

Medium Frontal Flap In Nasal Reconstruction After Skin Neoplasia

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Abstract:

Background: The Medium frontal flap is an effective technique for reconstructing lesions on the nose and upper eyelid, offering good aesthetic results. Non-melanoma skin cancer, particularly basal cell carcinoma and squamous cell carcinoma, is the primary cause of these lesions, often due to sun exposure. The high incidence of these conditions poses a challenge for plastic surgeons seeking to optimize aesthetic outcomes.

Materials and Methods: This study included 9 patients (4 women and 5 men, aged between 44 and 82 years) operated on between November 2023 and March 2024. The choice of the Medium frontal flap was based on the size of the lesion, its location, and the need to reconstruct the entire nasal aesthetic unit. The lesions, ranging from 2.5 cm to 7 cm, were predominantly located on the nasal dorsum and the eyelid

Results: There were no cases of flap necrosis. The medium frontal flap was used for nasal reconstruction, primarily for lesions on the dorsum and tip of the nose, based on the supratrochlear artery. In two cases, nasogenian flaps were used. Reconstruction was performed after confirming clear margins in the histopathological examination. One patient with metastatic squamous cell carcinoma underwent cervical dissection and radiotherapy. Most cases involved basal cell carcinoma.

Conclusion: The medium frontal flap, with characteristics similar to the nasal region, provides good aesthetic uniformity and functionality, effectively covering nasal and medial eyelid lesions. The technique proved safe, with low morbidity and high patient acceptance.

Key Word: Surgery, Plastic; Surgical Procedures, Operative; Skin Neoplasms; Head and Neck Neoplasms; Treatment Outcome.

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I. Introduction

The medium frontal flap has its applicability for the reconstruction of lesions preferably located on the nose and can be used for upper eyelid reconstructions, with good aesthetic acceptability.

Nasal reconstruction dates back to the 1st century with reports of skin grafting practiced by Aulus Cornelius Celsus (53 BC - 7 AD). The Indian flap technique was initially presented by Sushruta Shamita, as crimes of adultery between the 10th and 15th centuries were punished by nasal amputation, with the technique now known as the mid-forehead flap. Other reconstruction techniques using flaps near the nose were also described, but due to the high incidence of complications, they fell into disuse. Criticisms related to this technique were mostly about scar retraction. Thus, Auvert in the 19th century designed an angle of 45°, causing the flap to lengthen.

Other techniques such as expanders, the use of cartilage and/or bone were described later, minimizing the main complaints regarding this technique.

Non-melanoma skin cancer is the main cause of nasal reconstruction, as 70% of basal cell carcinomas occur on the nose and it is also a frequent site for squamous cell carcinoma, as the nose is a prominent organ exposed to solar radiation. The increased incidence of this type of lesion has become a challenge for the plastic surgeon in the expectation of reducing the aesthetic defects resulting from surgical treatment.

Several authors can be cited in the development of nasal reconstruction techniques, such as reconstructive rhinoplasty techniques developed by Johann F. Dieffenbach and Lewin Joseph, with resections and transections via intranasal routes, George Peck with tip projection, and John Tebbets with the open technique. All contributed to achieving better aesthetic results.

II. Material And Methods

Nine patients were included in the study, four females and five males, aged 44 to 82 years, operated on between November 2023 and March 2024.

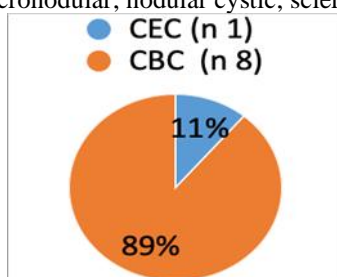
The determining factors for the use of the mid-forehead flap (MFF) were the size of the remaining raw area, the location of the lesion, the impossibility of reconstruction by other methods, and the reconstruction of the entire affected nasal aesthetic unit.

The lesions mostly affected the nasal dorsum, upper and lower eyelids at the medial canthus, affecting or not deeper structures. The lesions ranged from 2.5 cm to 7 cm in size, the extent of the defect after tumor resection was 3.0 cm to 8.5 cm. Two patients had already undergone nasal amputation due to SCC and BCC, and came with the objective of reconstruction.

When the nasal ala was compromised in its full thickness, a combination of nasolabial flaps was indicated, with or without cartilage grafting in the columella and nasal ala. Reconstruction was indicated when patients had a pathology report showing clear margins.

