ABSTRACT The nasal area has a three-dimensional structure that forms the centerpiece for the face. Defects in this area are among the most challenging for surgical reconstruction. Nasal reconstruction aims to restore both the form and function of the nose. The reconstructive modality of choice will depend on the location, size, and depth of the surgical defect. Here we report the case of an 80-year-old female with basal cell carcinoma (BCC) of the nasal sidewall. The diagnosis was made based on clinical features, dermoscopic, and histopathologic examination. The patient was treated with Modified Mohs Micrographic Surgery (MMS), and tumour-free margins were achieved after the second stage. Nasal skin defect reconstruction was carried out with a combination of transposition and advancement flap. Modified rhombic transposition flap took advantage of glabellar laxity to repair the nasal sidewall wound. Advancement flap of the cheek maintains the borders of cosmetic units and allows closure lines to be placed discretely along the lower eyelid cheek junction and nasolabial fold. No evidence of recurrence or alteration of nasal function was reported at one-year follow-up. Therefore, we conclude that transposition advancement flap is a useful alternative method for large nasal skin defect reconstruction.

KEYWORDS transposition advancement flap, surgery, nasal sidewall

Introduction

Basal cell carcinoma (BCC) is the most frequent type of cancers in humans. The incidence of this tumor is rising worldwide.[1-3] About 75-80% of all BCC happen on the face, among that 25% involves the nose due to the accumulation of the sunlight exposure.[4, 5]

There are several modalities for treating BCC, including standard excision surgery, destruction with various modalities, Mohs micrographic surgery (MMS), and topical chemotherapy. MMS is the preferable option for treatment for BCC with a high risk of recurrence. BCC that categorized as high recurrence are lesion which located on the face such as H zone, including the central face, eyelids, eyebrows, periorbital, nasal, lip, chin, mandibular, auricular, temples, and ears; tumors with obscure edges or histopathological features of aggressive growth and recurrent lesions.[1, 6] MMS allows maximal conservation of tissue compared to standard excision surgery by histologic analysis of tumor edges.[1] Reconstruction of the surgical wound can be done after tumour-free margins have been established.[7]

Given the essential functions of the nose in daily life, the repair of facial defects must maintain the integrity of complex facial functions and expressions, as well as facial symmetry and an excellent aesthetic outcome. When planning the reconstruction of surgical defects, a surgeon must carefully consider the nose’s unique characteristics, including the nasal structure, with convex and concave surfaces nearby, the symmetry of the nose, and the limited laxity of the nasal skin, and the sebaceous composition of the distal nasal skin.[7, 8]

For this reason, the flaps are more likely to result in superior cosmetic outcomes than skin graft because they match the color and texture of the surrounding skin better.[9] The characteristics
of skin covering the nose are not homogenous. The skin covering the bony components is highly movable, while the skin over cartilage components is thicker, tighter, and bound to the cartilage.[10] No single flap can be used universally for all the nasal defects. The reconstructive options will vary on the location, size, shape, and orientation of the defect.[11]

Here we report a case of BCC on the nasal sidewall treated with Modified MMS. Nasal skin defect reconstruction was performed with a combination of transposition and advancement flap. There was no tumor recurrence or alteration of nasal function reported after one year of follow-up.

Case report

An 80-year-old female presented to the Dermatology-Venereology clinic, Dr. Wahiddin Sudirohusodo Hospital, Makassar, Indonesia, with a hyperpigmented thick patch of the nasal wall that had been present for two years. Initially, it was as big as a pinhead, but then, it grew bigger. The complaint worsened one year ago, and the lump sometimes bled. The same history of illness in the family was denied. Physical examination revealed a solitary, well-defined, dark brown, pigmented patch measuring 2 x 1.3 cm, which involved 50% of the right nasal sidewall extended to the infraorbital cheek area. (Figure 1) The surface showed a thick pigmented patch, papular islands of growth, with raised borders, thread-like and irregular. A right alar retraction was also noted.

The dermoscopic examination showed multiple blue-grey dots and globules, milia-like cyst, and arborizing blood vessels, which suggested the diagnosis of BCC (Figure 2). The results of laboratory examinations were within normal limits.

The patient underwent modified MMS under local anaesthesia with lidocaine and epinephrine. Histological examination revealed showed nests of malignant tumors, which consist of a proliferation of basaloid cells, rounded nuclei, monotonous, hyperchromatic, prominent nuclei with the edge of the tumor nest consist of palisade cells. The basaloid epithelium forms a palisade with a cleft forming from the adjacent tumor stroma. These findings confirmed the diagnosis of BCC. (Figure 3).

