost was reported in a U.S. study in treating non-melanoma skin cancer.[2]

BCC was found to originate from keratinocytes of the basal layer of the epidermis and pluripotent cells of the hair follicles. BCC occurs more commonly on sun-exposed areas, with the head and neck accounting for approximately 80% of cases. Among those BCC involving the head and neck region, 25-30% were found on the nose.[3] BCC rarely metastasises (<0.1% incidence); however, 30-50% recur within 5 years, and nasal BCC was noted to have a higher risk of recurrence.[4]

Resection of BCC involving the nose will leave a soft tissue defect, which poses a challenge in reconstruction, aiming to achieve both good functional and cosmetic outcomes. A good understanding of nasal anatomy, as well as preoperative planning, is necessary for successful nasal reconstruction. Various soft tissue reconstruction methods for nasal defects have been introduced throughout the past few decades, ranging from primary closure to free flaps and wound coverage, depending on the size, depth, orientation, and location of the defect on the nose.[5] We present a series of cases of different methods of soft tissue reconstruction for nasal BCC post-resection involving different areas of the nose.

MATERIALS AND METHODS

We conducted a retrospective review of patients who underwent nasal reconstruction after resection of nasal BCC using various techniques from 2012 to 2024 in Hospital Universiti Sains Malaysia (HUSM), and Hospital Raja Perempuan Zainab II (HRPZ II). Patients with nasal BCC who underwent wide resection with a 3mm resection margin, followed by immediate reconstruction, were reviewed to illustrate different techniques used.

A 3 mm surgical margin was adopted for clinically well-defined, low-risk lesions, in line with our institutional protocol and supported by evidence that this margin achieves adequate clearance in most cases while preserving tissue in cosmetically sensitive areas such as the nose. Wider margins, as recommended by the NCCN (4–5 mm), were avoided to minimize functional and aesthetic compromise. For ill-defined or recurrent lesions, wider margins or intraoperative frozen section control were considered to ensure complete excision. All excised specimens were submitted for histopathological examination to confirm margin clearance.

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Reconstruction was done with either a free or local flap, depending on the size and location of the defects. All patients were followed up for at least 6 months to assess their functional status and any recurrence of disease. All patient data, clinical information, surgical techniques, pathology results, radiology results, and follow-up information were reviewed.

Ethics approval

The study adhered to the principles outlined in the Declaration of Helsinki. The local ethics committee approved this study – JEPEM USM, with JEPeM Code: USM/JEPeM/KK/24040349, and the Medical Research and Ethics Committee, with code NMRR ID-24-02556-UED. Photo publication consent was obtained from patients.

RESULTS

A total of 7 patients were identified in this retrospective study, comprising five females and two males (Table I). The age of these seven patients ranges from 60 to 77 years old. All patients have lesions over their nasal region, which include three on the dorsum of the nose, one on the nasal ala, two on the nasal bridge, and one over the whole nose, as well as the right cheek.

Wide local resection was performed in all cases, with a 3 mm lateral margin and a deep margin extended to the pre-fascial layer or deeper, depending on the layers of tissue involved. The majority of the cases we encounter are primary lesions, which account for 6 cases, and the remaining case is due to local recurrence after resection. Post-resection histopathology examination revealed that the margins were clear in 5 cases, whereas 2 cases were noted to have inadequate resection margins.

All seven patients' post-excision underwent immediate soft tissue reconstruction with either a local or regional flap, a free flap, or a combination of flaps. Only one patient developed flap-related complications, characterized by partial necrosis of the flap tip, which was treated conservatively.

All patients were followed up for at least 7 months, with a range of 7-38 months. Postoperative outcomes were assessed at follow-up visits based on both functional recovery and cosmetic appearance. Functional outcomes—such as nasal breathing, speech, and oral competence—were evaluated clinically by the surgical team. Cosmetic outcomes were assessed subjectively, based on the operating surgeon's clinical judgment and patient satisfaction, using standard postoperative photographs and discussions during outpatient reviews. Functional and cosmetic assessments over the resected area post-reconstruction were good. Adjuvant radiotherapy was offered to 2 patients who had inadequate resection margins. One out of 7 patients developed new lesions over the same region of the body, which was found to be histopathologically proven BCC as well.

