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ARTICLE



The impact of COVID-19 pandemics on dermatologic surgery: real-life data from the Italian Red-Zone

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ABSTRACT

Background: The COVID-19 pandemic is challenging healthcare systems worldwide. Dermatology had to re-prioritize visits, guarantee urgent care, and ensure continuity for chronic patients.

Objectives: To evaluate the COVID-19 impact on dermatologic surgery outpatient management.

Material and methods: In this real-life retrospective observational study, we evaluated both major and minor outpatient surgeries (MaOS and MiOS) performance in 2020, before and during the first month of lockdown declaration, in a primary referral center in Northern Italy. During the lockdown, all lifesaving and cancer surgery, (approximately 80% of our usual activities), were continued. Data from 2020 were compared with the 2019 corresponding periods to assess the real-life impact of COVID-19 in dermatologic surgical activities.

Results: From January 1st to April 3rd, 2020 we performed 769 interventions, compared to 908 over the corresponding 2019 period. After the lockdown, scheduled surgeries were reduced by 14.8%; overall performed ones displayed a reduction of 46.5% (51.6% MaOS, 44.2% MiOS). 52.9% and 12.5% procedures were canceled due to patients' renunciation and due to confirmed/suspected COVID-19, respectively.

Conclusions: While reduced in number, dermatologic surgeries, similarly to other surgical specialties, remained operative to provide oncological and/or life-saving procedures.

Abbreviations: (COVID-19): coronavirus disease 2019; (SARS-CoV-2): severe acute respiratory syndrome coronavirus 2; (SSU): Skin Surgery Unit; (PST): pre-surgery triage; (PPE): personal protective equipment; (SSI): surgical site infection; (MaOS): Major outpatient surgery; (MiOS): Minor outpatient surgery; (UNISDR): United Nations International Strategy for Disaster Reduction

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Introduction

On March 11 2020, the World Health Organization (WHO) declared the Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a global pandemic. The next day, a precautionary closure of all activities, including routine healthcare, was recommended in the entire Italian national territory. Northern Italy had already been declared a Red-Zone a few days before (from March 5th). Nevertheless, the healthcare system was rapidly overwhelmed and was forced to reorganize, reducing non-urgent access and promoting social distancing and telemedicine (1–9). At the same time, treatments to non-COVID-19 emergencies had to be guaranteed, and thus every department had to re-prioritize their interventions.

The eligibility criteria for who needed care were fundamental in the departments with sub-specializations, such as dermatologic surgery, that are characterized by limited, highly trained human resources (8–10). Recently, national eligibility criteria for dermatologic surgery during COVID-19 pandemics were enumerated by the Italian Dermatologic Society (11–13). However, this helpful guidance

did not account for regional and single-hospital characteristics. Real-life data are needed to know the impact of COVID on dermatologic surgery practice. Herein, we report our real-life experience in the management of dermatologic surgery during the first month of the lockdown in the Italian Red-Zone.

Materials and methods

This real-life, single-center, retrospective, observational study involved the Skin Surgery Unit (SSU) of Maggiore della Carità Hospital in Novara, Italy. This is a primary referral center in Piedmont Region, Northwestern of Italy, and has a solid dermatologic surgical tradition with a strong focus on skin cancer (14–16). In 2019, 5,171 skin surgery procedures were performed; 897 (17.4%) were major dermatologic surgery outpatient surgeries (MaOS) and 4,274 (82.6%) were minor outpatient surgery (MiOS) procedures (Table 1).

Data from 2020 were divided before (January 01–March 04 2020) and after (March 05–April 03, 2020) Red-Zone declaration; then they were compared with the corresponding periods in

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2019 to further evaluate the real-life impact of COVID-19. March 5 2020, was the Red-Zone declaration day for our Region, in which all ordinary surgical activity and any medical intervention requiring the use of operating rooms, except for time-dependent, lifesaving, and/or cancer surgery procedures were suspended. We analyzed also the period before the Red-Zone, since COVID-19 were already present in Italy and capable to influence the dermatologic surgical activities through the

increased morbidity/mortality displayed among patients and healthcare providers.

