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Aesthetic Reconstruction Of Nasal Defects With Local Flaps

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Abstract
Background
Nasal reconstruction was one of earliest performed plastic surgical procedures. Reconstruction of nasal defects must preserve the integrity of complex facial functions and expressions and a pleasing aesthetic outcome. Location,size ,shape and orientation of the defects are important factors in determing the method used in reconstruction. Individualized therapy is the best course and numerous flaps has been designed to provide coverage of a variety of nasal specific defects.
Methods
The Study done at Sawai Man Singh hospital, Jaipur from January 2019 to October 2020 . A total of 85 patients having nasal defects were included. Reconstruction with local flaps was performed in all cases.
Results
Skin malignancy , trauma and post burn defect are common causes of nasal defects included in our study. Nasal defects were found to be located more on Distal third zone of nose. Reconstructions of defects were commonly done by Forehead flap, nasolabial flap , bilobed flap . Results were aesthetic satisfactory as color and texture matches and distinct nasal contour. Scar were inconspicuous and patient had no flat or tented nose.
Conclusion
In spite of numerous options in nasal reconstruction, optimal results are usually obtained when "like is used to repair like". Local flaps are reliable and gives better aesthetic results. Local flaps survived well and patients had satisficatory outcome.

Key Words
Plastic Surgery, Nasal defect, Reconstruction, Local flaps, Aesthetic outcome.

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I. Introduction

History of nasal reconstruction dated thousands of year back. Description of nasal reconstruction was first given by Indian physician Sushruta.[1] He performed nose reconstruction by using local flap taken from cheek. Later on , nasal reconstruction was practiced by using rotation flap from adjacent forehead. Technique was known " Traditional Indian method of rhinoplasty " . Since then , many refinements have been made. Indian surgeon performed nasal reconstruction using median forehead flap.[2]

Nose plays a functional role in breathing and sense of smell. The nose occupies a central portion and prominent feature of the face. Aesthetics of a person's nose can profoundly impact the way he or she is perceived by the outside world. Person who are perceived negatively as a result of nasal deformity can have increased difficulty interacting with others in social situations or in the workplace.[3]

Nasal deformity may be due to truma ,burn ,infection, skin cancer , sequele of cancer treatment, congenital malformation , haemangioma, immune disease.

Nose is the most common site of skin cancer and is the most common site of recurrence after treatment. 85% are basal cell carcinoma.[4]

The external anatomy of nose is unique in each patient. Uniqueness of dramatic and progressive differences in skin quality along its entire surface , underlying bony and cartilaginous archintecture, subtle convexities and concavities should be noted and accounted for when performing nasal reconstruction. It is important for reconstructive surgeon to preserve color, thickness , texture and contour.

Common techniques used to reconstruct cutaneous defects of nose mentioned in the literature includes healing by secondary intention, primary closure, full thickness skin grafts, dermabrasion , composite grafts, local flaps and free flaps.

Flap is always preferable than skin grafts as it produces a superior match in color and texture . It has the additional advantage of producing a vascularised soft tissue cover for nasal skeleton and resistant to contractures.[5]

This study documents the various causes of nasal defects and locoregional flaps used to reconstruct defects .

II. Material And Methods

A prospective study done from January 2019 to October 2020 in Department of plastic and reconstructive surgery , SMS hospital Jaipur India . Total of 85 nasal defect treated with local flaps. Etiology of nasal deformity , age, sex, characteristic of lesion (site and size of defects) were recorded.

Nasal defect varied from partial to subtotal loss of nose. Nasal region was divided into 3 groups according to anatomical zone: proximal, middle, distal thirds. Defects that spanned more than one subunit were categorized as combined defects. All the defects were mapped according to location on nose . Type of flap involved in nasal reconstruction and results were recorded.

Age: 6- 70 years

Inclusion criteria : Lesion involving superficial loss (skin and subcutaneous fat)
Defect treated with Local flaps

Exclusion criteria: Primary closure , skin grafting or composite grafting.

Following local flaps were performed

- Glabellar flap
- Miter flap
- Bilobed flap
- V- Y advancement flap
- Nasolabial flap
- Forehead flap
- Cheek advancement flap

Maximum procedure performed under local anaesthesia while forehead flap and nasolabial flap are frequently performed under general anaesthesia.

III. Results

A total of 85 patients of nasal defects due to various reasons were treated in our department in last 22 month. There were 40 men and 45 females. The mean age of patients was 43 years.

The etiology of nasal defects included 55 patients with skin malignancy, 16 patients due to truma, 8 patients of burns, 3 patients due to infection, 2 patients of congenital abnormalities , single patient of haemangioma.

There were 11 defects in the proximal third, 19 in middle third , 45 in distal third of nose and 10 complex defects extending beyond one zone.

The reconstruction of nose defects were done using forehead flaps in 27 patients, nasolabial flap in 11 patients, bilobed flap in 18 patients, dorsal nasal flap in 12 patients, glabellar flap in 7 patients, V Y advancement in 6 patients , cheek advancement in 2 patients and transposition flap in 2 patients.

Complications in our study were superficial infection in three patients, two patient had hematoma, one patient had partial flap dehiscence , three patients had distal flap necrosis which was treated conservatively, three patients had forehead donor site graft loss which was treated conservatively. 44 patients required secondary and revision procedures like defatting, reinset and trimimg of edges.

IV. Discussion

Nasal reconstruction is challenge to reconstructive surgeon. Any distortion to the nasal appearance should be avoided. Restoration to as normal a nasal contour as possible should be priority. The appropriate selection of patients, meticulous planning and use of appropriate method of reconstruction gives better results.

