



## Post-COVID-19 Dysphonia may have Several Origins

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Dear Editor

We read the article entitled: “*Vocal Disorders in Patients with COVID 19 in Egypt*” by Aziz Azzam et al. [1]. The authors investigated the occurrence of dysphonia in COVID-19 patients in Egypt and the videolaryngoscopic findings associated with vocal symptoms. They reported that 79% of patients had dysphonia, while 18.8% were phonesthenic. Authors observed a significant association between rhinorrhea, sore throat, cough and dysphonia. At the videolaryngostroboscopic examination, they found vocal fold edema, swellings, ventricular hypertrophy and vocal fold immobility. Vocal fold congestion was associated with dysphonia. The study of dysphonia in COVID-19 patients is important and we congratulate authors for this

research. However, we wish to draw attention to many points.

First, as reported in other studies [2, 3], COVID-19 may be associated with dysphonia and the study of Aziz Azzam et al. supports the association. An important confounding factor that was not evaluated by authors is the prevalence of laryngopharyngeal reflux (LPR) in the cohort. The prevalence of LPR in North Africa was estimated to 19.2% [4]. LPR is associated with similar otolaryngological nonspecific symptoms than COVID-19, including cough, postnasal drip, throat clearing, throat pain, and dysphonia [4]. From a clinical standpoint, LPR is associated with vocal fold findings, swelling, ventricular and laryngeal edema [4]; all of them being observed by Aziz Azzam et al. in the study population. The consideration of LPR is important in a pandemic period because the increased stress and anxiety of patient related to COVID-19 infection may have favored autonomic nerve dysfunction, which is associated with esophageal sphincter relaxations and, therefore, an increase of pharyngeal reflux events [5]. Interestingly, females are more susceptible to develop dysphonia related to LPR [6], which may corroborate the observation of Aziz Azzam et al. The increase of LPR prevalence in the context of COVID-19 pandemic was moreover suggested in a previous study [7].

Second, the use of inhaled corticosteroids is another confounding factor that may be associated with dysphonia. Inhaled corticosteroids may be particularly prescribed in patients with mild COVID-19 and dyspnea. The consideration of inhaled corticosteroids makes sense because they may lead to vocal fold dryness and dysphonia [8].

Third, authors observed vocal fold immobility in 13.2% of patients. This observation is particularly important because severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is known to be a neurotropic virus, and was

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associated with some nerve disorders, i.e. vocal fold paradoxical movement, olfactory dysfunction, and sudden hearing loss [9, 10]. The prevalence of laryngeal nerve impairments in COVID-19 population is probably underestimated because, in practice, few dysphonic patients really benefited from videolaryngostroboscopic examination. This association has to be investigated in future large multicenter studies.

We congratulate Aziz Azzam et al. for this interesting study that highlights the importance of dysphonia in COVID-19. Future studies are needed to reinforce the prevalence of dysphonia in COVID-19 patients considering direct and indirect mechanisms such as LPR or inhaled corticosteroids.

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#### Declarations

**Conflict of interest** The authors declare that they do not have any conflict of interest.

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