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Original Research Article

Reconstruction of nasal defects with local flaps

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ABSTRACT

Background: Nasal reconstruction was among the earliest plastic surgical procedures performed. Mutilation of noses as a result of trauma, infection or tumor is a problem since antiquity. Skin cancer is the most common human malignancy. Various techniques of nasal reconstruction are mentioned in the literature includes healing by secondary intent, dermabrasion, primary closure, full thickness skin grafts composite grafts, local flaps and free flaps. This study was done to document the various causes of nasal defects and outcome of nasal reconstruction with local flaps.
Methods: It was a prospective study done from August 2011 to August 2014 conducted at Bangalore Medical College and Research Institute. A total of 41 patients having a nasal defects were included in study. Age: 5-70 years. With mean age of 44 years. The following procedures were done in the study: forehead flap (pre-laminated forehead flap was done in 2 patients.) Nasolabial, bilobed flap, dorsum nasal dorsum glabella flap, free helical graft, cheek advancement flap.
Results: The etiology of nasal defects included 27 patients with skin malignancy, 11 patients due to trauma, 2 patients due to infection,1 patient of electrical burns and 1 patient of heamangioma. Nasal defects seen were columella defects in 3 patients ,subtotal nose loss in 3 patients, alar defects in 9 patients, tip, supratip and soft triangle defects in 15 patients , dorsum of nose defects in 8 patients and total nose loss in 3 patients. The reconstruction of the nose defects were done using forehead flap in 20 patients, nasolabial flap in 11 patient, bilobed flap in 4 patients, dorsum nasal flap in 2 patients, free helical graft in 2 patients, cheek advancement flap in 2 patients.
Conclusions: In our study, malignancy is the most common cause of nasal defect flowed by trauma. We conclude that nasolabial flap is flap of choice for small size defects with minimal donor morbity. Moderate to big defects, prelaminated forehead is the best option.

Keywords: Forehead flap, Nasal reconstruction, Nose

INTRODUCTION

Nasal reconstruction was among the earliest plastic surgical procedures performed. The earliest nose reconstruction were performed using local flaps taken from the cheek by Sushruta (600BCE).[1] Only later was nasal reconstruction attempted using local flaps from the forehead, a technique known nowadays as the Indian method. Guidelines for this approach were passed on for years until 1794 when a nasal reconstruction using a median forehead flap was performed by two Indian surgeons and then published in the Gentleman's Magazine of London.[2] Mutilation of noses as a result of trauma, infection or tumor is a problem since antiquity. Disfiguration due to nasal defect causes serious effects on persons work and social life. Nose is a central and prominent feature of the face and commands attention. So reconstruction of mutilated noses is very much necessary. Skin cancer is the most common human malignancy. The nose is the most common site of involvement and is most

common site of recurrence after treatment (30%). 85% are basal cell carcinomas.[3]

It is Important for nasal reconstruction to Preserve color, thickness and texture.

Various techniques of nasal reconstruction are mentioned in the literature includes healing by secondary intent, dermabrasion, primary closure, full thickness skin grafts composite grafts, local flaps and free flaps. This study was done to document the various causes of nasal defects and outcome of nasal reconstruction with local flaps.

METHODS

It was a prospective study done from August 2011 to August 2014 in Victoria Hospital Bowring and Lady Curzon Hospital, Bangalore (attached to Bangalore Medical College and Research Institute). A total of 41 patients having a nasal defects treated. The nasal defects varied from partial to total loss of nose. Age: 5-70 years. With mean age of 44 years.

Inclusion criteria

Local flaps or with free helical composite graft.

Exclusion criteria

Primary closure or skin grafting.

The following procedures were done in the study:

- Forehead flap (pre-laminated forehead flap was done in 2 patients)
- Nasolabial
- Bilobed flap
- Dorsum Nasal dorsum glabella flap
- Free helical graft
- Cheek advancement flap.

