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Reconstruction of nasal defects after tumor excision through Mohs micrographic surgery

Reconstrução dos defeitos nasais após exérese de tumores pela cirurgia micrográfica de Mohs

ABSTRACT

Introduction: The reconstruction of surgical defects resulting from the excision of tumors in the nose is a challenge for dermatologic surgeons due to its rigid structure and low mobility. The Mohs Micrographic Surgery technique allows the preservation of healthy tissue and leads to a smaller surgical wound.

Objective: To demonstrate techniques for surgical correction of defects after removal of tumors of the nose through Mohs Micrographic Surgery, according to the anatomical location of the tumor.

Methods: Descriptive study of patients operated on using Mohs Micrographic Surgery during the period 1996–2010. Patient images taken pre-, intra-, and post-operatively were analyzed with the aim of classifying the defect's anatomic location and the type of surgical reconstruction adopted.

Results: 170 patients (totaling 203 lesions) were included in the study. The most common locations for tumors were (in descending order): nasal ala, dorsum, tip, and lateral wall. The advancement flap was the most common reconstruction type for lesions located in the lateral wall and in the nasal ala. Grafts were most often used in lesions located in the tip of the nose. Grafts and advancement flaps were more frequently used in the dorsum of the nose.

Conclusions: The parameters that provide guidance on choosing the best reconstruction method must take into consideration the size and location of the surgical defect.

Keywords: Mohs surgery; carcinoma, basal cell; carcinoma, squamous cell.

RESUMO

Introdução: A reconstrução dos defeitos cirúrgicos gerados pela excisão de tumores no nariz, por sua estrutura rígida e de pouca mobilidade, é um desafio para os cirurgiões dermatológicos. A técnica de cirurgia micrográfica de Mohs (CMM) permite poupar tecido saudável, produzindo ferida cirúrgica menor.

Objetivo: Demonstrar as técnicas de correção dos defeitos cirúrgicos após remoção de tumores do nariz pela CMM, de acordo com a localização anatômica do tumor.

Métodos: Estudo descritivo com pacientes operados pela CMM no período 1996 a 2010. Foram analisadas imagens pré, intra e pós-operatórias dos pacientes com o intuito de classificar a localização anatômica do defeito cirúrgico e o tipo de reconstrução adotada. **Resultados:** Foram incluídos no estudo 170 pacientes, totalizando 203 lesões. A localização mais comum dos tumores foi (em ordem decrescente): asa nasal, dorso, ponta e parede lateral. Nas lesões localizadas na parede lateral e asa nasal o tipo de reconstrução mais utilizado foi o retalho de avanço. Nas lesões localizadas na ponta nasal, o enxerto; no dorso, o enxerto e o retalho de avanço.

Conclusões: Os parâmetros que nos orientam na escolha do melhor método de reconstrução devem levar em consideração o tamanho e a localização do defeito cirúrgico.

Palavras-chave: cirurgia de Mohs; carcinoma basocelular; carcinoma de células escamosas.

INTRODUCTION

Skin tumors are the most common neoplasm in humans. The estimated incidence of non-melanoma skin cancer in Brazil for 2013 is 134,000 new cases—62,680 in men and 71,490 in women. These values correspond to the estimated risk of 65 to 71 new cases per 100,000 men and women, respectively.¹

Basal cell carcinoma (BCC) is the most common type and accounts for approximately 75% of these lesions, followed by the squamous cell carcinoma (SCC) with an incidence of 15% and, more rarely, by melanoma, which in Brazil corresponds to 4% of cutaneous malignancies.^{2,3} The most common site of occurrence is on the face, with 70% located on the nose and forehead.

The Mohs micrographic surgery technique (MMS) is used to perform the mapping of 100% of the margins, allowing the complete removal of the lesion, which translates into high cure rates. The five-year recurrence rate of primary and recurrent BCC treated with conventional surgery is 10% and 17%, respectively. In tumors treated with MMS that rate decreases to 1% and 6%.⁴ The MMS technique also spares normal tissue, which results in smaller surgical wounds.⁵

The complex contours of the nose reflect the different structures by which it is formed, as well as the different features of the skin that covers it. While the skin is thick and sebaceous in the nasal tip and wings, it is thin in the dorsum and lateral regions. In addition, the skin has greater mobility in the upper two-thirds of the nose. The combination of these factors leads to the creation of aesthetic subunits of the nose (dorsum, tip, lateral wall, nasal ala, and columella) (Figure 1).⁶ The reconstruction of surgical defects generated by the excision of tumors on the nose is a challenge for dermatologic surgeons, due to its rigid structure and limited mobility.

