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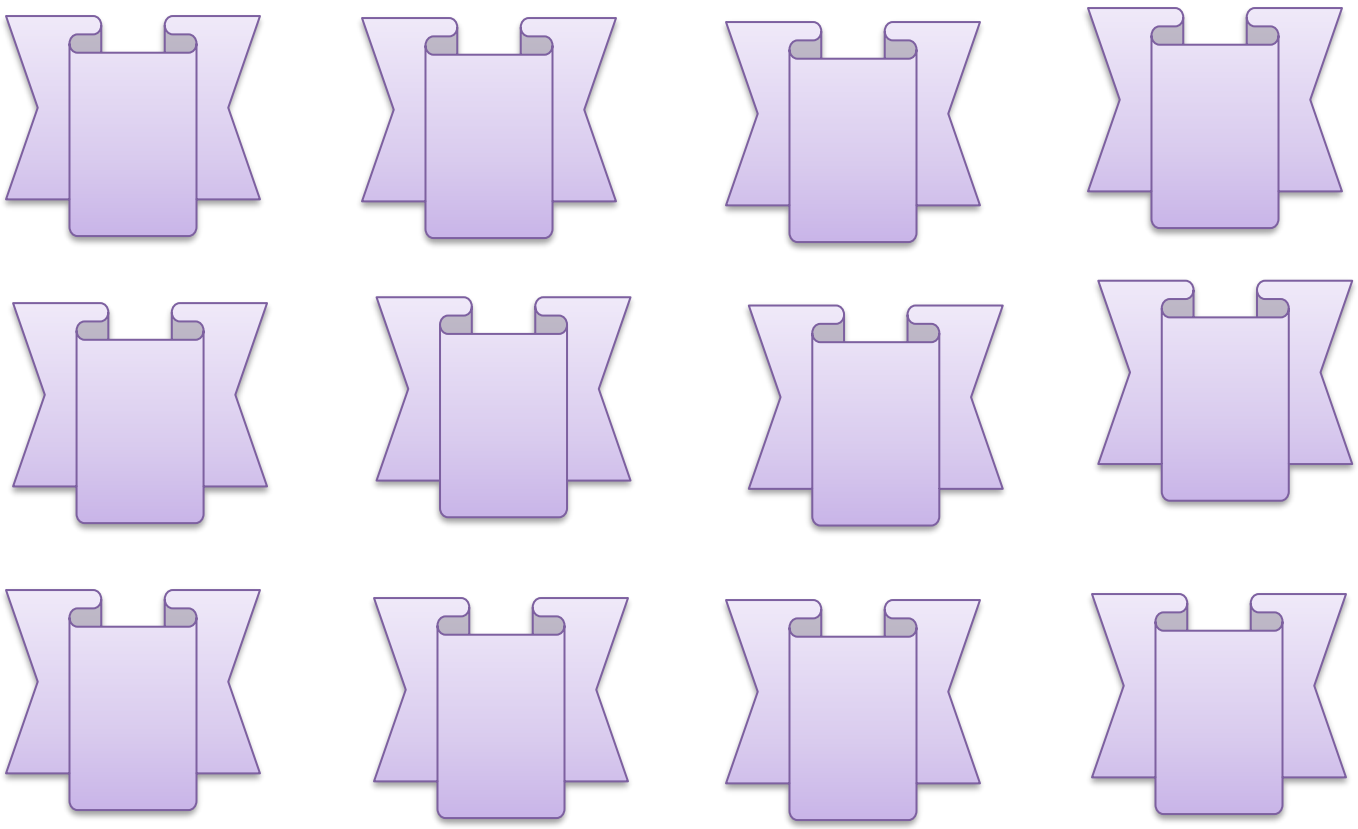

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Original Article

Incidence of Post COVID-19 Rhinosinusitis Among Otorhinolaryngology Patients in New Damietta

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ABSTRACT

Background: Chronic rhinosinusitis [CRS] is a common condition encountered in otorhinolaryngological practice. It shares pathophysiological mechanisms with the severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]. However, the incidence of CRS after COVID-19 and the association between the two conditions is not well investigated.