Pre-lamination of forehead flap was staged procedure which includes 4 stages:

- Stage 1: Flap requirement marked flap is raised, conchal cartilage is placed in subcutanous pocket (delay)
- Stage 2: The inner layer of the flap and donor area is grafted
- Stage 3: Flap is raised completely and rotated; inset is given, with reconstructive plate as the support.
- Stage 4: Division of the flap
- Stage 5: Removal of reconstructive plate and placement of cantilever ulna bone graft.

RESULTS

A total of 41 patients of nasal defects due to various reasons were treated in three years period. Male to female ratio was 28:13. The etiology of nasal defects included 27 patients with skin malignancy, 11 patients due to trauma, 2 patients due to infection, 1 patient of electrical burns and 1 patient of heamangioma (Figure 1). The mean age of the patients was 44 years. The type of nasal defects seen were columella defects in 3 patients, subtotal nose loss in 3 patients, alar defects in 9 patients, tip, supratip and soft triangle defects in 15 patients, dorsum of nose defects in 8 patients and total nose loss in 3 patients (Figure 2).

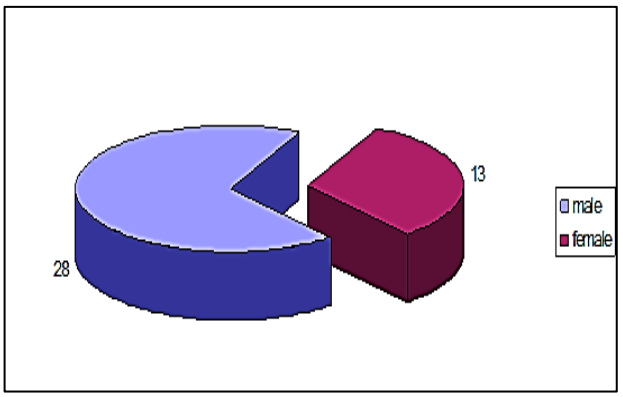

Figure 1: Sex ratio.

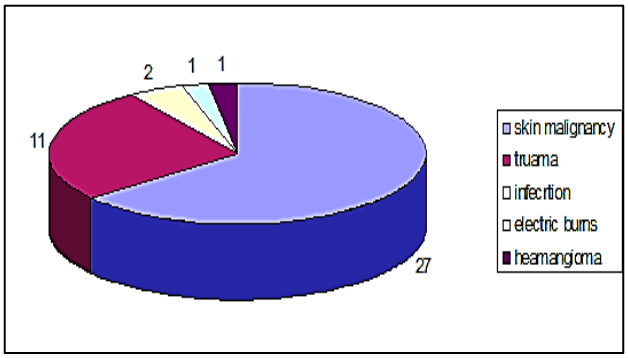

Figure 2: Etiology.

Table 1: Types of nasal defects.

Nasal defects	
Columella defects	3
Subtotal loss of nose	3
Alar defects	9
Tip, supra tip and soft triangle defect	15
Dorsum of nose defect	8
Total nose loss	**3**

The reconstruction of the nose defects were done using forehead flap in 20 patients, nasolabial flap in 11 patients, bilobed flap in 4 patients , dorsum nasal flap in 2 patients, free helical graft in 2 patients, cheek advancement flap in 2 patients. Out of 20 forehead flaps 2 patients underwent pre-lamination of forehead flap. 6 patients of allar defects required supporting the form of conchal cartilage. 2 nasal defects required dorsal support- one patient

reconstructive plate was used and in other patient cantilever ulna bone graft was used.[9] Patients required some form of inner lining. We used folded nasolabial flap in 9 patients, and pre-laminated forehead flap in 2 patients. We had our share of complication like one patient had nasolabial distal flap necrosis, treated conservatively, three patients had forehead donor site split thickness skin graft loss, treated conservatively. 34 patients required secondary and revision procedure like defatting, reinset and trimming of edges.

Table 2: Type of reconstruction.

