



"SUSHRUTA FLAP" FOR RECONSTRUCTION OF NASAL BASAL CELL CARCINOMA EXCISION- BRIDGING ANCIENT WISDOM AND CONTEMPORARY PRACTICE

Dr. Priyanko Chakraborty

Assistant Professor, ENT, MGM Medical College, Krishnaganj, India.

Dr. Aseem Anand

Senior Resident, ENT, MGM Medical College, Krishnaganj, India.

Dr. Gajendra Kumar

Associate Professor, ENT, MGM Medical College, Krishnaganj, India.

ABSTRACT

Basal cell carcinoma (BCC) is most common skin malignancy in humans (1). BCC in head and neck region usually presents as a slow growing pearly dome shaped and raised rolled edge located above the line connecting the angle of the mouth and ear lobe. It is locally invasive lesion and causes serious disfigurement but rarely metastasizes. Diagnosis is usually based on the clinical features and is confirmed by histopathology. Surgery is treatment of choice. The Sushruta flap is one of the oldest recorded surgical techniques for nasal reconstruction, this flap provides surgeon with a robust pedicle and large amount of tissue to reconstruct almost any defect

KEYWORDS : Basal cell carcinoma, Rodent ulcer, Sushruta flap, Nasal reconstruction, Cutaneous malignancy of skin, Paramedian forehead flap

INTRODUCTION

Basal cell carcinoma is derived from the non-keratinizing cells originating from the basal layer of the epidermis, it is common in whites but rare in dark skinned individuals. 1%-2% of the Indians are affected by BCC out of which one-third are white population⁽²⁾. Risk factors for BCC are exposure to solar UV radiation, Ionizing radiation, Arsenic exposure.

It is characterized by slow growth, minimal soft-tissue invasion, and a high cure rate with surgery. Removal of the tumour will lead to a Tri dimensional defect i.e : skin, cartilage and even nasal mucosa, therefore reconstruction of this defect will be a challenge to the surgeon⁽³⁾. There are many techniques used for reconstruction for these defects out of which paramedian forehead flap which will be henceforth termed as "Sushruta flap" in this article (honouring its creator) is the oldest one. In ancient India forehead was used for nasal reconstruction, Nasal tip amputation was a common punishment for a variety of crimes during 700 BC.

Medical treatise entitled The Sushruta Samita describes about the treatment of nasal reconstruction.⁽⁴⁻⁹⁾ J.M. Warren brought Sushruta technique to Europe in the 1500s and to the United States in the 1830s^(4,9), Kazanjian described supratrochlear and supraorbital arteries as the primary blood supply of the flap in 1930s, that led to significant innovation in its designs, Median forehead flap based upon a unilateral supratrochlear artery was designed by Labat.^(10,11)

Principles Guiding The Design And Elevation Of Flaps Encompass:

a) Maintaining an axial pattern whenever possible b) Utilizing the pedicle ipsilateral to the defect c) Extending the flap at right angles across forehead with caution and only when extra length is necessary d) Utilizing a reasonably narrow pedicle e) Early subperiosteal dissection

Case Presentation:

60-year-old man, presented with a single, dark ulcerated plaque over the dorsum nasi (tip of nose) for past 3 years, patient is farmer by occupation with no history of any radiation exposure or working in any factory setup.

There were no similar complaints in the family. On examination, revealed a 1.5 cm x 1 cm single, ovoid in shape, ulcerated plaque with raised rolled out margins (Figure 1A).



Figures 1 (A-E)- 1A: BCC on tip of nose 1.5cm x 1.5 cm; 1B: Flap and pedicle marked according to template defect; 1C: Tumour excised with free margin; 1D: Flap inset done without tension on the pedicle; 1E: Final flap inset with closure of donor area defect

Incisional biopsy was taken from the lesion, revealed small geographic lesion composed of small round, basaloid cells proliferation. The cells showed mild anisonucleosis, atypical mitosis and peripheral palisading consistent with BCC. Under general anesthesia, the BCC was removed with 5mm free margin (Figure 1C).

