



Has the Use of the Mask Exacerbated Rosacea During the Pandemic?

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ABSTRACT **Introduction:** During the COVID-19 pandemic, personal protective equipment, particularly face masks, became an essential requirement to engage in various activities. Several articles reported an increase of recurrences of dermatologic facial diseases (ie, acne, rosacea) related to mask use.

Objectives: To evaluate the number of recurrences of rosacea related to face mask use.

Methods: This prospective study was conducted on adult patients with a pre-pandemic diagnosis of mild and moderate papulopustular rosacea. All patients had previously achieved either partial or complete remission after a 4-month treatment with topical ivermectin in 2019. We collected data in two different phases characterized by different intensity of mask use during the pandemic and post-pandemic period. We collected data through clinical assessment of the disease, questionnaires on personal habits and standardized skin surface biopsy to study the Demodex mites count.

Results: We enrolled a total of 30 patients. In the pandemic period, 5/30 patients had a relapse of mild papulopustular rosacea; the Demodex sample resulted positive in 4/5 relapsed patients. In the post-pandemic period, 4/30 patients reported a relapse of mild rosacea (3 patients) and moderate papulopustular rosacea (1 patient). At the Demodex exam, 1/4 relapsed patients resulted positive.

Conclusions: We did not find a significant increase in relapses of papulopustular rosacea during the pandemic. An appropriate anti-parasitic treatment may reduce the number of recurrences due to mask use.

Introduction

During the COVID-19 pandemic, personal protective equipment (PPE), particularly face masks, had become an essential requirement to engage in various activities. Since the beginning of the pandemic, several articles reported an increase of inflammatory dermatitis relapses linked to the use of face masks [1-5]. As far as rosacea is concerned, there are no specific studies conducted on patients with this dermatological disease, but several Authors, among whom Damiani et al [6], reported an increase of recurrences.

Objectives

In this study, we aimed to evaluate the number of recurrences of papulopustular rosacea related to face mask use in a group of patients followed for this disease in our Centre.

Methods

This prospective study was conducted at the Dermatology Centre of Ospedale Policlinico San Martino IRCCS in Genoa (Italy) from March 1, 2020 to December 31, 2022. We included adult patients (>18 years old) with a pre-pandemic diagnosis of mild and moderate papulopustular rosacea (PPR); all these patients had been treated with a 4-month period with topical ivermectin in 2019. As a result of this treatment, all patients had achieved either partial or complete remission.

To study the effect of face masks on rosacea, we collected data in two different phases: pandemic period from September to December 2020, during which the use of personal protective equipment in public spaces was enforced by the Italian government and post-pandemic period from September to December 2022, characterized by a more limited use of PPE. Also, during the post-pandemic period, mask use was still necessary to engage in several activities.

In this study, only patients with a reported minimum daily use of the face mask of 6 hours during the pandemic period and of 3 hours in after-pandemic period were included. We aimed to avoid including patients with daily but extremely limited mask use, which could have been a confusing factor. In addition, other studies have adopted similar thresholds [7]. The patients did not receive any treatment during the study, did not use antiparasitic face wash gel and were advised to wear a disposable mask, which had to be changed daily.

The diagnosis of rosacea was made by an experienced dermatologist and based on the following National Rosacea Society (NRS) expert panel criteria [8]: fixed centro-facial erythema in a characteristic pattern that may periodically intensify; papules and pustules (with or without telangiectasias,

flushing and ocular manifestations). For each patient, we evaluated the degree of erythema, telangiectasias, papules and pustules and phyma with validated scales [8-10].

Each patient was asked to fill out a questionnaire during the pandemic and post-pandemic visits covering the following information: oral, nasal and ocular signs and symptoms due to masks, type of mask used and daily hours of usage. The presence of flushing was assessed according to Global Flushing Severity Score (GFSS) [8], erythema was evaluated using Clinician Erythema Assessment (CEA) [9] and the disease severity of papulopustular rosacea was classified by Investigator Global Assessment score (IGA score) [10]. IGA score defines disease severity from 0 to 4: IGA 0 = no inflammatory lesions, no erythema; IGA 1 = very few small papules/pustules, very mild erythema; IGA 2 = few small papules/pustules, mild erythema; IGA 3 = several small or large papules/pustules, moderate erythema; IGA 4 = numerous small or large papules/pustules, severe erythema. Due to the lack of validated scales for telangiectasias and phyma, we adopted a graded clinical scoring from 0 to 3 for the first and a graded classification from 0 to 1 for the second (0 = absent, 1 = present).