Reconstruction	
Forehead flap (pre-laminated forehead flap was done in 2 patients)	20
Nasolabial	11
Bilobed flap	4
Dorsum nasal glabella flap	2
Free helical graft	2
Cheek advancement flap	2

Figure 3: (A) Heamangioma over right side of nose. (B) Excision followed by coverage nasolabial flap.

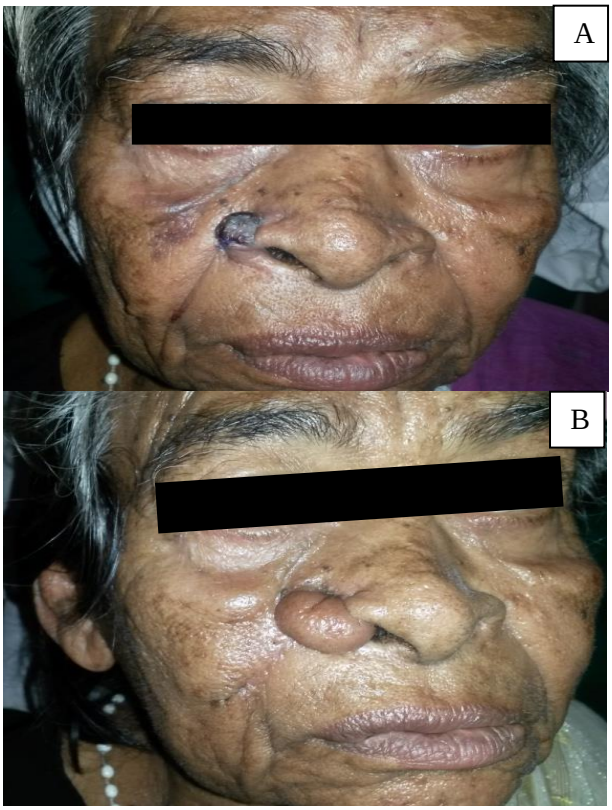

Figure 4: (A) Basal cell carcinoma of right alla of nose. (B) Reconstruction with nasolabial flap.

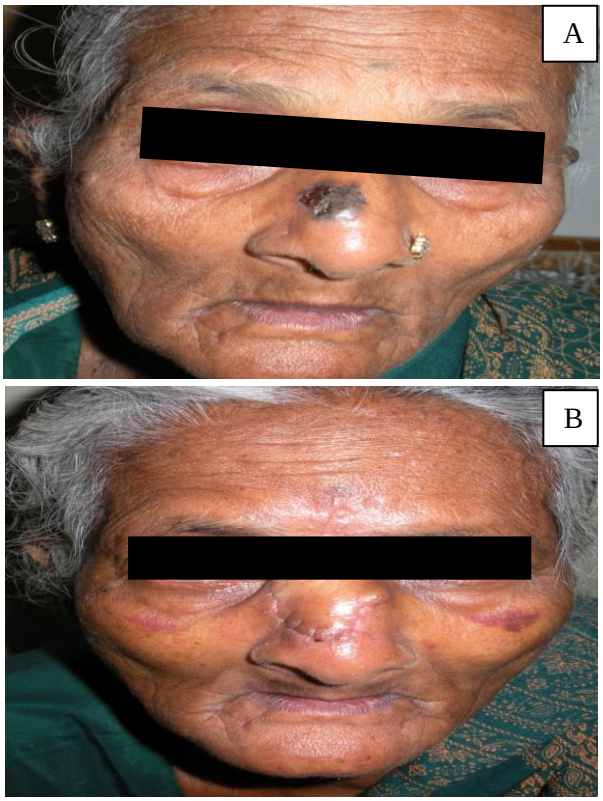

Figure 5: (A) Basal cell carcinoma of dorsum nose. (B) Reconstruction done with dorsal glabellar flap.

Figure 6: (A) Left alla defect less than 1 cm. (B) Reconstructed with Free helical graft.

Figure 7: Prelaminated forehead flap. (A) Squamaus cell carcinoma of nose. (B) Stage 1: wide local excision was done and delay of forehead flap plus prelamination with conchal cartilage. (C) Stage II: elevation and placement of STSG on both side of the flap. (D) Stage III: flap was rotated and inset was given, reconstructive plate was used as support. (E) Stage IV: flap division. (F) Stage V: ulna bone graft for support. (G) Well settled forehead flap donor site.