The histological examination also revealed that the margins and the base of the lesion were not tumour-free. The second stage of modified MMS was performed, and clear margins were achieved. The resulting defect measured 5.2 x 3.4 cm. (Figure 4)

Nasal skin defect reconstruction was carried out with a combination of transposition and advancement flap. The rhomboid flap was chosen to reconstruct the nasal sidewall defect—the flap base directed downwards and laterally towards the cheek. Additionally, a cheek advancement flap was used to close the infraorbital defect. The flap is advanced medially to the nasolabial sulcus, and the underside of the flap is fixed to the periosteum of the nasal process of the maxilla. (Figure 5)

At one-month follow-up, the flap survived completely. Postoperative scar was seen with no infection, ischemia, nor necrosis of flaps. The nostril was patent, and there was no blockage. The patient has been followed up for 12 months. There was no evidence of recurrence during this time. The flap has acceptable aesthetic results and showed a good texture and color match. The patient was pleased with the outcome (Figure 6).

Discussion

BCC of the nasal area is common. Because of the uniqueness of nose anatomy and problems in presurgical identification of
tumor margins, BCC in this area has a 2.5 times higher risk of recurrence after surgical excision.10 Despite this, surgery remains the mainstay of treatment.[1, 10] Early diagnosis and Mohs surgery ensure complete removal of these high-risk tumors. In all cases with positive tumor margins, Mohs surgery was continued until a tumour-free margin was confirmed by histological examination. The recurrence rates of primary BCC for this approach are very low: between 0 and 2.5%.10

It remains an individual decision to choose which type of reconstruction to be used for the nasal defect closure, depending on the structure and texture of the skin, patient compliance, and not least on the surgeon’s experience.[12] A balance should be achieved among these various factors, along with the patient’s medical condition, donor tissue availability, and expectations of the patient.[12, 13]

The selection of treatment modalities will depend mainly on the size, depth, and location of the post-surgery defect.[14] However, reconstructive plans ought to be customized and not based only on the size or location of the defect. There are numerous flaps design to repair various nasal-specific defects, enabling individualized therapy to be done. The nasal anatomic subunits must be restored whenever possible.[7] Direct elliptical closure can be used for defects up to 1 cm in diameter and work best for a post-surgical wound on the upper nose covered by non-sebaceous skin. A skin graft is generally not a perfect method for repair nasal skin defect, particularly for the thick, sebaceous skin of the nasal tip, ala, lower sidewalls, or dorsum. The main problem with using a skin graft is the patchwork appearance resulted from contour defects and color mismatch.[15] For nasal defects where a repair with flap and graft are both technically possible, a flap may be more likely to produce a better cosmetic result.[9]

Transposition flap is an often used flap for the head and neck area with a linear configuration.16 This flap can reorient tension and recruit a reservoir of tissue not immediately contiguous to the defect. The tension of closure is borne across the terminal defect of all transposition flaps; this avoids distortion of free margins by allowing for redirection of tension away from the primary defect. Transposition flaps are frequently used on the nose and readily adaptable to other areas with free margins such as the eyelids, lips, and ear.[17] In the reconstruction of the nasal defect, transposition flaps are most helpful in repairing post-surgical wounds located on the cephalic nasal sidewall and dorsum in the surrounding of the rhinion. The mobility of nasal skin in these areas facilitate the transposition and enables the dissolution of most of the standing cutaneous deformity forming from the transfer of the flap.[16]

The classic transposition flap was a rhombic flap designed by Limberg. Numerous modifications of this flap have been developed since then.[10] Rhombic flap based on shaping the defect into a rhombus or a diamond with four possible flaps drawn perpendicular to the long access of the diamond to recruits tissue from the donor site around the primary defect.[18] Rhombic flaps can be used for reconstruction of various defect on the head and neck cosmetic unit, including lateral upper 2/3 of the nose or small defects on the nasal tip.[19]

Skin defects of the nose that extend to the medial cheek are best reconstructed by independently repairing each aesthetic unit. The most common case is a repair of skin defects of the lateral nasal sidewall and medial cheek. It usually needs to use an advancement cheek flap to repair the cheek component and a separate flap or skin graft to repair the nasal component to

---

Figure 4: A 5.2 x 3.4 cm defect after the second stage Modified MMS.

Figure 5: (a) Flap design with combination of transposition flap for nasal sidewall (1) and check advancement flap for infraorbital area (2) (b-c) Photograph after transposition advancement flap was done.