In order to reconstruct the lost part Paramedian forehead flap (Sushruta flap) is used. Flap template is created by measuring the distance from diseased site to the medial end of upper eyelid. Same distance is applied from the medial end of upper eyelid to distal end of forehead, The pedicle is located approx 1.5 cm lateral to the midline near the medial end of upper eyelid (Figure 1B). The base of flap is designed 2 cm wide to include the pedicle. Flap elevation begins distally, It is elevated thickly to the level of the galea, and then 1 cm above the brow, The tip of the flap for the initial 1.5 to 2 cm is raised in the subcutaneous plane with removal of subcutaneous fat and underlying frontalis muscle, This tissue can be safely thinned because the supratrochlear artery is in a subcutaneous plane at a level approx 1 cm above the brow (Figure 1D). A single layer of permanent, monofilament suture is used to close the donor sit, open area of flap pedicle is covered with surgical to

ensure good hemostasis and adequate healing (figure 1E)

Patient was regularly examined, surgical was changed on every 3-4 days on the raw site of pedicle, and looked for colour change in graft site. The second stage of the operation (Flap Division and Inset) was done on day 21 (Figure 2A-2D). Skin closed with proline 4-0 Post op was uneventful. Suture were removed after 7 days



(Figures 2 (A-D)- 2A: 21st day post operative status; 2B: Flap detachment done from the proximal end first with securing haemostasis and suturing of donor area; 2C: distal end flap excised as per the recipient area margins; 2D: Recipient area closed with 4-0 Prolene.

We did wide local excision with Sushruta flap reconstruction for basal cell carcinoma nose. Reconstruction was well accepted, maintaining the nasal contour with no significant morbidity, subsequent follow ups show recurrence free survival and excellent cosmesis after 3 months and 1 year (Figure 3).

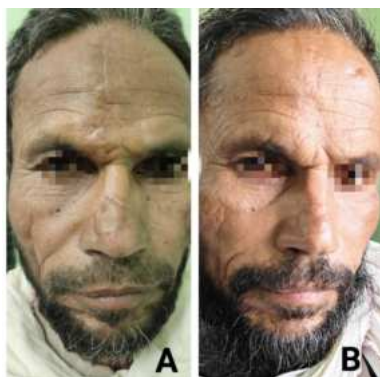


Figure 3 A: 3 months after operation; Figure 3B: 1 year after operation

DISCUSSION:

BCC represent 65%-75% of cutaneous malignancies in whites and 20%-30% in Asian Indians.⁽¹²⁾ out of all recorded cases of BCC 80%-85% have been located in head and neck regions, 15% on the trunk and unusual areas such as abdomen accounts for less than 2%⁽¹³⁾, BCC is one of the most common cancer in face arising from basal layer of epidermis, It is slow growing in nature, locally aggressive and invades surrounding structures, rarely metastasis is seen. It has 5 subtypes: Nodular, Superficial, Pigmented, Basosquamous, Mosaic. Main etiological factor in development of BCC is ultraviolet radiation, however, considering that lesion do occur in non-sun-exposed areas, existence of other risk factors like immunosuppression, ionizing radiation, Arsenic exposure, Fitzpatrick skin type (phototype) 1-2-3⁽¹³⁾ is to be considered.

The primary aim of treatment is the complete excision of the

tumour tissues, other are cryosurgery, laser therapy, immunotherapy. Surgical excision creates a defect that is difficult to restore, skin graft only covers superficial defects and has tendency to contract and may not take up properly. Also, because of the colour mismatch, it is not cosmetically identical to the face. The use of regional flaps like rotational flaps are very useful and versatile local flaps, with robust vascularity that can be readily elevated to cover a large defect.

The forehead flap is considered the optimal reconstructive option for numerous patients, and it can be safely and dependably carried out in either an outpatient or inpatient setting. principles that have improved outcomes include maintaining an axial pattern whenever possible, utilizing the pedicle ipsilateral to the defect, extending the flap at right angles across the forehead when extra length is necessary, utilizing a reasonably narrow pedicle, using early subperiosteal dissection and using the folded forehead flap for lining. The use of a Sushruta flap in order to restore the skin barrier of the tip of the nose after BCC removal led to an excellent outcome.

The commonest indication for Sushruta flap is in reconstruction of larger nasal tip and dorsal defects, however there has been reports of its use in complex periorcular reconstruction as well.¹⁴ Sushruta forehead flaps can provide enough skin to replace entire nasal subunits, which is useful when >50% of a subunit has been lost, and the best aesthetic outcome would be achieved by replacing the entire subunit instead of replacing only the missing tissue.¹⁵ Multiple reconstructive methods are available for nasal defects repairs, but the defects larger than 1.5 to 2 cm in diameter are best reconstructed by sushruta flaps with or without periosteal or perichondrial defects. Smaller defects are amenable to repair by primary closure or local advancement flaps. Sushruta flaps can also be used for complete excision of external nose (rhinectomy) defects and alleviate the need of Free flaps such as Radial artery forearm flap. Complex, staged, and layered procedures can be performed using Sushruta flaps which can be folded or covered over tissues like bone, cartilage, or titanium implants for reconstruction of rhinectomy defects.^{16,17,18}

In this case, the clinical morphology suggested a nodular-ulcerative tumor covered by a hemorrhagic crust, for which wide local excision was done taking 5mm margin all along and Sushrut flap was used for reconstruction.