Pre-dermatosurgery triage

We established an algorithm for rationalizing the pre-surgery triage (PST), through which patients were divided into COVID-19 suggestive and non-suggestive; non-suggestive

Table 1. The main criteria for distinguishing between major dermatosurgery outpatient procedures (MaOS) and minor outpatient interventions (MiOS).

	Major outpatient surgery (MaOS)*	Minor outpatient surgery (MiOS)*
Execution time	Equal to or greater than 60 minutes	Less than 60 minutes
Anatomical site of the skin lesion	Head-neck, hands, feet, genitals**	Trunk, upper and lower limbs (excluding hands, feet)
Type of surgical technique	MOHS surgery and its variants Radicalization of melanoma and sentinel node biopsy Complex reconstruction techniques (e.g. grafts, flaps ...)	All the remaining non-complex surgical techniques that do not fall into the category of MaOS (e.g. simple surgical excision, biopsies ...)
Clinical characteristics of the patient	Presence of comorbidities (e.g. severe heart disease, nephropathy, respiratory failure ...) Chronic medical therapy with anticoagulants/antiplatelet agents Patient with cardiac pacemaker or an implantable cardioverter defibrillator	Healthy patient, with no significant comorbidities

*MaOS comprehends at least one of the conditions listed in the first column; MiOS comprehends all the non-complex interventions that do not fall within the criteria referable to MaOS.