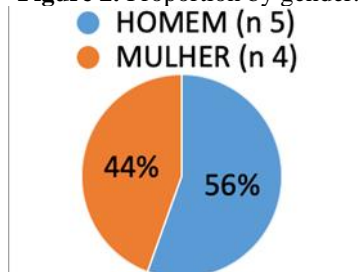
The extent of the flap was based on the size of the defect. The flaps were always paramedian, based on the supratrochlear artery, with a 180° rotation arc. When cartilage grafting was necessary, it was taken from the nasal septum.

Figure 1. Percentage of neoplasia that predominated in clinical cases (basal cell carcinoma) with histological subtypes (nodular and pigmented micronodular; nodular cystic; sclerodermiform pattern; adenoid variant).



Source: own authorship, 2024.

Figure 2. Proportion by gender.



Source: own authorship, 2024.

III. Results

We had no cases of flap necrosis. In one patient, the reconstruction occurred in the second stage after the removal, awaiting the pathology result for flap execution due to the extent and location of the lesion (upper and lower eyelids, medial canthus, and nasal dorsum), which would make reconstruction difficult in case of reoperation.

There was margin compromise in one patient, with no signs of local recurrence to date.

Cartilage grafting of the columella was performed in one patient undergoing reconstruction of the entire nasal unit.

Six cases involved lesions on the nasal dorsum and nasal tip.

The flap indicated for nasal lining repair, when indicated, was the nasolabial turnover flap (two cases).

In donor areas where total closure was not possible, the raw area healed by secondary intention.

One patient presented with epidermolysis at the tip of the flap, without the need for intervention.

One patient who was in the postoperative period of eight months after partial rhinectomy (entire nasal tip and columella) presented on the 30th postoperative day with the appearance of a lymph node in the cervical region, zone II, which was biopsied confirming SCC metastasis, undergoing cervical dissection and radiotherapy.

In five patients, the diagnosis was clinical. The confirmation of clear margins came with the pathology result postoperatively.

The patient with lesions on the eyelids and nasal dorsum had a pathology report of BCC. In our case series, basal cell carcinoma was the most prevalent.

Non-melanoma skin cancer is the most frequent malignant tumor, with an increasing incidence, with basal cell carcinoma being the most prevalent, with slow progression, no metastatic potential, and high cure rates with early intervention.

Once autonomized, the pedicle was released. The minimum time for autonomization was three weeks.

The characteristics of patients undergoing nasal reconstruction with a midfrontal flap are shown in table no 1

Table no 1: Patients undergoing nasal reconstruction, with Mid Frontal Flap, after skin neoplasia.

| | AGE | GENDER | HISTOLOGICAL TYPE | COMORBIDITIES | SURGICAL TIME | COMPLICATIONS |
|-------------|-----|--------|---|--|---------------|---|
| JRO | 76 | Male | Nasal tumor: invasive squamous cell carcinoma of the nasal tip (clear margins) | Ex-smoker and ex-drinker, parotid gland carcinoma with right cervical dissection (6/6 nodes affected, undergoing RT) | 3 | Inflammatory process in the right nasal ala, confirmed by biopsy |
| DBB | 44 | Female | Upper eyelid: nodular-cystic basal cell carcinoma, ulcerated. Deep margin focally compromised. Eyelid bed margin free of neoplasia. Fragment of deep margin without neoplastic involvement. | No comorbidity | 3 | None |
| GGR | 79 | Male | Nasal dorsum: nodular, micronodular, ulcerated basal cell carcinoma (fragmented material) | No comorbidity | 2 | None |
| NBV | 70 | Male | Nasal dorsum: adenoid variant basal cell carcinoma - deep margin compromised | Diabetes mellitus II | 2 | None |
| FGNA | 58 | Female | Nasal dorsum: micronodular basal cell carcinoma. Lateral margins compromised | No comorbidity | 2 | None |
| AC | 72 | Male | Left nasal ala: nodular-cystic basal cell carcinoma, ulcerated. Nasal dorsum: sclerodermiform pattern basal cell carcinoma, superficial ulcerated. | Hypertension, diabetes mellitus II, smoker | 3 | Small focus of necrosis in the left nasolabial flap, resolved spontaneously |
| MJMA | 74 | Female | Nasal dorsum: nodular, micronodular, pigmented, superficial ulcerated basal cell carcinoma. Frontal region: nodular, micronodular, cystic basal cell carcinoma, clear margins | History of leprosy treatment with a right foot lesion in treatment | 2 | None |
| IC | 82 | Male | Nodular-cystic, ulcerated basal cell carcinoma on the nasal dorsum | Hypertension | 2 | None Female |
| MGBS | 71 | Female | Nasal tip: nodular ulcerated basal cell carcinoma | Hypertension | 2 | None |

Source: own authorship, 2024.

