OUTCOME OF PARAMEDIAN FORHEAD FLAP IN RECONSTRUCTIVE RHINOPLSTY

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ABSTRACT

Objective: To assess the results of paramedian forehead flap (PMFF) in reconstructive rhinoplasty.

Material & Methods: This descriptive study was conducted on 35 patients at the Departments of Ear, Nose, Throat, Lady Reading Hospital and Khyber Teaching Hospital, Peshawar from January 2010 to December 2012. All patients with acquired nasal defects were admitted through outpatient department and casualty. The patients were evaluated preoperatively in terms of history, examination and relevant investigation and postoperatively in terms of success of paramedian forehead flap and photography. All procedures were carried out under general anaesthesia and covered by intravenous antibiotics. The skeletal support was achieved by using costal cartilage grafts if needed. These patients were followed for two years.

Result: Our study included 35 patients constituting 26 males and 09 females, with male to female ratio of 3:1. The age of the patients ranged from 17-70 years with mean age of 28.35 years ± 2.15 SD. Most of the patients presented in 3rd and 4th decade of life (67.71%). Most of the patients were from rural area 25 cases (71.42%). Assault (40%) was on top followed by accidents (28.57%). Indication for rhinoplsty in all patients was cosmetic (100%). In all patients paramedian forehead flap was used (100%). Overall success rate was (90%).

Conclusion: Reconstruction of nasal defects with paramedian forehead flap provides a good cosmetic and functional result with minimal complication.

Key Words: Rhinoplasty, reconstructive, paramedian, forehead flap, nasal defect, Cosmetic.

INTRODUCTION

The nose is the most projecting aesthetic structure (unit) of the face. This makes it more exposed to traumatic injuries in daily life[1]. Nasal defects are usually due to accidental trauma, human and animal bites, infection and nasal skin tumours excision[2]. Although normal nasal breathing is vital, the primary role of external nose is to look esthetically normal. Change in the nasal shape to any degree spoils the facial beauty and personality and lead to a big psychological problems to the patient and a major therapeutic challenge to rhinologist. The majority of patients with external nasal defects search for cosmetic correction. Rhinoplasty can bring a sense of mental wellbeing for the patient and achievement for the surgeon. Therefore attempts at nasal reconstruction with forehead flaps were made even thousands of years ago by Indian surgeons where nasal amputation was a common form of social punishment for various crimes, from theft to adultery[3]. Reconstruction of external nasal defects is carried out to improve nasal appearance, respiratory function, and solve psychiatric problems[4]. The reconstruction of external nasal defect is a major therapeutic challenge to rhinoplastic surgeon due to the triple layered structure. Anatomically, the nose is made up of osteocartiligenous framework covered by skin, lined by vascular mucosa, which matches the face in colour and texture[5]. If all or part of the nose is missing, the requirement for reconstruction will depend on the size and depth of cover, support and lining loss. The aims of nasal reconstruction are to achieve near normal good functional and attractive nasal appearance and avoid nasal obstruction due to flap collapse, excess bulk or constricting scar. Various grafts and flaps have been described for reconstruction of nasal defect. The forehead flap is excellent for repairing extensive deep nasal defects because of its excellent skin colour, size, texture, thickness and superior vascularity[6]. The forehead flap is perfused by a network of anastomosis between the frontal muscle and skin supplied by the supraorbital,