Figure 6: (a-b). Post operative view at 12 months follow up.
repair this defect. The defect in this patient extended to the infraorbital cheek area, and the use of transposition flap was combined with unipedicle advancement flap. This technique moves cheek skin medially towards the aesthetic border between the cheek and nasal sidewall. The skin on the medial cheek has great mobility, making the advancement flap useful in this reconstruction. This mobility is concomitant to the plentiful subcutaneous fat located under the skin of the medial cheek.[20]

**Conclusion**

Nasal reconstruction after tumor resection is a challenging task. The location, size, and depth of the surgical defect will affect the reconstructive modality selection. Transposition advancement flap is a useful alternative method for reconstructing large nasal skin defects extended to the cheek area. Appropriate follow-up and post-surgical care are crucial to optimize the outcome. Patients should be informed that their cooperation with postoperative instructions will contribute to the optimal cosmetic and functional result.

**Funding**

This research received no grant from any funding agency or any private sector.

**Conflict of interest**

There are no conflicts of interest to declare by any of the authors of this study.

**References**

1. Tang JY, Epstein EH, Oro AE. Fitzpatrick’s Dermatology ed S Kang et al. New York: McGraw Hill; 2019.
2. Baxter JM, Patel AN, Varma S. Facial basal cell carcinoma. Brmj. 2012;345:e5342.
3. Fecher LA, Sharffman WH. Advanced basal cell carcinoma, the hedgehog pathway, and treatment options - role of smoothened inhibitors. Biologics. 2015;9:129-40.
4. Moolenburgh SE, McLennan L, Levendag PC, Munte K, Scholtemeijer M, Hofer SO, et al. Nasal reconstruction after malignant tumor resection: an algorithm for treatment. Plast Reconstr Surg. 2010;126(1):97-105.
5. Ge NN, McGuire JF, Dyson S, Chark D. Nonmelanoma skin cancer of the head and neck II: surgical treatment and reconstruction. Am J Otolaryngol. 2009;30(3):181-92.
6. Clark CM, Furniss M, Mackay-Wiggan JM. Basal cell carcinoma: an evidence-based treatment update. Am J Clin Dermatol. 2014;15(3):197-216.
7. Salgarelli AC, Bellini P, Multiunu A, Magnoni C, Francomano M, Fantini F, et al. Reconstruction of nasal skin cancer defects with local flaps. J Skin Cancer. 2011;2011:181093.
8. Spataro E, Branham GH. Principles of Nasal Reconstruction. Facial Plast Surg. 2017;33(1):9-16.
9. Jacobs MA, Christenson LJ, Weaver AL, Appert DL, Phillips PK, Roenigk RK, et al. Clinical outcome of cutaneous flaps versus full-thickness skin grafts after Mohs surgery on the nose. Dermatol Surg. 2010;36(1):23-30.
10. Wollina U, Bennewitz A, Langner D. Basal cell carcinoma of the outer nose: overview on surgical techniques and analysis of 312 patients. J Cutan Aesthet Surg. 2014;7(3):143-50.
11. Guo L, Pribaz JR, Pribaz JJ. Nasal reconstruction with local flaps: a simple algorithm for management of small defects. Plast Reconstr Surg. 2008;122(5):130e-9e.
12. Rustemeyer J, Günther L, Bremerich A. Complications after nasal skin repair with local flaps and full-thickness skin grafts and implications of patients’ contentment. Oral Maxillofac Surg. 2009;13(1):15-9.
13. Asgari MM, Bertenthal D, Sen S, Sahay A, Chren MM. Patient satisfaction after treatment of nonmelanoma skin cancer. Dermatol Surg. 2009;35(7):1041-9.
14. Konofaos P, Pierce CA, Jing XL, Wallace RD. Nose and Ear Reconstruction Following Tumor Excision. Non-Melanoma Skin Cancer and Cutaneous Melanoma: Springer; 2020. p. 295-334.
15. McCluskey PD, Constantine FC, Thornton JF. Lower third nasal reconstruction: when is skin grafting an appropriate option? Plast Reconstr Surg. 2009;124(3):826-35.
16. Baker SR. Reconstruction of the nose. Local Flaps in Facial Reconstruction 3rd ed Philadelphia, PA: Elsevier Saunders. 2014:415-80.
17. Blake BP, Simonetta CJ, Maher IA. Transposition Flaps: Principles and Locations. Dermatol Surg. 2015;41 Suppl 10:S255-64.
18. Miller CJ. Design principles for transposition flaps: the rhombic (single-lobed), bilobed, and trilobed flaps. Dermatologic Surgery. 2014;40:S43-S52.
19. Romani J, Yébenes M. [Repair of surgical defects of the nasal pyramid]. Actas Dermosifiliogr. 2007;98(5):302-11.
20. Bhrany AD, Bradley DT, Murakami CS. Reconstruction of the cheek. Local flaps in facial reconstruction. 3: Elsevier; 2014. p. 530-62.