Figure 3. JRO, 76 years old, in the late postoperative period of partial rhinotomy for excision of a lesion on the nasal tip. Preoperative, frontal view (a) and right profile (b). Reconstruction performed with a mid-forehead flap and bilateral nasogenian flap to compose the nasal lining. 2 weeks after the procedure (c). 5 weeks postoperative, preparing for pedicle release (d). 4 months after pedicle release (e). Undergoing radiotherapy due to metastasis of parotid gland carcinoma.



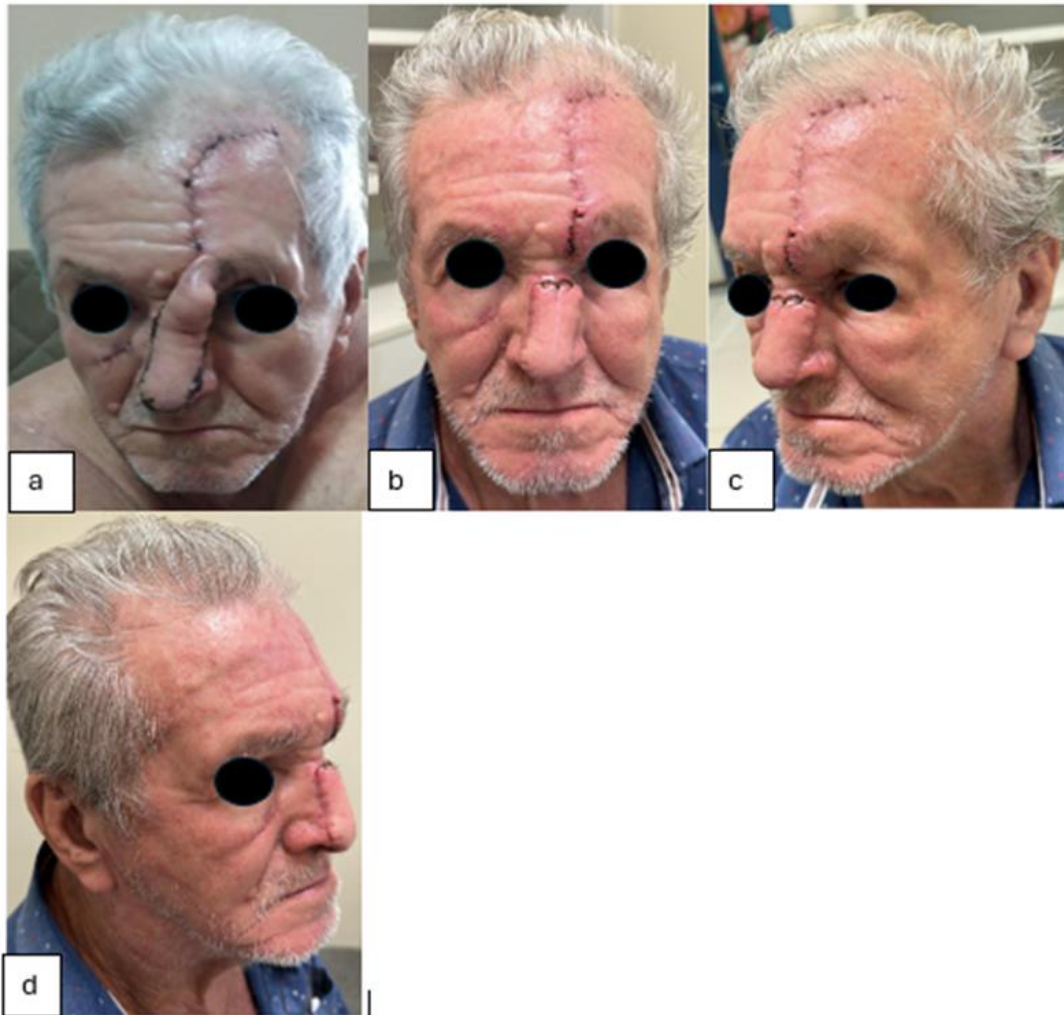
Source: own authorship, 2024.