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supratrochlear, infratrochlear, dorsonasal, and angular branches of the facial artery[7]. Different types of forehead flap design are described. The median forehead flap, oblique forehead flap, island forehead flap, transverse forehead flap, scalping forehead flap, and paramedian forehead flap. The classic median forehead flap based on bilateral supraorbital and supratrochlear vessel used in repair of complex nasal defects, providing similar skin color, texture. However flap's length is limited by hairline and its reach is limited by pedicle's high arc of rotation which also displace medial eyebrow and flap inset results in an inverted v-shaped glabellar scar[8]. An Oblique flap is designed as a layer of flap by slanting it across the forehead at a angle of 45, can reach to the base of columella. However a second flap cannot be created as on one side the pedicle is destroyed and on the other side the forehead is scarred[14,15]. The PMFF based on single supratrochlear is excellent, because its arc of rotation is near the medial canthus, making it easy to reach and reconstruct the columella, ala, and inner nasal lining without incorporating hair-bearing scalp[9]. The narrow pedicle created from the side contralateral to the defect provides maximal flap length and ease of rotation and can be thinned before inset. Primary closure of the proximal forehead defect is possible with minimal scar and without displacing the medial eyebrow hair as a result of the narrow pedicle. A second flap can also be harvested from the contralateral forehead after a prior vertical paramedian flap. In this study we evaluated the results of paramedian forehead flap to reconstruct the nasal defects. Particular note was made of short and long term complications and patient's satisfaction in term of cosmetic and functional results.

MATERIAL AND METHODS

This study was conducted at the Departments of Ear, Nose, Throat, Lady Reading Hospital and Khyber Teaching Hospital, Peshawar from January 2010 to December 2012. All patients with nasal defects were admitted to ENT unit through outpatient department and casualty. A detailed history and physical examination of the nasal defects both from cosmetic and functional aspect was carried out. Patients with acquired nasal defect due to accidental trauma, assault, post infection and tumour excision were included in this study. Those patients with previous history of nasal surgery, recently infected cases and defects involving more than nasal unit of face were excluded from the study. Approval of the Hospital Ethical Committee was taken before studying the cases. The procedure was explained to the patient and informed consent for photography and procedure was taken. All 35 patients underwent reconstructive rhinoplasty with PMFF. Procedure; All procedures were carried out under general and local infiltrative anaesthesia with 2% xylocain with adrenalin in a concentration of (1:200000) in donor and recipient areas. All operations were covered by prophylactic antibiotics. The antibiotics were inj. (Co-amoxiclav) 1.2 gm intravenously for 02 days and then orally for 07 days to prevent infection. The PMFF was designed according to the site, size and depth of nasal defect. Special care was taken not to include hair bearing (scalp) skin in flap designing. The inner lining was provided with folded forehead flap. The skeletal support was achieved by using a costal cartilage graft if needed. The flaps were monitored closely for first 48 hours for ischemia, venous congestion. Stitches were removed from 7-10 day. Patients were advised to avoid excessive sun exposure, touching and scratching of the grafted area for at least six weeks. Flap division and closer of superior forehead flap donor site defect was done after 6 weeks. Follow up of the patients was done monthly for first 3 months and then 6 month interval onwards for two years.

RESULTS

Our study included 35 patients constituting 26 males (74.29%) and 09 females (25.71%), with male to female ratio of 3:1. The age of the patients ranged from 17-70 years with mean age of 28.35 ± 2.15 SD years. Most of the patients presented in 3rd and 4th decade of life (67.71%) Table 1. Most of the cases were from rural area 25 cases (71.42%). Assault was on top 14 patients (40%) followed by accidents 10 patients (28.57%) Table 2. The commonly occurring defects were nasal dorsum defect 10 cases (28.57%) and Alar defect 10 cases (28.57%) Table 3. Out of 35 patients, 20 cases (57.15%) having partial thickness nasal defect (skin only), and 15 cases (42.85%) having full thickness nasal defect (skin, cartilage, mucosal lining). In all patients paramedian forehead flap was used (100%).Two patients (5.71%) had alar retraction, two patients (5.71%) had flap tip necrosis and one patient (2.86%) had flap failure. Thirty patients were fully satisfied and five patients were partially satisfied with cosmetic results. Table 4 gives details of the complications and hence patients dissatisfaction. Esthetic and functional results of nasal reconstruction were subjectively graded by three otolaryngologists and the patients. Ratings for function are 1 (much worse than before operation) to 5 (much better than before operation), judged subjectively by patients. Ratings for esthetics are 1 (poor) to 5 (excellent), judged by three surgeons.

