

# Outpatient Nonmelanoma Skin Cancer Excision and Reconstruction: A Clinical, Economical, and Patient Perception Analysis

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**Background:** Nonmelanoma skin cancers constitute more than 15% of all types of cancer. To obtain the best cosmetic outcome, local flaps represent the ideal surgical choice.

**Methods:** We conducted a retrospective review of patients treated from 2016 to 2019. The day-surgery group included 73 patients, and the outpatient group included 70 patients. We analyzed medical records regarding age of diagnosis, waiting time, site of lesion, reconstructive technique, histologic diagnosis, radicality of excision, and complications. We administered a survey based on quality items and carried out an economic evaluation.

**Results:** Outpatient removals were radical 92.6% of the time against the 78% of those performed in the operating room ( $P = 0.14$ ). We observed two cases of wound dehiscence and two cases of hematoma in the day-surgery group. Economic analysis showed reduced costs in the outpatient setting.

**Conclusion:** Skin excision and local flap reconstruction are safe procedures in an outpatient setting under a clinical, economical, and patient perception point of view. (*Plast Reconstr Surg Glob Open* 2022;10:e3925; doi: [10.1097/GOX.0000000000003925](https://doi.org/10.1097/GOX.0000000000003925); Published online 24 January 2022.)

## INTRODUCTION

Nonmelanoma skin cancers constitute more than 15% of all types of cancer, and they represent a relevant public health issue: more than 3 million new cases diagnosed per year in the USA and a morbidity of 100 cases out of 100,000 inhabitants in Italy.<sup>1,5</sup>

To face this fast-growing issue, it is mandatory to rapidly spot premalignant lesions that can be treated with a conservative approach, along with high cure rates and very low mortality rates. Approaches are various and depend

on the type of cancer, age, clinical conditions, and many other factors.<sup>2</sup>

Surgical treatment is widely used because it allows for histologic analysis and margin assessment.<sup>2,3</sup> After the surgical intervention, most patients need a plastic reconstruction to minimize skin deformity.

Local cutaneous flaps represent the preferred choice, allowing the creation of tension-free scarring, even in difficult areas such as nasal pyramid and periocular region with a good cosmetic outcome. Patients can be operated on in both the in-office setting and in the operating theater. Outpatient surgery might be performed to allow cost saving, even though some issues may arise: limitation in width of excision, increased rate of complications, few possibilities to monitor patient's parameters if compared with an operating theater. Safety of the whole procedure should be, eventually, the only leading criterion to pursue.<sup>4</sup>

We performed a retrospective study to compare the outpatient and day-surgery management in surgical excision and following flap reconstruction of nonmelanoma skin cancer.

The aim of this study was to define that day-surgery and outpatient management are equally effective with a specific cluster of patients. Our evaluation considered parameters such as safety, radicality of excision, complications, patients' satisfaction, pain control, and costs.

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Received for publication December 5, 2020; accepted September 27, 2021.

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DOI: [10.1097/GOX.0000000000003925](https://doi.org/10.1097/GOX.0000000000003925)

**Disclosure:** The authors have no financial interest to declare in relation to the content of this article.

**MATERIALS AND METHODS**

We conducted a retrospective review of patients treated surgically at Humanitas Research Hospital from January 2016 to May 2019 (Table 1).

The “day-surgery group” (DS group) was obtained from patients’ database of surgical interventions made from January 2016 to December 2017. In this group, preliminary assessment was performed by a plastic surgeon, involving pre-hospitalization laboratory examinations and eventually, hospitalization just before the surgical procedure. Patients were called to come in the early morning, on an empty stomach.

The surgical procedure, performed with local anesthesia along with light sedation, consists of radical excision of the cancerous lesion and immediate reconstruction with the most suitable cutaneous flap. All patients remained in the postrecovery unit for the following 6 hours before being discharged, following anesthesiologists’ protocol. The new protocol was introduced in January 2018 so that the outpatient group (OP group) has been selected from that moment till May 2019 for a total of 70 patients.

The process followed by those patients was a preliminary assessment by a plastic surgeon with a planning of the outpatient excision. We decided to exclude from the outpatient approach patients with a clinical diagnosis of anxiety or that were concerned about the pain related to a procedure without sedation.

Patients were called to come on a scheduled date, underwent the surgical treatment, and were discharged afterward. The surgical procedure consisted in a radical excision of lesion using local anesthesia followed by flap reconstruction. In both groups, we assessed margins based on a clinical evaluation and we considered advancement flaps with Burow’s triangles. We analyzed medical records to extrapolate the following data: age of diagnosis, waiting time (measured as the time span from first plastic surgeon evaluation to the excisional procedure), anatomical site of lesion, reconstructive technique, histologic diagnosis, radicality of excision, and immediate and delayed complications.