Planning of nasal reconstruction is a highly individualized process, and there is a multitude of factors to consider. The patients' age , co-morbidities, medical history, aesthetic goals must also be included in the decision making process. Reconstruction can often require multiple stage of surgery and revision to achieve the desired final surgical results. Different reconstructive options must be considered and individualized to each patient following a thorough discussion of their priorities and willingness to invest in potentially multiple procedures.

The initial step in devising this plan is defining the nasal defect itself in term of what is missing and what needs to be restored to achieve an appropriate nasal contour and an aesthetically accepted nasal appearance. Defects should be characterized with regards to their absolute size, depth, orientation and relative location on nose.

Skin graft when used to cover the defects, it produces contour deformity and color mismatch. Local flaps have advantages of replacing like with like witrh superior aesthetic and functional outcome.

Certain flaps work better in different areas such as glabella, miter for horizontal defects and V-Y advancement and nasolabial flap for vertical loss of substance. [6]

Axial pattern flap such as forehead flap , nasoladial flap and dorsal nasal flap for defects larger than 1.5 to 2 cm in diameter.

The,glabellar flap, miter flap and dorsal nasal flap takes advantages of relative excess of tissue present in glabella and nasal dorsum region and are useful for closure of defect in proximal and middle third of nose[7,8,9]. These flap are based on perforators from angular artery. These flap are elevated as skin and subcutaneous tissue with or without muscle and rotated and /or advanced inferiorly toward the nasal tip. These flap shows similar skin characteristic to defect area in term of color, texture and thickness. One common disadvantage of these flaps is the depressed transverse scar that often apparent at flap junction.

The V-Y flap is versatile local flap for small nasal defect that can be utilised throughout the nose.[10] Flap should be designed immediately adjacent to defect with an orientation such that resultant Y scar is placed in a narural crease or concavity.

Bilobed flap was first described by Esser in 1918 , who used it to cover nasal tip [11]. Zitelli modified the design by reducing the rotation angle and it becomes the workhouse flap for 1-1.5 cm defect of thick , stiff skin of distal third and lateral part of nose, particularly for nasal tip, supratip , ala near tip.[12,13] Limitation include distortion of nasal tip, alar notching.

The dorsal nasal flap has proven useful for closure of central and lateral nasal tip and supratip defect of up to 2 cm in diameter.[14] It is considered in defect of distal zone mainly horizontally oriented. It has advantage of less local distortion.

Nasolabial flap can be utilized for resurfacing defect of nasal side wall and ala. Nasolabial transposition flap is useful for reconstruction of alar lobules defect with 1.5 to 2 cm diameter. Flap makes uses of abundant cheek skin .It is 1 step/ 2 step transposition / advancement flap [15]and its donor site is skilfully hidden in the melolabial crease and it should be undermined properly to prevent anatomic distortion. Disadvantage of this flap may be blunted alar groove and development of trapdoor deformity.

Excess tissue near the melolabial flap matches with color and texture of nose and its underlying fat has a strong tendency to contract. As the melolabial fold has enough skin which can be used to resurface the ala [16]and its nature of contractility is useful to maintain the round expected bulging of normal ala and natural expression lines of the face may hide the donor site scar.

Forehead flap used for defect larger than 2 cm , involving multiple subunit and composite defect. It is a type of fasciocutaneous flap based on supratrochlear (dominant pedicle) and supraorbital (minor pedicle) vessel. Karanjian advocated primary closure of the forehead donor site[17]. Millard applied a characteristic gull wing design with lateral extension to reconstruct the alar margin and to get greater flap length he extended the pedicle incision below the brow.[18,19] Burget and Menick emphasized for aggressive thinning the skin paddle and they also advised narrowing the pedicle base for easier rotation and length [20,21].

The median forehead flap requires two stages for the division of the bridging segment. While reconstructing the nasal defects an ipsilateral flap has the advantage to cover the distal border for its effective greater flap length but there may be chance of pedicle base compromization due to its greater arc of rotation. However , acontralateral flap may not reach to distal end but it has less rotation at pedicle base.

Forehead flap may be contraindicated if deep and horizontal scars placed across the base of the forehead.

V. Conclusions

In this study, most common cause of nasal defect is malignancy followed by truma. Multiple surgical options available for repairing cutaneous defects involving nose. Locoregional flaps are useful tool for nasal reconsrtruction. They also often provide unique characteristics peculiar to nose. Perfectly designed and well executed surgery gives satisficatory aesthetic and functional results. Appropiate postoperative care and follow up is required to optimize final outcome.

In our study distal third zone is most affected location in nose deformity. We used bilobed flap for small defect in nasal tip , nasolabial flap for alar defects and forehead flap for larger defect and combined defects . our local flaps survived and patients had satisfactory results.

Reconstructive surgeon should approach each patients as a distinct individuals with a unique defect and perform the best reconstruction possible, tailored based on patient's needs and expectations. Educating procedure to patients plays an important role in preoperatory decision making, increasing patients compliance and also postoperative long term self care.

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Fig 1: Nasal Cleft Deformity Corrected by Transposition Flap

Fig 2: BCC over middle third of nose excised and reconstructed with glabellar flap

Fig 3: Post burn nasal alar defect reconstruct with nasolabial flap

Fig 4: BCC of dorsum nose, reconstructed with forehead flap

Fig 5: BCC over ala, reconstructed with bilobed flap

Fig 6: BCC over sidewall of nose, reconstructed with VY advancement

Fig 7: Post trauma nasal tip defect, reconstructed with forehead flap

Fig 8: Skin malignancy over distal third of nose, reconstruct with dorsal nasal flap

Fig 9: BCC over dome of nose, reconstruction with bilobed flap

Fig 10:BCC over middle third of nose, reconstruction with dorsal nasal flap

Fig 11: Skin malignancy of nasal alar base, reconstruction with nasolabial flap

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