DISCUSSION

The aims of nasal reconstruction are the restoration of an esthetic, functional nose with minimal donor site deformity. We used PMFF paramedian forehead flap in all 35 patients. Males were affected thrice than female

Table 1: Age-wise distribution of the patients

Age ranges in years	No. of patients and percentage
17 – 30	06 (17.14%)
31 – 40	14 (40.00%)
41 – 50	09 (25.71%)
51 – 60	03 (08.57%)
61 – 70	03 (08.57%)
Total	35 (100%)

Table 2: Causes of nasal defect

Causes	No. of patients & percentage
Assault	14 (60.71%)
Accidental trauma	10 (25.00%)
Tumour excision	09 (14.29%)
Post leshmaniasis scar excision	01(02.86%)
Donkey bite	01(02.86%)
Total	35(100%)

Table 3: Nasal Subunit Involvement

Subunit Involvement	No. of patients and percentage
Nasal dorsum defect	10(28.57%)
Sidewall defect	7(20%)
Alar defect	10(28.57%)
Columellar defect	3(08.57%)
Subtotal nasal defect	5(14.29%)
Total	35

Table 4: Complication

Complication	No. of patients & percentage
Alar retraction	2(5.71%)
Flap tip necrosis	2(5.71%)
Flap failure	1(2.86%)
Total	5(14.28%)

because they are more exposed to trauma comparable to the results shown by Brodland DG[10]. Most of the patients operated for nasal defects were of 31-50 years because this age group is more exposed to trauma and nasal skin tumour development as also mentioned by Masic et al[11]. The main causes for nasal defects were assault followed by accidental trauma and tumour excision in our study, this is also reported by Ahmad and Jovanovic M et al[12,13]. The forehead flap can be used in many ways, Bouhanna A and Giugliano C used this flap as an oblique flap to avoid hairline for better caudal advancement[14,15], while Okada and Maruyama used it as a median forehead flap[16]. We used PMFF because it is a efficient, reliable and durable flap for repair of large,deep nasal defects due to its rich blood supply, low arc of rotation, extra length and minimal donor site morbidity[10]. We achieved excellent success in form of cosmetic and functional result in 30 patients(90%), partial flap defect in 4 patients (11.42%) and full failure of respective flap in 1 patient (2.85%). While Ahmad report 100% success in his case series report of 21 patients with no major complication[12]. Belmar P also reported excellent success in 90% cases and partial flap necrosis in 10% cases of his ten patients[17]. The problems with forehead flap nasal reconstruction as described by Mureau et al are impaired nasal function, conspicuous donor site, thick flap, residual nasal deformity, unaesthetic outcome, infection, alar retraction, flap necrosis and flap failure[18]. We faced complication in 5 patients (14.28%) in the form of alar retraction 2(5.71%), flap tip necrosis 2(5.71%), and flap failure 1(2.85%), revision surgery was performed to correct these deformities. Even in the best of surgical hands, 5-10% of patients require revision rhinoplasty to provide the best possible cosmetic result as cited by Dziewulski P[19]. However the study of Quatela VC shown no major complication but request for revision surgery was found only in 2 patients (6.25%) for alar retraction and hypertrophic scar in his case series of 32 patients[20]. Charles M et al reported partial thickness superficial flap necrosis in 2 patients (1%), and revisional surgery for minor residual defects in 79 patients (54%) in total of 147 patients[21]. Masic T et al reported good and satisfying results in all of his 20 cases repaired with forehead flap, except for one speech dysfunction[2].

CONCLUSION

Reconstruction of large complex nasal defects with paramedian forehead flap provides a good satisfying cosmetic and functional result because of its hairless outlining, low arc of rotation, increased length, with minimal glabellar scar and eyebrow displacement.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Javaid M: Conception and design.

Ahmad N: Acquisition of data.

Khan N: Drafting the manuscript.

Haq NU: Statistics.

Zada B: Interpretation of data.

Wahid F: Followup.

Khan IA: Critical revision and final approval of the version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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