In the reconstruction of nasal defects, the fulfillment of some basic principles is essential for a good aesthetic result. Initially, it is necessary to determine the surgical wound's characteristics (topography, length, and depth). When possible, the limited availability of tissue at the site should be offset by the best available equivalent, which in the nose region is the skin adjacent to the wound. Another principle that must be followed is to respect the aesthetic units, aiming at locating scars in the natural folds and furrows of the nose.⁷ In cases where the tumor affects more than 50% of an aesthetic unit, some authors recommend the complete excision of the subunit, closing the wound with an advancement flap or graft to minimize tissue contrasts.^{8,9}

Many techniques can be used in the closure of surgical defects that result from the excision of tumors on the nose, among them are the side-to-side closure, the advancement flap, the transposition flap, the bilobed flap, grafts or a combination of techniques.

The objective of the present study is to demonstrate the available techniques for correcting surgical defects on the nose, according to the anatomical location of the tumor, in patients who underwent CMM at the Dermatology Service of the Hospital do Servidor Público Municipal de São Paulo (HSPM), (SP) Brazil, between 1996–2010.

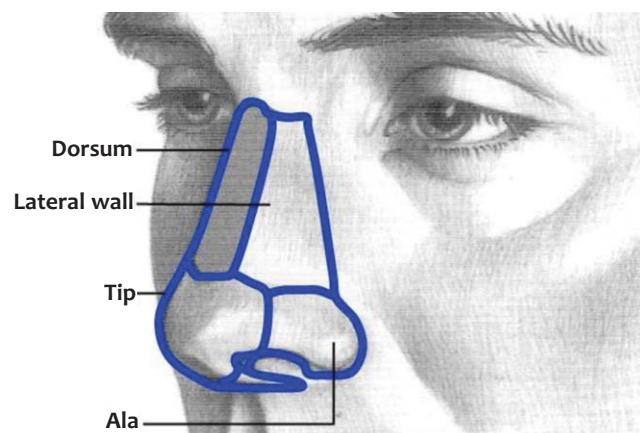


FIGURE 1: Aesthetic subunits of the nose

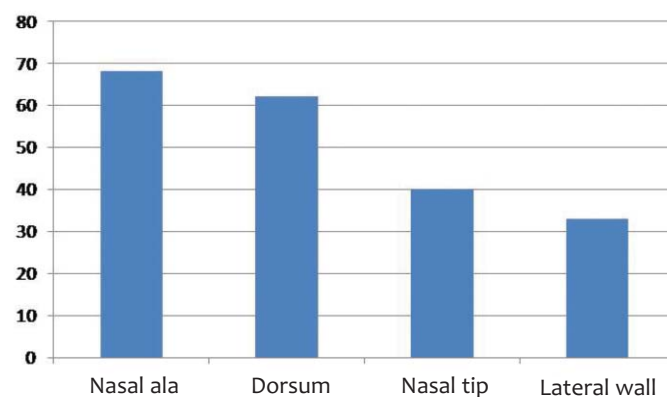
METHODOLOGY

A descriptive study of patients who underwent CMM at the Dermatology Service of the HSPM during the years 1996–2010 was carried out. Medical records and pre-, intra-, and post-operative photographs of patients who underwent exeresis of tumors in the nasal region were analyzed in order to correlate the surgical defect's anatomical location and the type of reconstruction to be adopted. The study excluded patients whose lesions extended into more than one nasal sub-unit or the limits of the nose, as well as those who did not have a complete photographic record.

RESULTS

Two hundred and thirty-six (236) patients were operated on, with 279 tumors removed from the nasal region through CMM during the 1996–2010 period. Of these patients, 170 were included in the study (109 women and 61 men, with a total of 203 lesions). The patients' ages ranged from 19–93 years (mean = 65 years).