DISCUSSION

Basal cell carcinoma is the most common non-melanoma skin cancer, and its annual incidence rate has been rising in the past few decades worldwide. In our experience, we have treated BCC mostly in the head and neck region, which corresponds to what has been reported, where 80% of BCCs involve the head and neck region, and out of those, 25-30% are found on the nose.[3] BCC is characterised as a locally invasive skin malignancy. It rarely metastasises (accounts for < 0.1%).[1] In our encounter, none of the cases we encountered had distant metastasis. Some cases showed substantial local destruction involving up to cartilage, bone, or even the dura mater, which required craniectomy.

Our series demonstrated a preference for local and regional flaps in nasal reconstruction because they provide a superior color and texture match. Six out of seven patients underwent wound coverage with local and/or regional flaps. However, one patient with extensive soft tissue defects post-tumour resection required a free flap for wound coverage. Skin grafting and healing by secondary intention were avoided whenever possible because of poor aesthetic outcomes and contour irregularities.[6] However, in elderly patients with multiple comorbidities who are unable to undergo operation under general anaesthesia, skin grafting is a possible wound coverage option for them.

For small to medium–sized defects (up to 2 cm in diameter) over the upper third of the nose, we performed a transposition glabella flap for wound coverage. It was first introduced by Von Graefe in 1818, and subsequently, multiple modifications have been reported.[7] The advantages of this flap include a single-stage procedure, which can be done under local anaesthesia, and the donor site can be closed primarily.

For a small to medium-sized defect involving the upper third of the nasal sidewall, we performed a cheek advancement flap for wound coverage. This flap was described by Beare in 1969 and subsequently modified by Mustarde, Schrudde, and Beinhoff for facial reconstruction.[8] The single-stage procedure, ability to camouflage the scar between aesthetic facial lines, and robust blood supply are all advantages of this flap; thus, it is also considered the first-choice technique for nasal sidewall reconstruction by other authors.[8-9]

A combination of cheek flaps with other flaps is not uncommon and has been used in large defects affecting the nasal sidewall, dorsum nasal, and medial cheek subunit.[3,10] This was performed on one of our patients (Figure 1) with a full-thickness defect size of 5x3cm post-wide resection with a margin of 3mm of BCC lesion involving the nasal sidewall and dorsum nasal subunit. A Mustarde rotational cheek flap with a subcutaneously pedicled island forehead flap was performed for outer skin coverage. In contrast, a conchal chrondrocutaneous graft was harvested and inset as the inner lining as well as for cartilage reconstruction for support. For small lesions (less than 1cm in diameter) over the distal third of the nose, we performed other types of transposition flaps. A Zitelli's bilobed double transposition flap was performed for a small nasal dome defect of 1.6cm. The bilobed flap was first introduced by Esser in 1918, and later, modifications to the technique were introduced by Zitelli in 1989 to reduce the incidence of pincushioning or trapdoor deformity.[11] For a patient with a nasal alar defect (Figure 2), we performed a transposition nasolabial flap, which was first

Table I: Overview of cases in this study

No	Patient (age, sex)	Location	Primary/ recurrence	Tumor size (cm^2)	Defect size (cm^2)	Margin of resection (mm)	Margin involved	Reconstruction method	Operation-related Complication	Follow-up time (months)	Recurrence (HPE proven)
1	70, F	Dorsum of nose	Primary	4.6	7.5	3	Clear	Forehead flap	None	7	None
2	77, F	Right nasal alar	Primary	1.5	3.0	3	Clear	Nasolabial flap with concha cartilage graft	None	7	None
3	64, F	Left nasal bridge	Primary	0.8	1.82	3	Clear	Cheek advancement flap	None	7	None
4	62, M	Right nasal dorsum	Primary	1.4	4.5	3	Clear	Glabellar flap	Tip of flap necrosis	7	None
5	70, M	Left nasal dorsum	Primary	1.0	2.56	3	Clear	Bilobed flap	None	26	None
6	60, F	Nasal bridge and right nasojugal	Primary	10	15	3	Margin involved	Right cheek Mustardė flap + forehead flap + conchal chrondrocutaneous graft + FTSG	None	10	None
7	65, F	Midface	Recurrence	35.3	81.6	10	Margin involved	Free LD flap + capular bone flap	None	38	Yes, local