Figure 4. DBB, 44 years old. Tumor affecting the right lateral nasal subunits and medial regions of the upper and lower eyelids. Preoperative - frontal view (a) and right oblique view (b). Image after tumor resection (c). 4 weeks later, awaiting the result of the surgical margins (intraoperative freezing service is not available at the hospital) (d). After deep margin enlargement and mid-forehead flap construction (e); 2 months postoperative after pedicle release (f).



Source: own authorship, 2024.

Figure 5. NBV, 71 years old. Lesion on the nasal dorsum. Image 1 week after mid-forehead flap construction (a). Image after pedicle release, frontal view (b), left oblique view (c), and right oblique view (d).



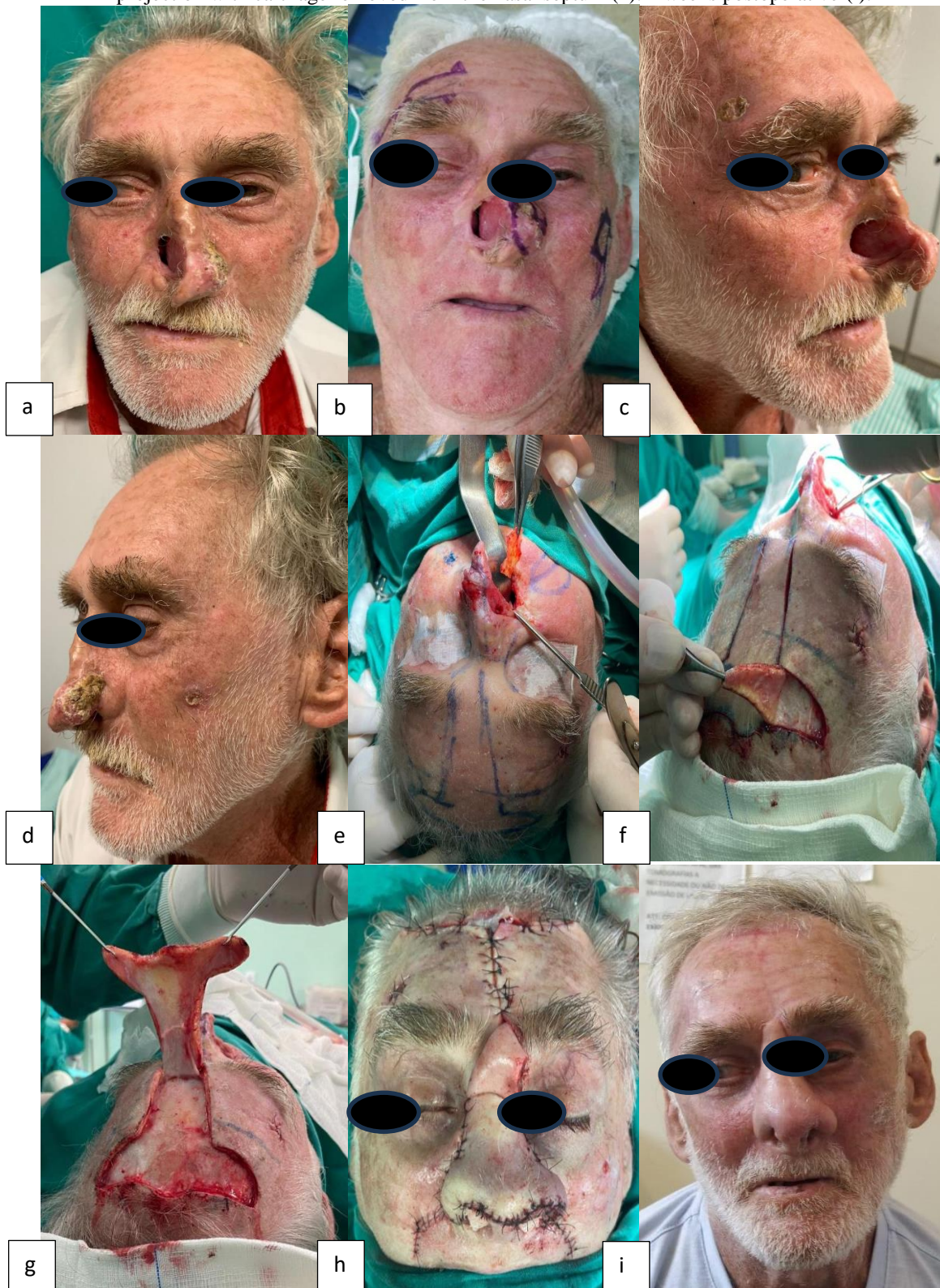
Source: own authorship, 2024.

