

## Paramedian forehead flap reconstruction for skin tumors involving central subunit of face: An analysis of 37 cases

Shiv Rajan<sup>a</sup>, Naseem Akhtar<sup>a,\*</sup>, Vijay Kumar<sup>a</sup>, Sameer Gupta<sup>a</sup>, Sanjeev Misra<sup>b</sup>, Arun Chaturvedi<sup>a</sup>, Shashank Chaudhary<sup>a</sup>, Parijat Suryavanshi<sup>a</sup>

<sup>a</sup> Department of Surgical Oncology, King George's Medical University, Lucknow, UP, India

<sup>b</sup> All India Institute of Medical Sciences, Jodhpur, Rajasthan, India

### ARTICLE INFO

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### ABSTRACT

**Introduction:** Tumors of facial skin are common in upper part of central subunit of face. Defects after resection require a flap, which is pliable, thin, and has a good colour match. Among the various local flaps available paramedian forehead flap is a good option.

**Patients and methods:** Patients reconstructed with paramedian forehead flap during the period from January 2015 to March 2020 were included in the study. Data regarding the demographic, clinical characteristics, and treatment details was recorded, and analyzed for postoperative complications and cosmetic outcomes.

**Results:** Paramedian forehead flap reconstruction was performed in 37 patients who were resected for tumor involving upper central subunit of face. Median age of patients was 57 years. Male to female ratio was 1.4:1. All tumors were resected with a negative margin. Nodal disease was managed by superficial parotidectomy only (4/37), superficial parotidectomy along with supra-omohyoid neck dissection (6/37) and modified neck dissection (1/37). In five patients additional buccal mucosa graft was used to reconstruct conjunctiva. Additional flaps were required in two patients in whom nasolabial and mustarde flaps were used. Partial flap loss occurred in one patient. There was no major flap loss. Surgical site infection developed in only one patient, who had partial flap loss. On subjective assessment, nearly 60% patients described their appearance as good.

**Conclusion:** Facial reconstruction in area of dorsum of nose and medial aspect of both eyelids using paramedian forehead flaps is a simple and quick procedure.

### Introduction

Tumors of facial skin are common in upper part of central subunit of face. Resection of these tumors leave defects, which cannot be primarily closed because of proximity and involvement of root/dorsum of nose and eyelids. These defects require a flap, which is pliable, thin, and has a good colour match. Even the best of microvascular tissue transfer will not be good for these defects. Local flaps are ideal. Among the various local flaps available paramedian forehead flap is good, versatile and simple, especially for defects involving dorsum of nose, medial aspect of both eyelids and adjacent skin.<sup>1–3</sup> Use of paramedian flap does not require a plastic surgeon and can be done by the operating surgeon himself. This saves cost and time. Paramedian flap is ideal in resource constrained situation and hospitals where plastic surgeons are not available. We have been using the paramedian forehead flap for defects

involving upper part of central subunit of face following resection of tumors. This article describes our experience with the paramedian forehead flap.

### Patients and methods

We conducted this retrospective review of practice in the Department of Surgical Oncology, at a tertiary care hospital in North India. Patients undergoing surgery for skin cancer in area of central subunit of face and reconstructed with paramedian forehead flap during the period from January 2015 to March 2020 were included in the study. We have performed paramedian forehead flap reconstruction following resection in patients of cutaneous tumors involving central subunit of face including nose, eyelid and adjacent skin. Data regarding the demographic, clinical characteristics, and treatment details was

\* Corresponding author.

E-mail addresses: [shivrajan.194@gmail.com](mailto:shivrajan.194@gmail.com) (S. Rajan), [naseemakhtar97@gmail.com](mailto:naseemakhtar97@gmail.com) (N. Akhtar), [drvkumar2007@gmail.com](mailto:drvkumar2007@gmail.com) (V. Kumar), [sameerdr79@gmail.com](mailto:sameerdr79@gmail.com) (S. Gupta), [misralko@gmail.com](mailto:misralko@gmail.com) (S. Misra), [drchatur@gmail.com](mailto:drchatur@gmail.com) (A. Chaturvedi), [shashankbmc@gmail.com](mailto:shashankbmc@gmail.com) (S. Chaudhary), [parijatsuryavanshi@gmail.com](mailto:parijatsuryavanshi@gmail.com) (P. Suryavanshi).