Immediate and late complications were distinguished. The former include hemorrhage/hematoma, wound dehiscence, skin necrosis, and surgical site infection, whereas the latter refer to pathological scarring and local recurrence.

We also administered a telephone survey on quality that consisted in assigning a score from 1 to 10 on various items: preoperative explanation of the procedure by surgeon, punctuality, pain, and postoperative

**Takeaways**

**Question:** The article compares skin tumor excision in different clinical settings.

**Findings:** Skin excision and reconstruction are safe procedures in an outpatient setting under a clinical, economical, and patient-perception view.

**Meaning:** We want to let plastic surgeons be aware that skin tumor excision in the outpatient setting should always be considered to make the best surgical choice.

instructions. We opted for a telephone survey because our patients were generally of advanced ages, and we preferred not to make them come back to fill out a paper questionnaire. Follow-up has been fixed at 1 year from surgical operation.

Once these data were extrapolated, a statistical analysis was carried out to compare the two groups and assess whether there were differences in one or more of these parameters.

We finally conducted a detailed economic evaluation about resources required for the clinical path and on the relative costs for the two groups. Such an analysis was based on a sample of 65 patients: 35 were treated on a day-surgery basis and 30 on an outpatient basis. The data were promptly recovered from patients in the company data warehouse, organized and processed by the Management Control.

**RESULTS**

Among the 143 patients included in the study, the average age at the time of diagnosis was 76 in the OP group and 75 in the DS group ( $P = 0.71$ ). Table 2 shows the age distributions of patients divided by decades.

Waiting time was calculated from the day of the first visit to the day of the surgery. In the OP group, average waiting time was 26 days, whereas in the DS group, it was 31 days ( $P = 0.36$ ) (Table 3).

In total, 81.4% of cases had a lesion at the head level; the remaining 18.6% were affected at the body level. In the DS group, 86.3% had a skin lesion at the head level and 13.7% at the body level (Table 4).

Given the high frequency of these tumors at the head, a more detailed distinction of the various sites should be made (Table 5). Different types of cutaneous flaps were adopted, and the predominant ones were the advancement flaps. For this reason, we have simplified the

**Table 1. Inclusion and Exclusion Criteria of Our Study Population**

Inclusion Criteria	Day Surgery and Outpatient
Dimension	–Face < 2.5 cm –Trunk < 5 cm
ASA (American Society of Anaesthesiologists) score	< III
Patient’s psychology	Patient not suffering from anxious disturbance

**Table 2. Patient Age at Diagnosis**

Age of Diagnosis	Outpatient Group (n = 70)	Day-surgery Group (n = 70)
<51	2 (2.8%)	6 (8.3%)
51–60	5 (7.1%)	1 (1.4%)
61–70	9 (12.8%)	11 (15%)
71–80	26 (37.1%)	28 (38.3%)
81–90	28 (40.2%)	22 (30.2%)
>90	0 (0%)	5 (6.8%)

**Table 3. Waiting Time**

Waiting Time	Outpatient Group (n = 70)	Day-surgery Group (n = 73)	P
# days	26.2	30.8	0.36

**Table 4. Lesion Sites**

Lesion Site	Outpatient Group (n = 70)	Day-surgery Group (n = 73)	P
Head	57 (81.4%)	63 (86.3%)	0.42
Trunk	13 (18.6%)	10 (13.7%)	0.47

**Table 5. Lesion Site on the Head**

Lesion Site	Outpatient Group (n = 70)	Day-surgery Group (n = 73)	P
Periorbital	2 (2.8%)	13 (17.8%)	0.021
Nose	24 (34.2%)	21 (28.7%)	0.28
Ear	5 (7.1%)	4 (5.4%)	0.18
Forehead	10 (14.2%)	5 (6.8%)	0.2
Cheek	13 (18.5%)	10 (13.6%)	0.18
Scalp	0 (0%)	8 (10.9%)	0.03
Lips	15 (23.2%)	6 (8.2%)	0.17
Chin	0 (0%)	1 (1.3%)	0.2
Temporal region	0 (0%)	5 (7.3%)	0.018

statistical analysis by identifying three categories: unilateral advancement flap, bilateral advancement flaps, and others. The remaining ones include nasogenic flap, glabellar flap, and bilobed flap (Table 6).

Histological characteristics showed that the most frequent tumors were basal cell carcinomas and squamous cell carcinomas, the frequency of which has been analyzed separately. The other histological types have been paired together (Table 7).

A fundamental aspect was the radicality of skin removal. In OP group removals, we obtained clear margins 92.6% of the time against the 78% of those performed in the operating theatre (P = 0.14).

We did not observe any recurrence in either group at 1 year of follow-up. Complications noted were only wound dehiscence (two cases) and hematoma (two cases) in the control group. However we did not observe any case of surgical site infection, hemorrhage, skin necrosis, or late complications in either group.