Treated neoplasms corresponded to 190 BCCs and 13 SCCs. The following distributions were verified, according to the anatomical location: 68 lesions in the nasal alae, 62 in the nasal dorsum, 40 on the nasal tip, and 33 in the lateral wall of the nose (Graph 1).



GRAPH 1: Distribution of tumors by nasal sub-units

The following techniques were used for reconstruction of defects in the nasal dorsum: 18 grafts, 17 advancement flaps, 13 direct sutures, 7 bilobed flaps, and 5 transposition flaps. Combined techniques (direct suture and graft or advancement flap and graft) were performed in 2 patients.

In lesions on the nasal tip, 16 cases were closed with grafts, 9 with bilobed flaps, 8 with advancement flaps, 6 with direct sutures, and 1 with transposition flap.

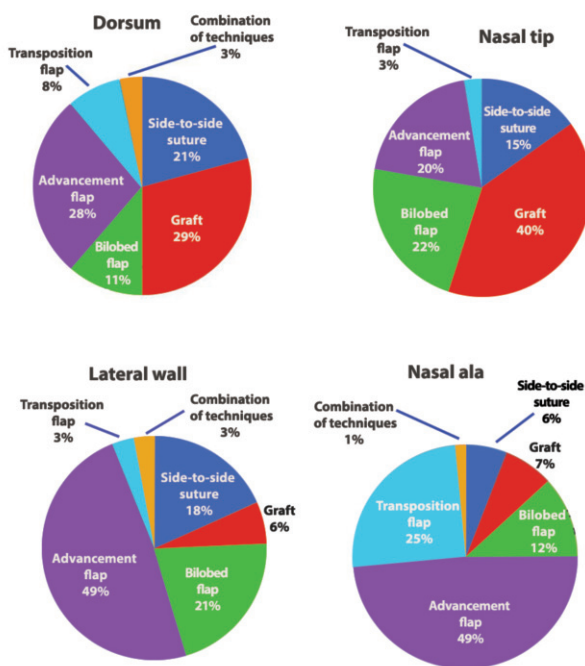
For lesions located in the lateral wall, the advancement flap was used more often (16 cases), followed by the bilobed flap (7 cases), direct suture (six cases), graft (2 cases), transposition flap (1 case) and a combination of advancement and transposition flap (1 case).

Finally, of the 68 surgical defects located in the nasal ala, 33 were reconstructed with advancement flaps, 17 with transposition flaps, 8 with bilobed flaps, 5 with grafts, 4 with direct sutures, and 1 with the combination of transposition flap and graft.

The distribution of the surgical techniques used for closure of the lesions according to the anatomical location of the surgical defect is depicted in the pie charts of Graph 2.

DISCUSSION

The closure of nasal defects is often difficult when it comes to achieving good functional and aesthetic outcomes. The patient's age, and size and location of the surgical defect are the parameters that guide the choice of the best reconstruction method.



GRAPH 2: Distribution of types of reconstruction according to the aesthetic subunit.

MMS is considered the most reliable method to approach skin cancer for it allows the histologic control of the margins of excised tumors, resulting in cure rates that exceed those of other therapeutic modalities, in addition to providing the maximum conservation of healthy tissue.⁴ Nevertheless, there are several challenges regarding the reconstruction of the nose in day-to-day practice.

In the present study, it was possible to observe that the topographical location of the most common tumors of the nose was the nasal ala (33% of cases), followed by the dorsum (30%). This data is consistent with the literature, which states that most tumors of the nose are located in the distal two thirds.^{8,9} Brata *et al.* studied 1,131 patients who underwent MMS and verified that the most common sites of neoplastic involvement were the nasal alae and dorsum.¹⁰

In the nasal dorsum, grafts (29% of cases) and advancement flaps (28%) were the most frequently used techniques for correcting surgical defects (Figures 2 and 3). Since the skin of the dorsum of the nose is thin and very mobile, flaps in this region should always be considered, unless there is fibrosis linked to prior surgeries that may preclude its mobility.¹¹ In such cases—or in large surgical wounds—grafts become the best option due