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Fig. 1. Basal cell carcinoma involving central subunit of face.



Fig. 2. Defect after resection.

recorded, and analyzed for postoperative complications and cosmetic outcomes.

## Results

Paramedian forehead flap reconstruction was performed in 37 patients who were resected for tumor involving upper central subunit of face (Figs. 1–4). Median age of patients was 57 years. Male to female ratio was 1.4:1. Details of the site of tumor and their histology are listed in Table 1. All tumors were resected with a negative margin. Wide excision of tumor also included orbital exenteration in two patients. Nodal disease was managed by superficial parotidectomy only (4/37), superficial parotidectomy along with supra-omohyoid neck dissection (6/37) and modified neck dissection (1/37). In five patients additional buccal mucosa graft was used to reconstruct conjunctiva. Additional flaps were required only in two patients in whom defects were large. In one patient in addition to median forehead, nasolabial flap and in another mustarde flap was used (Table 1).

Immediate postoperative complications are described in Table 2. There was no major flap loss. Minor flap loss was encountered in one patient. Surgical site infection developed in only one patient, who had partial flap loss. This was managed conservatively and did not require any intervention. On subjective assessment, nearly 60% patients described their appearance as good (Fig. 5).

## Discussion

There are various options available for cutaneous reconstruction of the central subunit of face after cancer resection and among them paramedian forehead flap is very useful. It has the advantage of being simple, quick and reliable and has minimal morbidity.

History of paramedian forehead flap dates back to 700 BCE in ancient Indian literature where its first description can be found in Sushruta Samhita.<sup>4</sup> Centuries later, Kazanjian described the primary blood supply of the flap in the 1930s. The design of this flap was modified and popularized by Labat, Millard and most recently by Burget and Menick. Later described the method, of extending the



Fig. 3. Paramedian flap.



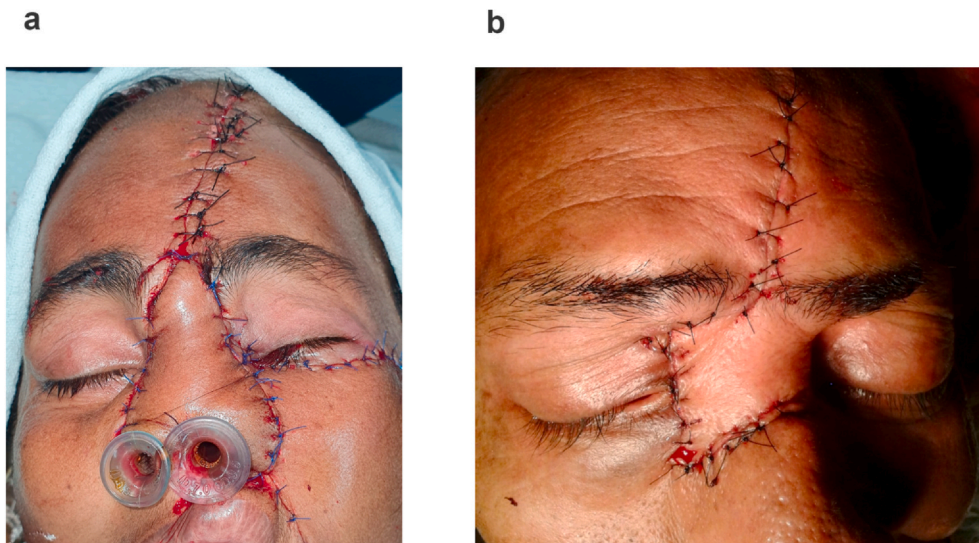


Fig. 4. a and b: Reconstruction after suturing the paramedian and mustarde flap.