In order to study the Demodex mites count, a standardized skin surface biopsy (SSSB) was performed by a trained dermatologist on the target area. SSSB is a sampling method in which 1 cm² of the superficial layer of the stratum corneum and its follicular content is recovered for analysis [11]. Samples obtained by SSSB were examined with an optical microscope at × 10 and × 40 magnifications. Samples with ≥5 Demodex/cm² (D/cm²) were considered positive (D+). After treatment in 2019, all patients resulted negative to Demodex sample. Descriptive statistical analyses were performed, and data was shown as median (range), mean (SD), or number (percentage). Relapse rates and the number of relapse times were evaluated for patients divided by IGA score and analyzed using the Kaplan-Meier method and log-rank test. Patients who relapsed were considered censored in the analysis. For categorical variables, data was analyzed using the χ^2 test and Fisher exact test.

The study was approved by the local Ethical Review Board (Comitato Etico Regione Liguria. N. Registro CER Liguria: 156/2022)

Results

A total of 30 patients (26 females, 4 males) were enrolled in this study, with an average age of 59.0-years old. The mean results are reported in Table 1. Analyzing the data collected through the questionnaire, 8/30 rosacea patients reported a subjective association between mask wearing and flares of rosacea. Patients reported of having worn a FFP2 mask for an average time of 9 h/day during the pandemic and for

Table 1. Clinical featuring of patients.

Rosacea	Pre-pandemic	Pandemic	Post-pandemic
	2019 (30 patients)	September 2020- December 2020 (30 patients)	September 2020- December 2020 (30 patients)
Erythema	19	25	24
CEA 4	0	1	2
CEA 3	1	4	1
CEA 2	4	5	4
CEA 1	14	15	11
CEA 0	11	5	6
Teleangiectasias	18	20	22
Grade 3	1	1	0
Grade 2	5	1	3
Grade 1	12	18	19
Grade 0	12	10	8
Flushing	10	14	12
GFSS 10	0	0	0
GFSS 7-9	0	0	0
GFSS 4-6	3	3	2
GFSS 1-3	7	11	10
GFSS 0	20	16	18
Phyma	3	3	3
Grade 1	3	3	3
Grade 0	27	27	27
Papulopustules	0	5	3
IGA 3	0	0	1
IGA 2	0	5	2
IGA 0-1	30	25	27
Demodex positive	0	5	2

CEA = Clinician Erythema Assessment; GFSS = Global Flushing Severity Score; IGA score = Investigator Global Assessment score.

an average time of 4.6 h/day in the post-pandemic period. Signs and symptoms caused by mask-wearing are reported in Table 2.

In the pandemic period out of the 30 patients, 25 had erythema, 20 had telangiectasias, 14 had flushing and 3 had phyma. The average results of the disease assessment are reported in Table 1. Five of the 30 patients had a relapse of IGA 2 papulopustular rosacea; they wore a FFP2 mask for an average time of 7h/day during the pandemic. The Demodex sample resulted positive in 4/5 relapsed patients and in 1/25 stable patients.

In the post-pandemic period, 24 patients had erythema, 22 telangiectasias, 12 flushing and 3 phyma. The average of the results of the disease assessment are reported in Table 1. Four/30 patients who wore a FFP2 mask for an average time of 4h/day reported a relapse of IGA 2 (3 patients) and IGA 3 PPR (1 patient). At the SSSB, 1/4 relapsed patients and 1/26 stable patients resulted positive.

Table 2. Eye, nose and mouth symptoms.