DISCUSSION

Nasal reconstruction is challenge to plastic reconstructive surgeons, especially in cases of total and subtotal nasal defects. The appropriate selection of patients, meticulous planning and use of appropriate method of reconstruction gives better results. The ideal reconstruction closes the defect following tumor resection with a good tissue match and no stenosis or distortion. Immediate closure decreases morbidity, prevents hemorrhage and minimizes wound infection.[4]

The management of nasal defects following surgery is influenced by several factors, including histology, location, staging, and previous treatment regimens employed.[5-8] The size and location of the defect as well as the availability of adjacent skin are further factors to be considered. The patients' age, co-morbidities, and aesthetic goals must also be included in the decision making process.

In this study, 41 patients underwent some form of nasal reconstruction. 20 patients underwent forehead flap for the nasal reconstruction. The forehead is acknowledged as the ideal donor site for nasal resurfacing because of its skin quality, size, and vascularity. The median forehead is perfused inferiorly from the supratrochlear and supraorbital vessels. Forehead represents maximum tissue reservoir for reconstructing large, full thickness defects of the nose. The excellent blood supply to this flap allows thinning of the distal portion of the flap enhancing pliability and final contouring with the incorporation of cartilage grafts to reconstruct the nasal skeleton. Nasal defects larger than 2.5 cm in length along the horizontal or transverse plane are best closed with a forehead flap. Prelamination of forehead flap with conchal cartilage and split thickness skin graft allows using it as inner lining for total nose defects.

Nasolabial flap based on the angular artery, an area of non-hair bearing tissue excess allows harvesting of a pedicled flap. The donor area is closed primarily hiding the scar in the nasolabial crease. The main indication for this flap is for defects on the lower third of the nose less than 2.5 cm.[9] The flap is used for the defects of the ala, lateral sidewall, tip and sometimes vestibular/columellar defects.

Nasal dorsal glabellar flap: by design a nasal dorsal glabellar flap is a rotation flap aiming to move skin from an area of relative excess (the glabella) to mid-nasal and lower nasal defects.[10] This rotation flap has a versatile blood supply covering mid and lower nasal defects up to 2 cms. Moreover it is a one-stage procedure and it provides excellent tissue match.

Composite grafts do not carry their own blood supply and are thicker than simple skin grafts so there is a greater risk of graft failure. The upper limit of a composite graft that will predictably survive relying solely on perfusion from only its peripheral edge is approximately 1 cm. Composite grafts are preferably taken from the root of the helix where the donor defect can be closed with a cheek advancement flap, resulting in minimal deformity.

In this series, Patients with defects on alla and columella were reconstructed with nasolabial flap. Patients with subtotal to total nose defect were treated with forehead flap, good results were obtained in 2 prelaminated forehead flap patients.Smaller defects were treated with local flaps like bilobed flaps, dorsal glabellar flaps. The colour, texture match was best with forehead flap. Even the donor site healed well. Various tissues can be used for dorsal support; we used reconstructive plate in one patient and ulna cantilever bone graft in one patient. Both gave good results. Minor complications like distal flap necrosis and skin graft loss were in seen, which were treated conservatively.

Reconstruction of nasal defects is a particularly challenging task, requiring the reconstructive surgeon to recreate facial symmetry. Each situation must be individualized to give better results for the respective deformities. Nasal reconstruction does not seek to precisely duplicate missing anatomy, but rather to create a facsimile of the missing part.[11] Ideally, this will sufficiently resemble a normal nose at a conversational distance to escape attention.

CONCLUSION

In this study, malignancy is the most common cause of nasal defect flowed by trauma. Study concludes that nasolabial flap is flap of choice for small size defects with minimal donor morbity. Moderate to big defects, pre-laminated forehead is the best option, which gives aesthetically good results.

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