The Aim of the work: The current work aimed to assess the incidence of post-COVID-19 rhinosinusitis.

Patients and Methods: Adult patients [18 years or older] attending our otorhinolaryngological department during a 6-months duration, with a newly confirmed CRS were included. All were evaluated on the clinical, laboratory and radiological basis. Those who had COVID-19 infection prior to the development of CRS were recognized. Their demographic and clinical characteristics were collected in a trial to plot a pattern of CRS after COVID-19. The duration between COVID-19 injury and development of CRS was measured and documented.

Results: The incidence of CRS after COVID-19 was 34.0%. Their age ranged 18 and 60 years, the mean ± SD was [38.4±9.89 years], with slight increase of the disease among male patients [58.5%]. Smoking was reported among 25 patients [47.2%] and all of them were males. All patients had nasal discharge and nasal obstruction, facial pain and headache. All patients with post-COVID-19 CRS had an abnormality of smell. Hyposmia was the commonest [reported for 67.9%] followed by anosmia [32.1%]. The bilateral infection was reported among 84.9%. The mean duration rhinosinusitis developed after COVID-19 infection ranged between 34 and 60 days and the mean value was 43.17 ± 7.23 days.

Conclusion: The incidence of post-COVID-19 chronic rhinosinusitis was 34.0%. The nasal discharge, nasal obstruction, headache and hyposmia were the commonest clinical manifestations. Thus, a high suspicion of CRS should be kept in mind in patients with recent COVID-19.

Keywords: Rhinosinusitis; SARS-CoV-2; Anosmia; Facial Pain; Nasal Discharge; Headache.

INTRODUCTION

The district of Wuhan, China was the site where a global pandemic of coronavirus disease 2019 [COVID-19] began in December 2019. It is due infection by the severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]. It invades the angiotensin converting enzyme II [ACE2] receptor through binding to the spike proteins. Then the viruses were primed and fused with the cell membranes by host transmembrane serine protease 2 [TMPRSS2] [1].

The viral infectivity is affected by host immune status in addition to expression and affinity of the virus to entry factors. Thus, patients with bronchial asthma, rhinitis, chronic obstructive pulmonary disease [COPD], and immunosuppression have been potentially associated with the severe COVID-19 susceptibility [2]. Thus, the SARS-CoV-2 is mainly associated with the lower airway diseases. However, the upper airway is not immune. The nasal swabs had more viral load than the throat swabs in patients with or without COVID-19 symptoms. In addition, the viral entry-associated genes [e.g., ACE2] were abundant in the nasal than lower respiratory tract epithelial cells [3]. In addition, there is a gradient expression of ACE2 and SARS-CoV-2 from the nasal to distal pulmonary epithelium, confirming the affinity of SARS-CoV-2 to respiratory epithelium with inhalation as the route of infection [4].

Chronic rhinosinusitis [CRS] is a common inflammation of the upper airways. It is associated with a global burden on the levels of the society and financial domains. Its prevalence ranged between 10 and 28% on the basis of self-reported manifestations. This was dropped to 4- 9 % on the basis of endoscopy and imaging studies [5]. CRS could be associated with different abnormalities [e.g., dysfunction of the epithelial barrier, colonization of different bacteria, and exaggerated or impaired immune response]. Thus, CRS may be associated with higher susceptibility to COVID-19 infection or may increase the severity of the disease. However, the results of previous preliminary trials are not conclusive and the potential association between CRS and COVID-19 infection or severity is not yet clearly established [6].

The current work was designed to investigate the incidence of post-COVID-19 rhinosinusitis among ENT patients in new Damietta.

PATIENTS AND METHODS

This prospective descriptive, cross-sectional study included all patients with confirmed diagnosis of chronic rhinosinusitis, who attended the department of otorhinolaryngology, Al-Azhar University Hospitals [New Damietta between December 2022 to June 2023. The final number of patients included in the study were 156 patients.

The inclusion criteria were the adult patients [18 years or older], both sexes, with persistent nasal obstruction or purulent discharge. On the other side, the exclusion criteria were patient refusal, other chronic medical diseases or malignancy.

