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Letter to the editor

Nicotinic acetylcholine receptors may induce urinary incontinence in patients with Covid-19

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According to the International Continence Society (ICS), urinary incontinence encompasses any complaint of involuntary urine leakage. Globally, more than 200 million women worldwide have this problem, and its prevalence varies from 2.5 to 8.70 in different regions (Islam et al., 2018). Although urinary incontinence occurs regardless of sex, its prevalence is higher in women and increases with age. It is one of the clinical manifestations of pelvic floor muscle instability, impacting over 50% of women during their lifetime (Aoki et al., 2017). Various etiologies contribute to its onset, including urinary tract or vaginal infections, constipation, medication, lower urinary tract dysfunction, etc. (McAuley et al., 2023). To our knowledge, clinicians have to consider the outbreak of COVID-19 as well.

COVID-19, caused by the acute respiratory syndrome coronavirus 2 (SARS-COV-2), presents with a spectrum of symptoms ranging from mild to severe. Approximately 14% of patients experience such as dyspnea, hypoxia, or extensive lung involvement, while 5% progress to critical symptoms like respiratory failure, shock, or multiple organ dysfunction (Wei et al., 2020). Notably, the virus can target neurons by affecting the central nervous system (CNS), potentially involving acetylcholine and nicotinic acetylcholine receptors (NAChRs) (Carod-Artal, 2020). Acetylcholine plays pivotal roles in various neurological functions and homeostasis, including respiratory regulation (Pourfridoni et al., 2021).

Urinary continence relies on the interplay of sympathetic, parasympathetic, and somatic nerves (pudendal). In this letter to the editor, we want to consider the somatic innervation which is associated with the filling phase of the bladder (Thomas, 2011). During this phase, the guarding reflex contracts the external urethral sphincter and pelvic floor muscles via NAChRs and pudendal nerves (Vizzard, 2010). Pudendal neuropathy has been reported in viral infections such as human immunodeficiency virus and herpes zoster (Kaur and Singh, 2020). Pourfridoni et al. recently declared that in patients with COVID-19, neural damage leads to bladder and bowel incontinence due to inflammation and demyelination in the pudendal nerve (Pourfridoni et al., 2021). It is assumed that COVID-19 may interact with NAChRs, as their subunits bear similarities to COVID-19 Spike co-receptors (Dormoy et al., 2022). Therefore, we hypothesized that the occurrence of urinary disorders in patients with COVID-19 could be attributed to this interaction, because it may inhibit the voluntary contraction of the pelvic floor muscles and the external urethral sphincter through the pudendal nerve.

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