**Table 1**  
Patient's details, tumor characteristics, and surgical details.

Demographic characteristics (N = 37)	
Median Age	57 year
Sex (M: F)	22:15
Tumor site	
Eyelid	
Lower	11 (29.7%)
Upper	05 (13.5%)
Medial canthus	05 (13.5%)
Face	09 (24.3%)
Nose	07 (18.9%)
Histology	
Basal cell carcinoma	15 (40.5%)
Squamous cell carcinoma	13 (35.1%)
Sebaceous cell carcinoma	06 (16.2%)
Adenoid cystic carcinoma	01 (2.7%)
Melanoma	01 (2.7%)
Sarcoma	01 (2.7%)
Treatment of primary	
Wide local excision (WLE) alone	35 (94.5%)
WLE with orbital exentration	02 (5.5%)
Nodal dissection	
No	26 (70.2%)
Superficial parotidectomy	11 (29.7%)
Supraomohyoid neck dissection	06 (16.2%)
Modified radical neck dissection	01 (2.7%)
Additional flap/Graft	
Buccal mucosa graft	05 (13.5%)
Split thickness skin graft	03 (8.1%)
Nasolabial flap	01 (2.7%)
Mustarde flap	01 (2.7%)

**Table 2**  
Postoperative complications and cosmesis.

Post-Operative Complications	Number (%)
Early	
Bleeding	03 (8.1%)
Surgical site infection	01 (2.7%)
Partial flap loss	01 (2.7%)
Major flap loss	0
Cosmesis	
Good	22 (59.4%)
Satisfactory	12 (32.4%)
Poor	03 (8.1%)



Fig. 5. Final cosmetic outcome.

incision below the orbital rim to add length to this flap<sup>5,6</sup>, which is used commonly nowadays.

The flap is elevated from cranio-caudal direction including skin, subcutaneous tissue, frontalis muscle and associated fascia or periosteum. There are some important anatomical points which must be

considered for raising this flap. This flap is raised in the axial plane of its blood supply from the supratrochlear artery that runs vertically up from orbital rim to hairline, 1.7–2.2 cm lateral to the midline at the level of the superior orbital rim.<sup>7</sup>

Because of superficial location of the blood vessel with extensive

distal subdermal plexus, flap necrosis is unusual. The vessels lie in the subcutaneous plane just above the mid-forehead and hence this flap is raised in supraperiosteal plane. Later it can be trimmed of extra tissue to provide pliable skin. However, to protect the blood supply, the inferior aspect of the flap should be elevated deep to the frontalis muscle in subperiosteal plane to safely include the vessel. Base of the flap is generally 1.5 cm wide to include the blood supply safely but can be narrowed up to 1.3 cm. This helps in providing a better rotational arc to the flap. No effort is made to visualize and safeguard the supratrochlear nerve that provides sensation to the skin of the flap. Therefore, these flaps have no sensation. If required, additional length can be gained proximally by extending the incision below the orbital rim which helps to avoid including the hair bearing skin of forehead. The pedicle is generally divided 3 weeks later under local anaesthesia, once the flap has gained a local blood supply from the recipient site.<sup>8,9</sup>

In a recent large retrospective descriptive study of paramedian forehead flaps for nasal reconstruction the most common complication was postoperative infection in 2.9% patients, followed by postoperative bleeding and DVT in 1.4% and  $\leq 0.5\%$  patients respectively.<sup>10</sup> In another series the infection rate was found to be statistically similar between patients undergoing 3 stage and 2 stage paramedian forehead flap reconstruction (5% vs 1%,  $P = 0.218$ ). Similarly, the rate of partial forehead flap necrosis was similar in both groups (2-stage, 3.4%; 3-stage, 5%;  $P = 0.601$ ). Authors concluded that there was no evidence to suggest that the use of a 3-stage forehead flap lowers the prevalence of necrosis.<sup>11</sup> In a 2001 study of postoperative complications of paramedian flap by Collin L. Chin et al. infection rates were 2.9% and bleeding was 1.4%, which is similar to our study.<sup>1</sup> In another series of 41 patients of nasal defect, early postoperative complications occurred in 14.6% of patients undergoing paramedian forehead flap reconstruction. The cosmetic results were considered acceptable or excellent in 90.2% of cases.<sup>12</sup>

## Conclusion

Facial reconstruction in area of dorsum of nose and medial aspect of both eyelids using paramedian forehead flaps is a simple and easy procedure. Skin of forehead has good match with the skin of this area in thickness as well as in colour. The result of this reconstruction is highly satisfactory along with good cosmesis. It is also ideal for hospitals

where plastic surgeons are not available.

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## Informed consent

Informed consent was obtained from all individual participants included in the study.

## Declaration of competing interest

No conflict of interest.

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