CONCLUSIONS:

Guiding Principles For flap Design And Elevation Include:

- 1) Maintenance of an axial pattern leads to a sturdy vascularity
- 2) Pedicle should be utilised from the same side of the defect
- 3) Flap may be extended at right angles to the defect
- 4) Keeping the pedicle narrow whenever possible
- 5) Subperiosteal dissection should be done early to avoid damage to feeding vessels.

Compliance To Ethical Standards

Ethics Approval : Not Applicable (Since this is a case report with no research involving trial of drugs or procedures, ethical approval not taken)

Informed Consent: Taken

Conflict Of Interests: None

Funding: Nil

Acknowledgement: Not Applicable

REFERENCES:

- 1) Carruci JA, Leffell DJ. Basal cell carcinoma. In: Freedberg IM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA, Katz SI, editors. Fitzpatrick's Dermatology in General Medicine. 6th ed., Vol I, New York, Chicago, San Francisco, Lisbon,

- London: The McGraw-Hill; 2003: 747-754.
- 2) Khullar G, Saikia UN, De D, Radotra BD. Nonmelanoma skin cancers: An Indian perspective. *Indian Journal of Dermatopathology and Diagnostic Dermatology*. 2014 Jul 1;1(2):55.
 - 3) Staples MP, Elwood M, Burton RC, Williams JL, Marks R, Giles GG. Non-melanoma skin cancer in Australia: the 2002 national survey and trends since 1985. *Med J Aust* 2006;184:6-10
 - 4) Converse JM. *Reconstructive Plastic Surgery*. Philadelphia, Pa: WB Saunders; 1964:797
 - 5) Carruci JA, Leffell DJ. Basal cell carcinoma. In: Freedberg IM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA, Katz SL, editors. *Fitzpatrick's Dermatology in General Medicine*. 6th ed., Vol I, New York, Chicago, San Francisco, Lisbon, London: The McGraw-Hill; 2003: 747-754.
 - 6) Khullar G, Saikia UN, De D, Radotra BD. Nonmelanoma skin cancers: An Indian perspective. *Indian Journal of Dermatopathology and Diagnostic Dermatology*. 2014 Jul 1;1(2):55.
 - 7) Staples MP, Elwood M, Burton RC, Williams JL, Marks R, Giles GG. Non-melanoma skin cancer in Australia: the 2002 national survey and trends since 1985. *Med J Aust* 2006;184:6-10
 - 8) Converse JM. *Reconstructive Plastic Surgery*. Philadelphia, Pa: WB Saunders; 1964:797
 - 9) Conley JJ, Price JC. The midline vertical forehead flap. *Otolaryngol Head Neck Surg* 1981;89(1):38-44
 - 10) Converse JM. *Reconstructive Plastic Surgery*. 2nd ed. Philadelphia, PA: WB Saunders; 1977:694
 - 11) Jackson IT. *Local Flaps in Head and Neck Reconstruction*. St. Louis, MO: Mosby; 1985
 - 12) Burget GC, Menick FJ. Nasal support and lining: the marriage of beauty and blood supply. *Plast Reconstr Surg* 1989;84(2): 189-202
 - 13) Millard DR Jr. Total reconstructive rhinoplasty and a missing link. *Plast Reconstr Surg* 1966;37(3):167-183
 - 14) Tripathy S, Garg A, John JR, Sharma RK. Use of Modified Islanded Paramedian Forehead Flap for Complex Periorbital Facial Reconstruction. *J Craniofac Surg*. 2019 Mar/Apr;30(2):e117-e119.
 - 15) Menick FJ. Nasal reconstruction with a forehead flap. *Clin Plast Surg*. 2009 Jul;36(3):443-59. [PubMed]
 - 16) Harrison L, Sieffert M, Kadakia S, Kadakia S, Johnson RM, Ducic Y. Reconstruction of a subtotal septorhinectomy defect with a chimeric paramedian-pericranial forehead flap. *Am J Otolaryngol*. 2019 May-Jun;40(3):445-447. [PubMed]
 - 17) Owusu J, Nesbitt B, Boahene K. Management of Complicated Nasal Defects. *Facial Plast Surg*. 2020 Apr;36(2):158-165. [PubMed]
 - 18) Noel W, Duron JB, Jabbour S, Revol M, Mazouz-Dorval S. Three-stage folded forehead flap for nasal reconstruction: Objective and subjective measurements of aesthetic and functional outcomes. *J Plast Reconstr Aesthet Surg*. 2018 Apr;71(4):548-556.