The satisfaction questionnaire showed that pre- and postsurgery explanations were considered exhaustive in both groups (average score: 10). Slightly lower scores were

**Table 6. Reconstructive Technique**

Reconstructive Technique	Outpatient Group (N = 70)	Day-surgery Group (N = 73)	P
Unilateral advancement flap	36 (51.4%)	15 (20.6%)	0.012
Bilateral advancement flap	21 (30%)	40 (54.8%)	0.1
Bilobed flap	5 (7.1%)	10 (13.7%)	0.2
Glabellar flap	5 (7.1%)	5 (7%)	0.5
Nasogenic flap	3 (4.4%)	3 (4.7%)	0.5

**Table 7. Histologic Diagnosis**

Histologic Diagnosis	Outpatient Group (N = 70)	Day-surgery Group (N = 73)	P
Basal cell carcinoma	41 (58.5%)	37 (50.7%)	0.45
Squamous cell carcinoma	5 (7.1%)	12 (16.5%)	0.21
Other	24 (34.4%)	24 (32.8%)	0.5

given to the pain experienced during the procedure, to punctuality and overall satisfaction (Table 8). Economic assessment revealed considerable differences between the two pathways: the average cost per patient subjected to hospitalization was € 691, whereas the cost for outpatient treatment was € 50.

## DISCUSSION

Nonmelanocyte skin tumors are a very frequent pathologic condition; in fact, they represent more than 15% of all malignancies and, therefore, constitute a significant public health problem.<sup>1,5</sup> The treatment involves radical removal of the tumor that can be performed both on an outpatient basis and in the operating theater. Considering the high frequency of this pathologic condition (most cases concern with malignant tumors affecting older people), a hospital organization that is able to treat patients quickly and effectively is necessary. The waiting lists are long and always saturated; that is why the hospital's goal should be to streamline the various procedures, whenever possible, while always guaranteeing the highest quality. To achieve this goal, an increasing number of patients should be treated in an outpatient setting, rather than in a day-hospital regimen.

Rohrich et al<sup>6</sup> showed how outpatient surgery offers many advantages, including cost-containment, privacy, and convenience, even though patient safety should be prioritized over these benefits. It should be noted that limited well-designed studies exist in the scientific literature on patient safety in the outpatient setting especially regarding reconstruction with skin flaps, which is generally performed only in the operating theater. To reduce waiting lists in January 2018, we started to perform on outpatient basis also local reconstruction with skin flaps in a selected population following strict inclusion criteria. We therefore conducted a retrospective case-control study to evaluate and compare the outpatient and day-hospital management to highlight differences between the two models. As a comparison group, we extrapolated a sufficient number of patients for the study who had been operated on before the introduction of the protocol in the operating theater,

**Table 8. Satisfaction Questionnaire**

Satisfaction Questionnaire	Outpatient Group (N = 70)	Day-surgery Group (N = 73)	P
Pre- and post-surgery explanation	10	10	0.5
Pain	9	9.8	0.49
Punctuality	8.7	8.4	0.48
Overall satisfaction	9.1	8.7	0.49

excluding the most complex cases and excessively large lesions to avoid any bias and have comparable populations. In the two groups the average age at diagnosis is around 75 years; therefore notwithstanding the age, the outpatient setting has been demonstrated to be equally safe. Our case series confirm that an outpatient-based approach determines a reduction in the waiting times because patients submitted to outpatient surgical removal and reconstruction were treated 5 days before day-hospital procedures. It should be underlined that we presented a pilot experience for outpatient clinic procedures and we observed a delay in the booking procedures for these patients. We are convinced we will observe a further reduction in the waiting times. On the other hand, we did not evaluate the possible benefits of a reduced waiting list for the more severe cases not included in our inclusion criteria, which could have benefitted from the fact that an increased number of patients have been treated on an outpatient basis.

Sites of lesions are almost superimposable in the two groups. Skin tumors mainly affect the photograph-exposed areas, and our study confirms a clear prevalence of interventions in the head region.

Analyzing more specifically the operated areas of the face, we have noticed an important difference in the frequency of the tumors located in the eye area: 2.8% in the outpatient clinic against 20.6% in the operating room. Indeed, we prefer to treat periorbital area in the operating theater in order to more easily prevent complications such as ectropion or entropion.

Furthermore, no patient treated on an outpatient basis presented the lesion in the scalp area. Such an area presents a high tendency to bleed with no extensible skin, and generally requires large flaps to be mobilized for skin gap closure.

Several reconstructive flap options present in the facial district are available. In our clinical trial, the majority of flap reconstructions were realized by means of mono and bilateral advancement flaps with the one-sided advancement flaps more frequently in the outpatient surgery and bilateral in the operating room. Operating times and complexity of procedures lead us to prefer performing bilateral procedures in the operating theater.