All subjects were submitted to clinical evaluation [full history, clinical examination and laboratory investigations]. In addition, all patients had a computed tomography [CT] for the nose and paranasal sinuses. The diagnosis of COVID-19 was achieved by polymerase chain reaction [PCR], antigen test and CT of the chest.

The chronic rhinosinusitis was confirmed by CT scan, Nasal obstruction [and/or] Nasal discharge with at least two of the following symptoms were present and persist for more than 12 weeks despite medical treatment [facial and/or dental pain, hyposmia or anosmia or headache].

Ethical Consideration: The data that were obtained from participants are confidential. The study participants were not identified by name in any report or publication concerning this study. Before the participants were admitted in this study, the purpose and nature of the study, as well as the risk–benefit assessment were explained to them. An informed consent was obtained.

Statistical Analysis: The collected data was coded, processed, and analyzed using SPSS program [Version 25] for windows [IBM SPSS Inc., Armonk, USA]. The calculated statistics included means, standard deviations, medians, ranges [for quantitative data], frequency and percentages [For qualitative data].

RESULTS

In the current work, 156 patients were eligible for participation in the study. Of them, 53 patients [34%] had post-COVID-19 CRS [Table 1].

The age of patients with post-COVID-19 CRS ranged between 18 and 60 years, the mean ± SD was [38.4±9.89 years], with slight increase of the disease among male patients [58.5%]. Housewives represent the highest occupation [28.3%] followed by farmers [245%] and then carpenters [18.9%]. However, the seller and drivers were the lowest [each reported for 1.9%]. Smoking was reported among 25 patients [47.2%] and all of them were males. All patients had nasal discharge and nasal obstruction, facial pain and headache. All patients with post-COVID-19 CRS had an abnormality of smell. Hyposmia was the commonest [reported for 67.9%] followed by anosmia [32.1%] [Table 2].

An interesting finding was the unilateral infection among 8 patients [15.1%]. However, the bilateral infection was reported among 84.9%. The mean duration rhinosinusitis developed after COVID-19 infection ranged between 34 and 60 days and the mean value was 43.17 ± 7.23 days [Table 2].

Table [1]: Incidence of post-COVID-19 rhinosinusitis incidence among all patients with chronic rhinosinusitis

	Total patients [n=156]	
	No.	%
Chronic rhinosinusitis [Without COVID-19]	103	66%
Chronic rhinosinusitis [post-COVID]	53	34%

Table [2]: Characteristics of patients with post-COVID-19 CRS

Variables	Measures	Values [n=53]
Age [years]	Mean ± SD	38.4±9.89
	Min. – Max.	18-60
Gender [n, %]	Male	31 [58.5%]
	Female	22 [41.5%]
Occupation [n, %]	Carpenter	10 [18.9%]
	Farmer	13 [24.5%]
	Housewife	15 [28.3%]
	Student	6 [11.3%]
	Teacher	4 [7.5%]
	Nurse	3 [5.7%]
	Seller	1 [1.9%]
	Driver	1 [1.9%]
Smoking [n, %]	Smokers	25 [47.2%]
	Non-smokers	28 [52.8%]
Clinical manifestations [n, %]	Nasal discharge	53[100.0%]
	Nasal obstruction	53[100.0%]
	Headache	53[100.0%]
	Facial pain	53[100.0%]
Smell [n, %]	Hyposmia	36 [67.9%]
	Anosmia	17 [32.1%]
Laterality	Bilateral	45 [84.9%]
	Unilateral	8 [15.1%]
Time interval between COVID-19 and CRS [days]	Mean ± SD	43.17±7.23
	Min. – Max.	34-60

Table [3]: Characteristics of patients with CRS without COVID-19

Variables	Measures	Values [n=103]
Gender [n, %]	Male	57[55.33%]
	Female	46[44.66%]
Smoking [n, %]	Smokers	23[22.33%]
	Non-smokers	80[77.67%]
Smell [n, %]	Hyposmia	89[86.40%]
	Anosmia	14[13.60%]
Laterality	Bilateral	81[78.64%]
	Unilateral	22[21.61%]

DISCUSSION

The current work was designed to estimate the incidence of post-COID-19 rhinosinusitis among patients admitted the END department of the tertiary care hospital [Al-Azhar University Hospital, New Damietta, Egypt]. During the assigned duration of the study, 156 patients with confirmed CRS. The COVID-19 prior to COVID-19 was reported among 53 [34.0%] of patients. They were in their forties with slight increase of males [58.5%]. All had nasal discharge and obstruction, headache and facial pain. The condition is mainly bilateral with hyposmia and developed within one to two months after COVID-19.