LD – latissimus dorsi, FTSG – full-thickness skin grafting, HPE – histopathological examination

Table II: Reconstructive Options for Nasal BCC Defects Based on Size and Location

Defect Location	Defect Size	Preferred Flap	Advantages	Limitations
Upper third	< 2cm	Glabellar flap	Single stage, good color match, donor site closes primarily	Limited reach, risk of medial brow scar
Nasal sidewall	< 2 cm	Cheek advancement flap	Excellent scar concealment along facial lines, robust blood supply	May distort adjacent aesthetic units if large
Nasal tip/dome	<1.5–2cm	Bilobed flap	Good color match, preserves contour	Risk of trapdoor deformity if poorly designed
Nasal ala (full-thickness)	< 2 cm	Nasolabial flap with cartilage graft	Good texture match, reliable vascularity	May require secondary debulking, staged if interpolated
Multi-subunit or large defect	> 2 cm	Forehead flap (paramedian)	Excellent color/texture match, robust flap	Requires 2–3 stages, visible donor site scar
Extensive/through-and-through	> 4–5 cm or composite	Free flap	Allows bone/cartilage reconstruction, fills large dead space	Technically demanding, longer operative time

Fig. 1: Case no. 6 – 60 years old lady with right nasal sidewall BCC
A). BCC lesion preoperation, B). post resection with 3mm margin taken, C). post Mustarde rotational cheek flap with forehead flap and conchal chrondrocutaneous graft, D). post operation 1 year

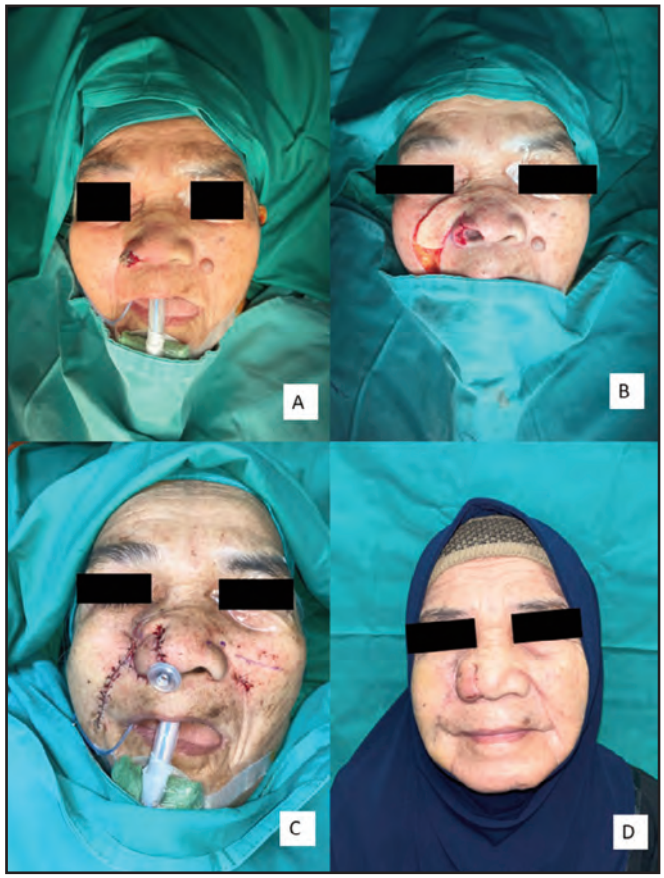

Fig. 2: Case no.2 – 77 years old lady presented with full thickness right nasal alar BCC
A). Lesion pre-operation, B). post-wide local excision and superiorly-based right nasolabial flap elevation, C). post flap inset with conchal cartilage graft and closure of donor site, nasal stent was inserted to maintain the right nostril patency temporarily, D). 1 month post-operation