The histological diagnosis is similar in the two groups with an important prevalence of basal cell carcinomas that represent more than half of the cutaneous tumors. However, more spinocellular carcinomas are removed in the operating room than in outpatient surgery; such an observation, in our opinion, is merely linked to chance. Clinical efficacy is largely based on the percentage of radical excision. Our data sustain our protocol, since paradoxically, a larger percentage of radical interventions was performed on an outpatient basis. Such an event is due to the fact that the periorbital area, mostly approached in operating theater, is treated less aggressively, leading to a higher rate of nonradical excision. Given the low rates of complications, our clinical study confirms that the outpatient setting is equally effective as the operating theater setting following codified inclusion and exclusion criteria. To our knowledge, this is the only study to evaluate clinical

safety not only of skin excision but also of local flap reconstruction. Our study aimed to confirm the safety of local flap reconstruction after skin cancer removal in selected patients in an outpatient setting, and we consider that the lack of evidence should be addressed to ease such procedures and reduce waiting lists.

Steven et al<sup>10</sup> performed a similar study evaluating skin excision without taking into consideration flap reconstruction that showed good oncologic radicality outcomes for both operating room and procedure clinic, with the latter showing to be by far less expensive.

The authors agree that the outpatient setting offers an opportunity to reduce costs while maintaining high quality of care. Our economic evaluation confirms such an observation, also taking into account flap reconstruction. Indeed, the differences are statistically relevant, since the day-hospital regimen is a real hospitalization and costs include access to the operating theater and the execution of a pre-hospitalization examination. Conversely, outpatient treatment is much more streamlined so that the resources adopted and the costs involved are considerably less. In addition to that, the use of an outpatient regimen allows for clearing precious resources for the hospital in terms of operating sessions and operators' time.

## CONCLUSIONS

Nonmelanocyte skin cancers constitute a major public health problem accounting for more than 15% of all malignancies. In addition to being effective and safe for patients, the treatment of these lesions must also take into account the need for efficient management to minimize waiting times and waiting lists.<sup>8,9</sup> Skin tumors can be removed both in the operating room and in the outpatient clinic even if they need a reconstruction with flaps within certain limits.

A modern clinical approach should analyze not only the clinical effect and safety of procedures but also their economical sustainability. Our analysis stands out as unique about this topic, as it evaluates clinical efficacy of nonmelanocytic skin cancer and local flap reconstruction removal under several aspects.

Economic analysis confirmed reduced costs with a comparable rate of radical excision and complications. In the future, we would like to continue applying this reconstructive technique in the outpatient scenario, maybe with increasing indications and number of patients.

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## REFERENCES

1. Sánchez G, Nova J, Rodríguez-Hernandez AE, et al. Sun protection for preventing basal cell and squamous cell skin cancers. *Cochrane Database Syst Rev.* 2016;7:CD011161.
2. Kim JYS, Kozlow JH, Mittal B, et al. Guidelines of care for the management of basal cell carcinoma. *J Am Acad Dermatol.* 2018;78:540–559.

3. Kim JYS, Kozlow JH, Mittal B, et al. Guidelines of care for the management of cutaneous squamous cell carcinoma. *J Am Acad Dermatol.* 2018;78:560–578.
4. Owens DK, Qaseem A, Chou R, et al.; Clinical Guidelines Committee of the American College of Physicians. High-value, cost-conscious health care: concepts for clinicians to evaluate the benefits, harms, and costs of medical interventions. *Ann Intern Med.* 2011;154:174–180.
5. Wood G, Xu YG, Aylward JL, et al. Nonmelanoma skin cancers: basal cell and squamous cell carcinomas. In: *Abeloff's Clinical Oncology.* 5th ed. Philadelphia, Pa.: Elsevier Inc; 2014:1092-1111.
6. Rohrich RJ, Mendez BM, Afrooz PN. An update on the safety and efficacy of outpatient plastic surgery: a review of 26,032 consecutive cases. *Plast Reconstr Surg.* 2018;141:902–908.
7. Fahradyan A, Howell AC, Wolfswinkel EM, et al. Updates on the management of non-melanoma skin cancer (NMSC). *Healthcare (Basel).* 2017;5:E82.
8. Imadojemu S, Sarwer DB, Percec I, et al. Influence of surgical and minimally invasive facial cosmetic procedures on psychosocial outcomes: a systematic review. *JAMA Dermatol.* 2013;149:1325–1333.
9. Linos E, Chren MM, Stijacic Cenzer I, et al. Skin cancer in U.S. elderly adults: does life expectancy play a role in treatment decisions? *J Am Geriatr Soc.* 2016;64:1610–1615.
10. Ovadia SA, Spector SA, Thaller SR. Comparison of costs and outcomes for in-office and operating room excision of nonmelanoma skin cancer. *Ann Plast Surg.* 2019;83:78-81.