Additional signs and symptoms	The pandemic Total = 30
	N patients, (%)
Eye	16 (53.3)
Burning	11 (36.7)
Tearing	11 (36.7)
Itching	5 (16.7)
Foreign body sensation	4 (13.3)
Redness	2 (6.7)
Nose	9 (30)
Secretions	5 (16.7)
Itching	2 (6.7)
Burning	1 (3.3)
Mouth	4 (13.3)
Burning	2 (6.7)
Itching	1 (3.3)

All the patients were either retired or indoor workers, so they received minimal sun exposure during work. All the patients were non-smokers, and occasional alcohol drinkers (less than 3 times a week). None of the patients significantly changed their habits during the study.

Conclusions

This is the first study which compares the clinical course of rosacea before, during and after the pandemic. The other studies reported in the literature on this topic are inhomogeneous and difficult to compare. For example, Consasu et al (5) conducted a study exclusively on medical staff who wore masks during the Covid-19 pandemic, reporting a 39.1% increase in the risk of rosacea [5]. Damiani et al examined patients before and after the pandemic, reporting an increase of rosacea flares [6]. Singh et al reported an increase in rosacea-like lesions due to a change in skin environment [2]. In contrast with the literature data, we did not find a significant increase in relapses of PPR during the pandemic. Only 5/30 patients had a relapse with IGA2 PPR, and none of them linked the relapse to prolonged mask use. It may be possible that the observed relapses were simply due to the normal course of the disease, which is typically characterized by phases of exacerbation and remission [12]. However, we hypothesize that an appropriate treatment of the inflammatory stage of PPR and the control of Demodex folliculorum proliferation before the pandemic, reduced the number of recurrences. Topical ivermectin is considered an effective and well-tolerated drug which is used not only in moderate to severe PPR but also in almost clear/mild rosacea with a low number of clinical relapses over the time [13]. In our patients, topical ivermectin not only achieved complete resolution of the inflammatory phase of rosacea in 66.67% of patients and partial resolution in 33.33% before the onset of the pandemic, but we assume it also reduced recurrences during the period of mask use. In addition, controlling the initial hyperproliferation of Demodex folliculorum with topical treatment at the time of diagnosis of PPR, may have led to persistence of withdrawal negativity during the COVID-19 period in 83.33% of patients.

Four out of 5 patients who relapsed during the pandemic tested positive for Demodex folliculorum, versus 1/25 non-relapsed patients. Face masks are known to create an occlusive microenvironment with an increase of temperature and moisture: factors that can promote microbiome dysbiosis [14]. It can be assumed that mask use may promote the proliferation of Demodex folliculorum, which has a pathogenic role in rosacea, thus leading to an exacerbation of the disease [15]. However, the number of relapses in patients was so low in our group of patients that it would be impossible to

demonstrate an etiopathological association between relapse of rosacea and Demodex proliferation.

Regarding the typical signs and symptoms of rosacea, such as erythema, telangiectasias, and phyma, we did not observe a significant worsening. On the contrary, we found only a slight increase in the frequency of flushing, which was reportedly related to mask use, with resolution within a few hours in the evening.

Regarding other symptoms reported since the beginning of the pandemic, ocular alterations were the most frequent (16/30), followed by nasal (9/30) and oral (4/30) symptoms. Ocular symptoms are a relatively common manifestation of rosacea, which have also been associated with Demodex proliferation [16]. In these already susceptible patients, the use of face masks may have promoted a microbiome dysbiosis, with a probable increase of proliferation of Demodex mites in the eyes [17]. However, further research is needed to investigate this hypothesis.

To monitor our patients over time, we performed an additional follow-up visit after discontinuation of the mask requirement; we did not observe significant differences in relapses from previous periods. All patients who relapsed during and post COVID-19 were treated with antibiotics and topical ivermectin with the result of complete clinical remission and of SSSB negative for Demodex after 3 months of therapy.

In conclusion, we reported cases of good control of mild-to-moderate rosacea during COVID-19 due to appropriate anti-parasitic and anti-inflammatory treatment, which allowed control of proliferation by Demodex folliculorum before intensive mask use. The use of topical anti-parasitic and systemic antibiotics ensures control of the inflammation and restitution ad integrum. It would be interesting in the future to compare the results presented in this study with new data collected after the end of mask use to assess the effective role of the mask on the proliferation of Demodex folliculorum.

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