**Skin lesions localized in anatomical sites at high risk of intraoperative and postoperative complications.

PRE-OPERATIVE DERMATOSURGERY TRIAGE

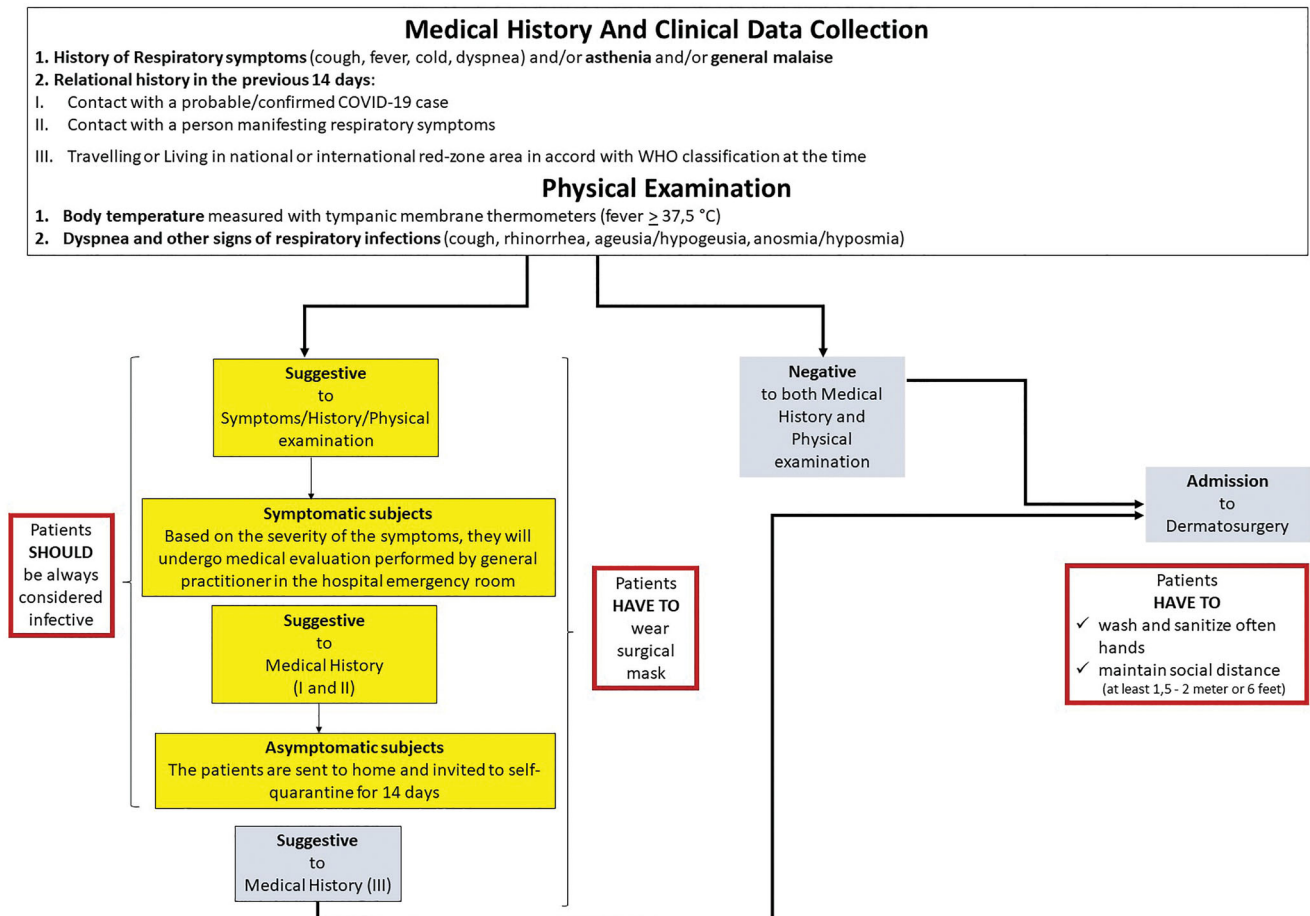


Figure 1. Flow chart of the triage process. The PST was performed two times: (i) the previous day of the scheduled procedure, through remote telephone assessment (medical history and clinical data collection), and (ii) before accessing the SSU, through a triage station at the entrance of the Dermatology Department (medical history and clinical data collection and physical examination). The triage must be performed by properly trained nurses and must be completed before patients reach the waiting room. All nurses involved in this procedure must be protected by PPE (17). All data collected by the triage forms should be recorded in a shared database to perform epidemiological analyses.

and asymptomatic patients were admitted to the SSU (Figure 1) (8,9,18).

Surgical procedure

According to the Crisis Unit declaration, we performed only surgical procedures of oncological relevance, life-saving surgical procedures, and diagnostic biopsies in lesion clinically ambiguous with a lethal disease in the differential diagnosis (i.e. pemphigus). We did not limit surgical procedures that routinely are performed in the SSU: (i) simple surgical excision (e.g. elliptical excision), (ii) complex skin surgery procedures (e.g. MOHS micrographic surgery and its variants), (iii) sentinel lymph node biopsy, or (iv) complex reconstruction techniques (grafts, flaps, etc.). Whenever possible (i.e. in case of small surgical excisions/biopsies), we used dissolvable stitches to avoid post-surgical control (19,20). We preferred primary instead of secondary intention healing, especially in the peri-ocular/oral/nasal areas, to avoid surgical wounds adjacent to the respiratory/ocular tract capable of increasing COVID-19 vulnerability (21). Facial sutures and dressings would compromise use of PPE were, if possible, avoided.

We did not substantially change our use of perioperative antibiotics. The prescription of antibiotics was limited to the treatment of potential infections of the surgical site (SSI) and to the prophylaxis of infective endocarditis or hematogenous prosthetic joint infection in high-risk patients (22). However, we preferred to prescribe tetracyclines since these molecules were thought to possibly exert a beneficial effect on COVID-19 confirmed patients with respiratory mild symptoms quarantined at home (23). For PPE and hygiene principles we referred to the World Health Organization (WHO) recommendations (17,24–26).

Post-surgical procedures

Post-surgical SSU-based wound healing management was limited with three main strategies: (i) incentivization to perform wound management at home using advanced care devices (e.g. silver-impregnated, hydrocolloid dressings) (ii) informative material to perform a correct dressing, (iii) delivery of medical/histological information by mail, after acquiring patient consent (5,27).