These results are comparable to **Myroshnychenko *et al.*** [7], who reported nasal congestion, yellowish-greenish discharge and nasal obstruction in all patients with CRS. However, hyposmia was reported among 72.7% of patients. In addition, **Akhlaghi *et al.*** [8] reported that in CRS after COVID-19 [25 patients], all had nasal discharge, nasal obstruction and headache. Moreover, **Faiq and Ghareeb** [9] reported that in patients with CRS after COVID-19, hyposmia was higher than anosmia **Reda *et al.*** [10] also reported that headache, nasal obstruction, and nasal discharge were the commonest symptoms in CRS after COVID-19 patients. Furthermore, **El-Kholy *et al.*** [11] reported that the most common presenting symptoms of patients in their study were headache and facial pain [100%] and facial numbness [100%]. Moreover, our results agree with **Krajewska *et al.*** [12] who reported that the most common otorhinolaryngological dysfunctions of CRS after COVID-19 were headache, nasal discharge, and facial pain. Rhinorrhea, nasal congestion and dizziness were also present. COVID-19 could manifest as an isolated sudden hyposmia/anosmia. **Sbeih *et al.*** [13] and **Wang *et al.*** [14] reported that in COVID-19 with CRS group, the most common symptoms were nasal obstruction, nasal discharge and fatigue.

On the contrary, our results disagree with **Sankovic-Babic *et al.*** [15] who reported that the most common general symptoms were cough [72%], fever [52%], dyspnea [46%] and malaise [46%]. Myalgia [19%], vomitus [3%] and diarrhea [3%] were observed to a lesser extent, sore throat or pharyngodynia was present in 20% of patients, anosmia in 22%, ageusia in 19 %, headache in 16%, tinnitus in 6%, vertigo in 5% and hearing loss in 3% of patients. This could be explained by racial differences, different inclusion and exclusion criteria and different sample size.

Our current study showed that 84.9% of the patients were bilateral and 15.1% of the patients were unilateral. This agree with **Myroshnychenko *et al.*** [7] who reported that in 9 cases [81.8%] rhinosinusitis was bilateral and in 2 cases [18.2%] were unilateral.

Regarding smoking, our results agree with **Akhlaghi *et al.*** [8], who reported that in CRS after COVID -19, there were 12 [48%] smokers. Furthermore, **Recalde-Zamacona *et al.*** [6] reported that among the studied cases there were seven [38.9%] smokers. Moreover, our results matched with **Sbeih *et al.*** [13], who reported that in COVID-19 with CRS group, there were [40.70%] smokers.

Our results showed that the mean duration which rhinosinusitis developed after COVID-19 infection was 43.17 ± 7.23 days with range 34 – 60 days. These results agree with **Myroshnychenko *et al.*** [7] who reported that the mean number of days during which rhinosinusitis developed after COVID-19 infection was 41.2±4.63 days

However, our results disagree with **El-Kholy et al.** [11] who reported that in patients with CRS, the mean duration for development of CRS after COVID-19 was 17.82±2.97 days.

In line with the results of the current work, **Vadher *et al.*** [16] reported that, patients developed rhinosinusitis within 5 days to 3 months after Covid-19 infection. The rate is higher in the fifth and sixth decade of life, and the recorded incidence was 34.52%. They attributed this incidence to the presence of comorbid conditions [diabetes, hypertension], and use of the corticosteroids.

In conclusion, the incidence of post-COVID-19 chronic rhinosinusitis was 34.0%. The nasal discharge, nasal obstruction, headache and hyposmia were the commonest clinical manifestations. CRS is slightly higher in males and affect people mainly in their fourth decade of life. However, small sample size and short duration of the study are two limiting steps of the current work. Thus, future large-scale studies are recommended.

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