Figure 6. MJMA, 73 years old. Tumor on the nasal tip and another in the frontal region with pre-surgical marking (a). Result of the mid-forehead flap after excision of the lesion on the nasal tip and frontal region (b). 4 weeks postoperative after pedicle release (c).



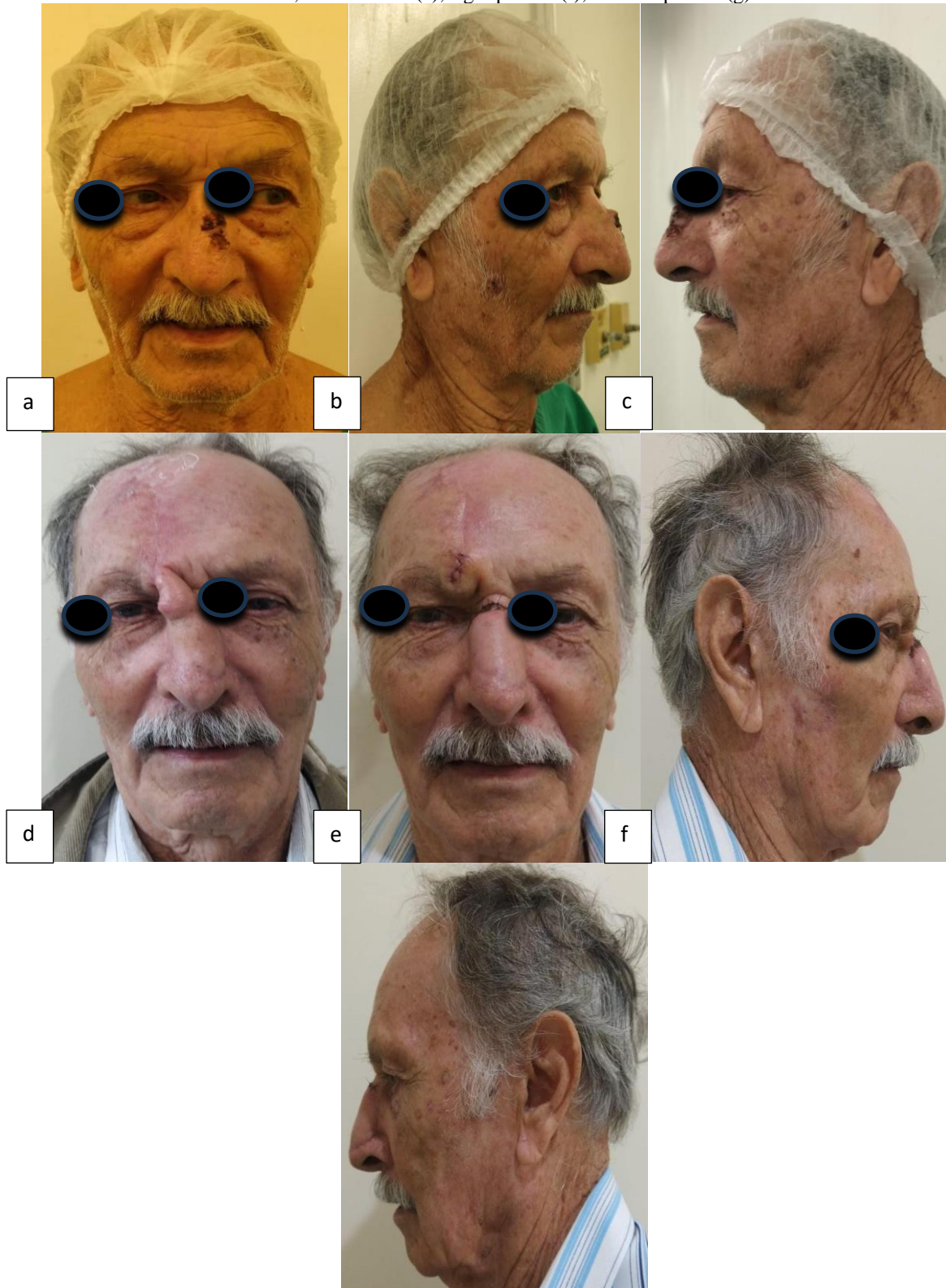
Source: own authorship, 2024.