Results

The scheduled procedures, the intervention performed, and those suspended during the first month of COVID-19 epidemic period (March 5–April 3, 2020) were compared with the pre-outbreak period (January 1–March 4, 2020) and that of the corresponding periods in 2019 (Tables 2 and 3, and in Figures 2 and 3). In 2020 (January 1–April 3, 2020), SSU had performed globally 769 surgeries (215 MaOS and 554 MiOS). In the corresponding period during 2019, SSU performed globally 924 interventions (280 MaOS and 628 MiOS); thus, during 2020 SSU did not perform 155 (–16.8%) surgeries, in detail 65 (–23.2%) MaOS and 74 (–11.8%) MiOS.

Globally, non-performed procedures increased to 101 (+731.3%, 16 vs 117). MaOS increased to 42 (+940%, 5 vs 47), for MiOS increased to 59 (+636.4%, 11 vs 70). No main differences were present in the scheduled surgeries; in particular, the global decrease was only 38 (4.1%, 924 vs 886) without substantial differences in MaOS vs MiOS.

The overall scheduled interventions did not significantly differ from 2019 (9; +1.5%); the scheduled MaOS decreased (–13; –6.9%) but the scheduled MiOS increased (+22, +5.3%). Performed procedures did not present significant differences and barely changed (+1%, 6) from the 2019 corresponding period, as well as the non-performed surgeries that increased from 10 in 2019 to 13 in 2020 (Table 2).

After the Red-Zone declaration, dermatologic surgical management drastically changed.

Even though the oncological diseases represent about 80% of our surgical activity, during Red-Zone declaration period in 2020 only 61.6% of the scheduled surgical procedures were performed, compared to 98.1% of the same period in 2019. Specifically, scheduled surgeries were 47 (14.8%) less than the corresponding period in 2019, and decreased by 10.3% and 16.7% for MaOS and MiOS (Table 3).

The performed surgeries registered a decrease of 145 (46.5%) procedures, 51.6% and 44.2% for MaOS and MiOS, respectively. Non-performed procedures had an increase of +1633% (6 vs 104); the 60% of these (59/98) were MaOS (Table 2).

Table 2. Summary of the dermatosurgical outpatient activities, distinguished in major outpatient surgery (MaOS) and minor outpatient surgery (MiOS) in 2020, before and after Red-Zone declaration, compared with the corresponding periods in 2019.

	Before Red-Zone declaration in 2020 (January 01–March 04)		Change	During Red-Zone declaration in 2020 (March 05–April 03)		Change
	Corresponding period in 2019 (January 01–March 04)	Corresponding period in 2019 (March 05–April 03)				
Interventions Scheduled (N, %)						
MaOS	175 (28.5)	188 (31.0)	–13 (–6.9)	87 (32.1)	97 (30.5)	–10 (–10.3)
MiOS	440 (71.5)	418 (69.0)	+22 (+5.3)	184 (67.9)	221 (69.5)	–37 (–16.7)
Total	615 (100)	606 (100)	+9 (+1.5)	271 (100)^b	318 (100)^b	–47 (–14.8)
Interventions Performed (N, %)						
MaOS	169 (28.1)	185 (31.0)	–16 (–8.6)	46 (27.5)	95 (30.4)	–49 (–51.6)
MiOS	433 (71.9)	411 (69.0)	+22 (+5.4)	121 (72.5)	217 (69.6)	–96 (–44.2)
Total	602 (100)	596 (100)	+6 (+1.0)	167 (100)^c	312 (100)	–145 (–46.5)
Interventions Not-Performed (N, %)						
MaOS	6 (46.2)	3 (30.0)	+3 (+50.0)	41 (39.4)	2 (33.3)	+39 (+195.0)
MiOS	7 (53.8)	7 (70.0)	0	63 (60.6)	4 (66.7)	+59 (+1475.0)
Total	13 (100)^d	10 (100)^d	+3 (+30.0)	104 (100)^d	6 (100)	+98 (+1633.3)

^aSkin interventions not performed due to patient's personal choice, acute health accident or changes in the indications for surgery (e.g. healing of dermatosis).

^bDuring Red-Zone declaration in 2020 (March 05–April 03), we recorded a reduction in scheduled surgical interventions of 14.8% compared to the same observation period in the year 2019 (271 vs 318, respectively), since our waiting list for both MaOS and MiOS interventions is less than 4 weeks (average: 20 days).