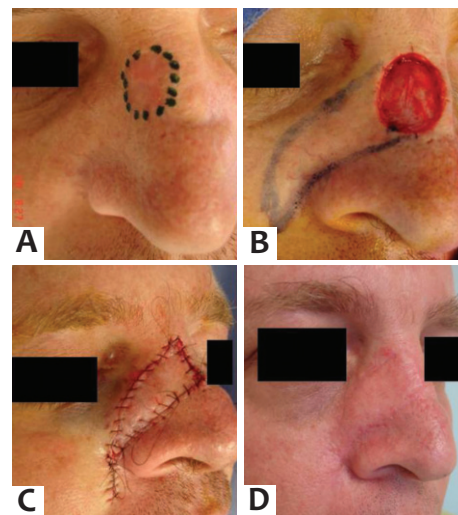


FIGURE 2: Advancement flap used in the closure of the surgical wound in the nasal dorsum (A, B, C, and D).

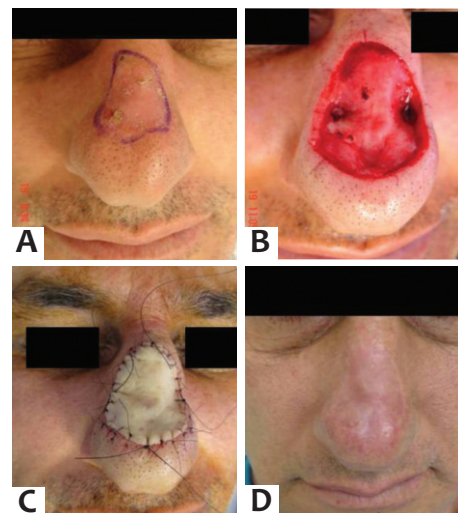


FIGURE 3: Large dimensional surgical defect in the nasal dorsum and use of graft with excellent final result (A, B, C, and D).

to being thinner, and the number of sebaceous glands in that region.^{8,12}

In addition to these two types of reconstruction, the side-to-side closure (21% of cases) was widely used in defects in the nasal dorsum of the present study's patients. A fundamental principle governing reconstructive surgery is that the simplest route must be always chosen, meaning primary closure is the best option whenever it can be attained (Figure 4).¹³ Nonetheless, the relative number of such procedures was lower than that for flaps and grafts, evidencing the number of moderate to large surgical defects present in the study's sample.

For lesions located in the nasal alae, the greatest challenge is to maintain the natural curvature of the nose without flattening it, keeping the respiratory function and intact balance with the opposite side.¹⁴ Of such defects, 49% were reconstructed with alar advancement flaps, 25% with nasogenian transposition flaps, and 12% with bilobed flaps. This data is consistent with the literature. Half of the study's patients bearing lesions in that subunit (nasal alae) had relatively small lesions located below the nasal sulcus, allowing for the performing of alar flaps. Bilobed flaps are often used for the reconstruction of the dorsum and of

the inferolateral third of the nose.¹⁵ Nasogenian flaps are widely used for repairs in the nasal tip and alae due to their good blood supply and the availability of redundant skin, offering good conditions for reconstruction.¹⁶ The transposition flap is a good option for lesions located close to the nasal alae's free margins because it does not raise the nostril and provides for the rebuilding of the nasal ala (Figure 5).¹⁷

Twenty-four of the 33 lesions (72%) which affected the side wall of the nose were closed with flaps—of which the most used was the advancement flap, corresponding to 49% of cases (Figure 6). The literature quotes advancement flaps from the jugal region to repair defects in the nasal lateral wall and dorsum due to their high mobility capacity.¹⁸

Regarding the tip of the nose, the techniques used more often in these cases were: grafts (40% of cases), bilobed flaps (22%), advancement flaps (20%), and direct suture (15%). It is important to note that for smaller lesions bilobed and advancement flaps were the most successful, resulting in excellent final results (Figure 7). In fact, some authors consider bilobed flaps, as well as the primary closure, very efficient for small defects of the

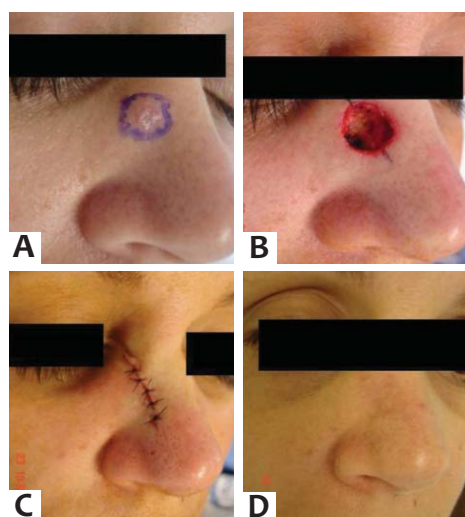


FIGURE 4:
Closing with side-to-side suture (A, B, C, and D).