Figure 7. AC, 71 years old. Late postoperative period of wide resection of the tumor on the right nasal ala with exposure of the ipsilateral septum (a, b, c). Current lesion on the left nasal ala (d). Isolated fragment of nasal septum cartilage for structure on the nasal tip (e). Lifting of the mid-forehead flap (f, g). Immediate postoperative period of nasal reconstruction with mid-forehead flap, bilateral nasogenian flap, and nasal projection with cartilage removed from the nasal septum (h). 4 weeks postoperative (i).



Source: own authorship, 2024.

Figure 8. IC, 82 years old. Lesion on the nasal dorsum, frontal view (a), right profile (b), and left profile (c). 8 weeks postoperative from mid-forehead flap construction (d). 2 weeks postoperative from mid-forehead pedicle release, frontal view (e), right profile (f), and left profile (g).



Source: own authorship, 2024.

Figure 9. MGBS, 71 years old. Tumor on the nasal tip and another lesion adjacent to the left nasogenian sulcus, frontal view (a), right profile (b), and left profile (c). Immediate postoperative period of the mid-forehead flap (d). 3 weeks postoperative from mid-forehead flap release and V-Y closure of the lesion near the left nasogenian sulcus, frontal view (e), and left profile (f).



Source: own authorship, 2024.

Figure 10. GGR, 79 years old. Lesion on the nasal tip extending to the columella. A long mid-forehead flap was performed. Immediate postoperative period of the flap (a). 1 week postoperative, frontal view (b), left profile (c), and right profile (d). 2 weeks after pedicle release, frontal view (e), and left profile (f).





Source: own authorship, 2024.

Figure 11. FGNA, 58 years old. Lesion on the nasal dorsum. Preoperative, frontal view (a), right oblique view (b), and left profile (c). Immediate postoperative period after mid-forehead flap construction (d). Immediate postoperative period after flap release, frontal view (e). 2 months postoperative, frontal view (f), right profile (g), and left oblique view (h).



Source: own authorship, 2024.

IV. Discussion

Nasal reconstruction should restore, as much as possible, the characteristics of the reconstructed nasal units. These measures determine the use of various techniques to achieve this goal, including the use of combined flaps, cartilage grafting from the ribs, ears, and nasal septum, or bone grafts.

At the time of resection, the lesion margin should be considered and checked to be disease-free, so the reconstruction approach can be definitive. A tertiary time should be considered to obtain more refined aesthetic results and allow for complementary surgery to improve the aesthetic outcome.

The nasolabial flap performed exclusively or in combination with other methods brings encouraging and well-accepted results by patients. Morbidity is low, and scar sequelae can be considered minimal given the achieved results.

Its initial design can be adjusted to the coverage area, being more elongated, wider, or horizontal as needed.

The use of anesthetic block with local vasoconstrictors combined with general anesthesia brought more tranquility in flap execution and reconstruction. However, the use of only local anesthesia can be considered for smaller lesions or those that do not require complements and in flap autonomization.

In our evaluation, whenever local anesthesia is used, the risk of immediate postoperative bleeding should be observed. In our service, we use a solution of 20 ml of 2% xylocaine, 1 mg of adrenaline, 10 ml of 8.4% sodium bicarbonate, and 100 ml of 0.9% saline. This solution proved advantageous in cases performed solely under local anesthesia.

The lack of infiltration of the flap with any solution significantly increased local bleeding, making execution difficult.

It is an easily performed technique, reproducible, and the results are very encouraging, allowing it to be adopted in nasal reconstruction.

V. Conclusion

The color and texture of the frontal region are closest to the nasal region, contributing to the uniformity of nasal aesthetics and the possibility of extending the flap to reach the nasal tip and columella, bringing functionality to the organ.

The mid-forehead flap proved effective and technically reproducible in covering lesions involving the nasal region with more than one aesthetic unit and also in the medial eyelid region. It did not present complications requiring surgical re-intervention.

The demand for the mid-forehead flap in our service was the lesion's topography, mostly in the nasal dorsum and tip, due to its versatility.

The presented results encourage us to use this technique due to its low morbidity and good patient acceptance.

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