^c2 MaOS accelerated (average time in advance: 7 day); 2 MiOS accelerated (average time in advance: 5 day).

^dSee Figure 3.

Table 3. Detailed summary of the dermatological activities during the RED-ZONE compared with the corresponding period in 2019.

	MaOS Dermatosurgery		MiOS Dermatosurgery	
	During Red-Zone (March 5–April 3, 2020)	Comparable period in 2019 (March 5–April 3, 2019)	During Red-Zone (March 5–April 3, 2020)	Comparable period in 2019 (March 5–April 3, 2019)
Malignant Melanoma <i>N</i> (%)	6 (13.0)	9 (9.5)	7 (5.8)	8 (3.7)
Sentinel lymph node biopsy <i>N</i> (%)	3 (6.5)	4 (4.0)	0	0
NMSCs <i>N</i> (%)	36 (78.3)	78 (82.0)	49 (40.5)	83 (38.3)
	In detail:	In detail:	all simple surgical excision	all simple surgical excision
	19 (52.7) simple surgical excision	39 (50.0) simple surgical excision		
	12 (33.3) MOHS surgery and its variants	23 (29.5) MOHS surgery and its variants		
	5 (13.9) complex reconstruction techniques	16 (20.5) complex reconstruction techniques		
Other skin cancer/ precancerous skin lesions/ dysplastic nevi <i>N</i> (%)	1 (2.2)	4 (4.5)	42 (34.7)	33 (15.2)
	all simple surgical excision	all simple surgical excision	all simple surgical excision	all simple surgical excision
Biopsy of oncological disease <i>N</i> (%)	0	0	13 (10.7)	22 (10.1)
Biopsy of non-oncological disease <i>N</i> (%)	0	0	10 (8.3)	19 (8.7)
Benign skin lesion <i>N</i> (%)	0	0	0	52 (24.0)
Total	46	95	121	217

NMSC: Non melanoma skin cancer.