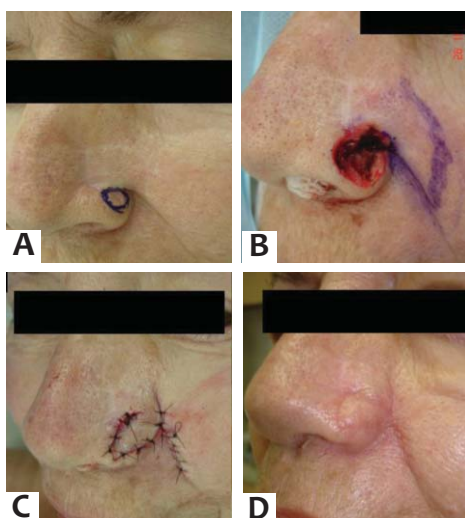


FIGURE 5:
Transposition flap used for reconstructing the defect in the nasal wing with maintenance of the anatomical contours (A, B, C, and D).

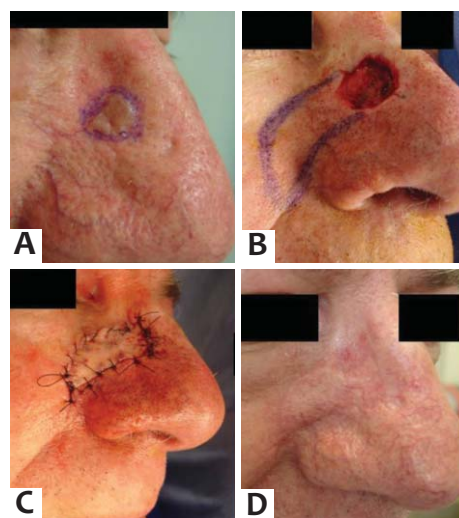


FIGURE 6: Use of advancement flap in the closure of a defect in the lateral wall (A, B, C, and D).

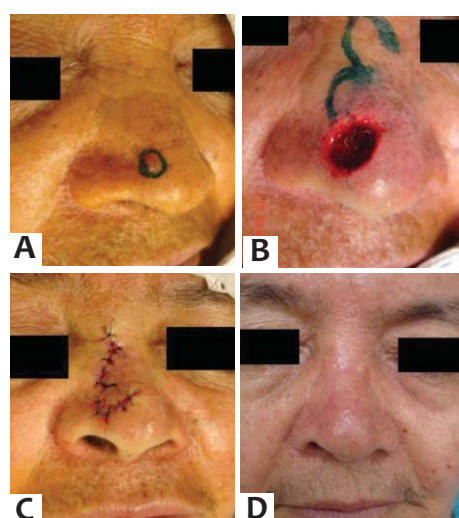


FIGURE 7: Defect surgery on the nasal tip and reconstruction with bilobed flap (A, B, C, and D).

nasal tip.¹⁹ For larger lesions, grafts have proven a good option as there was no deviation of the nose. Another possibility reported in the literature for the reconstruction of large defects in the nasal tip includes the frontal flap, however this technique was not included in the present study due to the exclusion of cases in which the wound exceeds more than one nasal sub-unit, or the limits of the nose. Furthermore, this reconstruction type requires a second surgical visit for the resection of the pedicle.

In the present study, it was observed that most of the grafts was performed in the early years of the analyzed period and that, as more experience and surgical skill were accumulated by surgeons of the dermatologic service, flaps were included in the preferred techniques for reconstructing large defects in the nose. According to the literature, this concept of restorative surgery—which prioritizes flaps over grafts whenever possible—developed in other dermatologic services worldwide due to the fact that the use of skin from the same aesthetic unit provides perfect texture and color.^{8,20}

The dermatologic surgeon must bear in mind the principle that when choosing the most appropriate method, the reconstruction must be as simple as possible and based on their technical capacity, and should also take into consideration the characteristics of each patient. ●

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