described by Johann Friedrich Dieffenbach, a German surgeon, in 1846.[12] Our patient has a full-thickness nasal alar defect involving all three layers of the nasal alar; thus, a single-stage superiorly based, turned-in nasolabial flap was performed, with a concha graft inserted between to maintain nostril patency.

For patients with larger defects (>2cm) over the distal third of the nose involving multiple aesthetic subunits, a two-stage interpolated forehead flap was performed (Figure 3). The forehead flap is one of the oldest surgical techniques recorded for nasal reconstruction. It was described in the Sushruta Samhita in 700 BC. Subsequently, Millard, Gilles, and Converse refined the techniques, and it remains a workhorse in nasal reconstruction today.[13] The forehead flap is performed under general anesthesia and requires two to three stages, spaced a few weeks apart, to complete the nasal reconstruction; however, it provides an excellent color-texture match for nasal reconstruction.

For a patient with neglected recurrent giant BCC involving the whole nose and right cheek with infiltration into the sinonasal and overlying skin loss, we performed a free flap for wound coverage post-resection. The large size of the defect post-resection, as well as its involvement of the maxillary sinus, which necessitates a maxillectomy, renders local and regional approaches infeasible in this case. A free chimeric myocutaneous latissimus dorsi and scapular bone flap was performed instead in this case. The scapular bone was anchored over the pterygoid plate to separate the oral cavity from the nasal cavity. In contrast, the myocutaneous latissimus dorsi flap was used to obliterate the dead space post-resection of the lesion. This flap was introduced by Deraemaeker back in 1988 and has been used in head and neck reconstruction.[14] The advantages of this flap include a long pedicle, the ability to include scapular bone as a chimeric flap, a reliable vascular system, and the ability to provide a bulk of tissue for cavity obliteration, and thus was chosen for our patient.

Out of the seven patients, only one had partial flap necrosis, which was left to heal with secondary intention, and all other patients did not experience any operation-related complications. The majority of our patients are also satisfied with both the aesthetic and functional outcomes following their operations. Patients in this series were followed up for at least 7 months (ranging from 7 to 38 months), and only one patient with a giant BCC developed local recurrence, which was histopathologically proven to be BCC as well.

Fig. 3: Case no. 1- 70 years old lady presented with nasal dorsum BCC
A). Lesion over right nasal dorsum pre-operation, blue dot was marked over supratrochlear artery, B). elevation of interpolated forehead flap, C). after flap inset and closure of donor site, D). 2 months after division of flap

While surgical principles are similar globally, certain considerations apply to Malaysian patients. Thicker sebaceous skin in Asian patients can lead to bulkier flaps, requiring meticulous thinning for optimal contour. Additionally, increased pigmentation in Malaysian patients makes scar camouflage critical, favoring local flaps over skin grafts. Limited availability of Mohs surgery in many Malaysian centers often necessitates conventional wide excision, influencing reconstructive choices toward more robust flaps with predictable vascularity.

In summary, small and medium nasal defects can be effectively managed with local flaps, while large or full-thickness defects may require staged forehead flaps or free tissue transfer (Table II). Reconstruction should aim to restore both function and aesthetics while minimizing donor site morbidity.

CONCLUSION

Nasal BCC reconstruction should be individualized based on defect size and location. Local flaps provide excellent results for small to medium defects, while forehead flaps and free tissue transfer are reserved for larger or complex cases. In Asian patients, thicker skin and pigmentation require meticulous planning to optimize contour and scar camouflage.

CONFLICT OF INTEREST

The authors have no conflicts of interest.

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