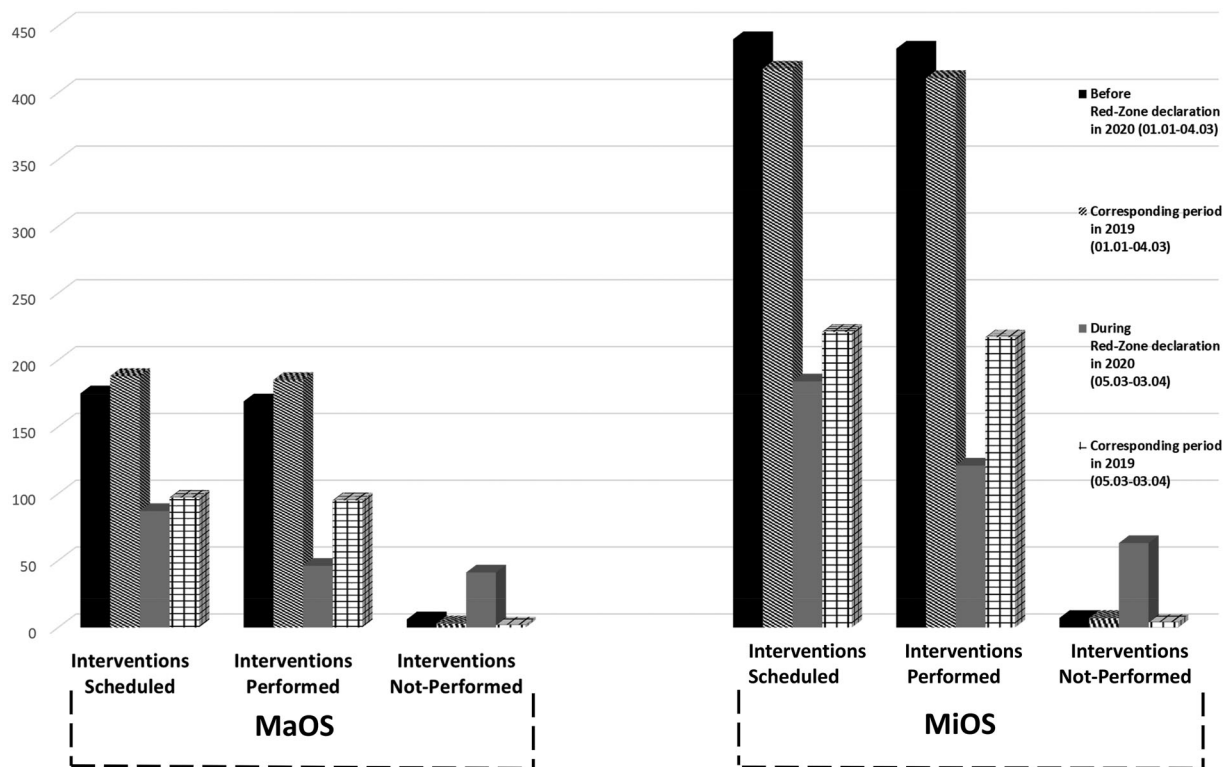


Figure 2. Graphic summary of the dermatological MaOS and MiOS skin surgery (scheduled, performed and not-performed) in 2020, before and after red-zone declaration, compared with the corresponding periods in 2019. Left panel: MaOS; right panel: MiOS.

Among MaOS and MiOS skin surgery, 41 of 87 (47.1%) and 63 of 184 (34.3%) scheduled interventions were not performed, respectively. Of them, the majority (55 of 104, 52.9%) were canceled due to personal renunciation of the patient; otherwise, 13 of 104 (12.5%) not-performed surgical interventions were canceled due to confirmed or suspected COVID-19 (Figure 3). No

melanoma patient renounced the scheduled surgery, and no surgical procedure, (i.e. primary excision, wide excision and/or sentinel lymph node biopsy), required modification or cancellation.

Conversely, the number non-melanoma skin cancer (NMSC) and biopsies of non-lethal diseases dropped (Table 3). The

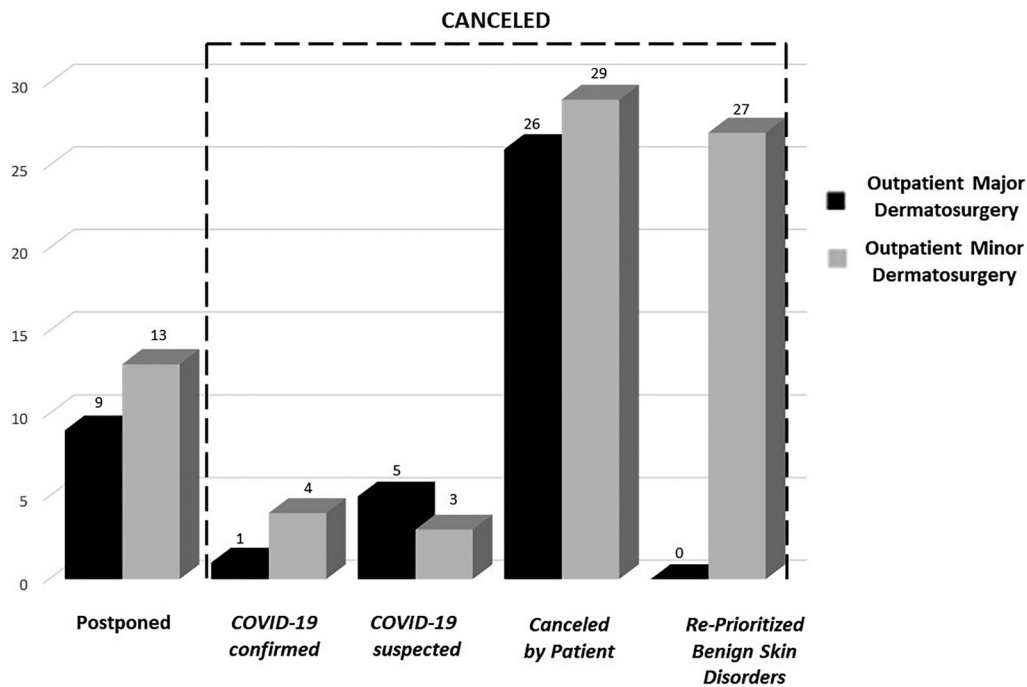


Figure 3. Causes of non-performed dermatological procedures during Red-Zone declaration. (March 5–April 3, 2020). Among MaOS skin surgery, 41 interventions were not performed of which 9 were postponed (*average postponement time: 1 month*); 32 were canceled (1 due to confirmed COVID-19; 5 due to suspected COVID-19; 26 due to personal renunciation of the patient for 'afraid to get in contact with COVID-19'). Among MiOS skin surgery, 63 interventions were not performed of which 13 postponed (*average postponement time: 1 month*); 63 were canceled (4 due to confirmed COVID-19; 3 due to suspected COVID-19; 29 due to personal renunciation of the patient for 'afraid to get in contact with COVID-19'; 27 for benign dermatological diseases).

absolute number of NMSC decreased (161 on 2019 vs 85 in 2020), due to the high rate of renunciation for personal patient choice.

All benign skin lesion excisions, which account for about 24% of our outpatient surgery, have been postponed (Table 3); biopsies for both oncological and non-oncological diseases were permissible but were carried out only in suspicious of severe or potentially lethal pathologies. Short waiting times (on average 3 days) for diagnostic biopsies have been guaranteed also during the COVID-19 outbreak.

Discussion

After the Red-Zone declaration, dermatologic surgical outpatient activity was drastically re-prioritized maintaining only life-saving procedures to preserve both healthcare providers' and patients' safety. However, dermatologic surgery had to adapt its routine because of the disaster (28). The COVID-19 pandemic fits in the United Nations International Strategy for Disaster Reduction (UNISDR) definition of disaster as a 'serious disruption of the functioning of a community or a society involving widespread human, material, economic, or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources' (29,30).

Among the organizational elements to be considered in the management of the COVID-19 health emergency in the field of dermatologic surgery, reestablishing eligibility criteria for skin surgery plays an essential role. So, since surgical rooms are a precious resource and should be preserved, we instituted an *ad-hoc* triage (31,32); at the same time, the dermatologic surgical routine was drastically reevaluated, maintaining only surgeries

performed on aggressive tumors and dermatological diseases capable to rapidly progress (32).

Our SSU postponed all interventions of non-cancer patients or non-dermatological emergencies. Surgical excision with radical intent and diagnostic biopsies of all skin cancers (both malignant melanoma and NMSCs), precancerous skin lesions, potentially lethal dermatological diseases (e.g. autoimmune bullous dermatoses), and skin/sentinel lymph node biopsies for diagnostic or staging purposes were continued. Surgery clinic vacancies were replaced by cancer patients from the waiting list; this strategy optimized the resources and accelerated the priority diagnostic/therapeutic procedures. The surgical scheduling was also re-designed to limit as much as possible the number of patients in the waiting room. Caregivers were tolerated only in the case of patients pediatrics or with cognitive impairments, to promote social distance (33,34).

Based on the new dermatologic surgery use criteria, we expected surgical activity to decrease by about 20%; the actual reduction in surgical activity was greater (46.5%), in part because of patients' preferences, difficulties in reaching the hospital, and other burdens of COVID-19 patients. We did not face an increased fatality in the perioperative period (35). The COVID-19 pandemic was also a practical occasion to demonstrate the utility of the telemedicine approach to dermatologic surgical patients during diagnosis and follow-up (i.e. teaching medications techniques and surgical ulcer analysis), in order to limit infectious possibilities and maintain safe both patients and dermatologists (5,6,36–38).

Even if the COVID-19 pandemic has required an unprecedented global health response, the maintenance of the hospital-based dermatologic surgery contributed to treating dermatological emergencies and offered a diagnostic and therapeutic approach to skin cancers. Since dermatologic surgery is a highly

specialized branch of dermatology that employs highly trained and experienced professionals, it represents a precious resource to preserve during disasters.

Signed patient consent form

Collected.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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