

Coronavirus Pandemic

Possible association of urinary incontinence with post-COVID-19: a report of three cases

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Abstract

Introduction: The disorder denominated urinary incontinence (UI) has been diagnosed amongst 25–45% of women worldwide. Muscle weakness is one of the more notable symptoms, which is exhibited in the acute form of coronavirus disease 2019 (COVID-19) that compromises the respiratory musculature. Accordingly, this report aims to delineate three cases in women with UI possibly associated with post-severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection.

Case reports: Three elderly Brazilian women expressed UI symptomatology post-COVID-19 recovery. In the investigation reports, there was no documented acute impairment or hospitalization post-COVID-19. Nevertheless, some form of UI derived from muscle weakness was detected and treated by physiotherapy in these patients. The patient 1 (P1) was classified as mixed urinary incontinence (MUI) based on the presented symptomatology during the filling phase and urinary leakage on exertion. Intravaginal probing suggested neural integrity. The P2 and P3 were classified as stress urinary incontinence (SUI), related to increased abdominal pressure. In all the three cases, there were benefits from physical therapy treatment.

Conclusions: This case report is relevant in improving our understanding and lead to future research about the possibility of clinical variations as UI after infection by SARS COV 2 contributing to greater awareness in the diagnostic workup and allowing for earlier treatment and management. It is concluded that the surveillance of the distinct symptomologies associated with the SARS-CoV-2 infection is fundamental, because there is no adequate corroboratory evidence in the scientific literature, for the cases of pelvic floor muscles weakness that causes UI.

Key words: physiotherapy, infectiology, COVID-19, diagnosis, prognosis.

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Introduction

The disorder denominated urinary incontinence (UI) has been diagnosed amongst 25–45% of women worldwide [1,2]. Pathologically, UI possesses various etiologies and predisposing factors, such as obesity, pregnancy, childbirth, smoking, age/menopause, and genetics. UI negatively affects the quality of life of those that are affected by this problem, which consequently places a burden on health services [3]. The disease is classified into three basic types: stress urinary incontinence (SUI), related to increased abdominal pressure; urge urinary incontinence (UUI), related to overactive bladder; mixed urinary incontinence (MUI), related to involuntary leakage associated with urgency and exertion [2,3]. Although it is known that coronavirus disease (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has a wide range of clinical

manifestations such as respiratory muscle weakness and generalized fatigue, there are rare, documented cases in the scientific literature that associate the disease with UI [4-6].

Muscle weakness is one of the more notable symptoms, which is exhibited in the acute form of COVID-19 that compromises the respiratory musculature. Nevertheless, there are several long-term consequences concomitant to the infection caused by the SARS-CoV-2, namely the neurogenic alteration known as myelitis. UI is associated with both the neurogenic and non-neurogenic pathways [4,6].

We report a detailed account of the manifestations along with possible link with post-COVID, contributing to a better understanding of the different manifestations. UI is associated with both the neurogenic and non-neurogenic pathways. Our report encourages a reflection on the most accurate approach to new

research and investigation for confirmation of this possible association. The UI disease symptomology was documented in previously healthy men after contracting COVID-19. Notably, a healthy 27-year-old man manifested urinary retention, constipation, and hypoesthesia at the T4 level post-COVID-19 [6]. Likewise, UI was reported in an elderly man who had no prior disease other than type 2 diabetes mellitus with indications of paraplegia and fecal UI approximately 3-4 weeks after COVID-19 therapy [5]. The disorder was exhibited in a previously healthy 50-year-old man accompanied by paraparesis and hypoesthesia at the T6 level [6,7]. In the aforementioned cases, acute transverse myelitis was diagnosed post-COVID-19 infection.

Furthermore, there is no adequate corroboratory evidence in the scientific literature, investigating the relationship between COVID-19, pelvic floor muscles (PFM) weakness and the resultant stress UI, which facilitate the investigation and effective rehabilitation post-SARS-CoV-2 infection. Accordingly, this report aims to delineate the reported cases of UI possibly associated with adverse effects post-SARS-CoV-2 infection, in three adult women, with no indicated acute impairment or hospitalization post-COVID-19. Nevertheless, some form of stress UI derived from muscle weakness was detected and treated by physiotherapy in each of the cases.

Case reports

Three female patients with no previous history of UI underwent physiotherapy sessions after expressing UI symptomology post-COVID-19 recovery. The clinical *in vivo* study of the three cases in relation to the manifestation of UI post-COVID-19 is collated as follows.

Case 1

The first case was an elderly 66-year-old Brazilian woman (patient 1; P1) without any known chronic non-communicable diseases, a body mass index (BMI) of 22.6 kg/m², and with the onset of mild COVID-19 symptoms on 12 January 2022, presenting a positive post-test diagnostic on 17 January 2022. The symptoms were regulated through the utilization of antipyretics; there were no complications and no need for hospitalization. In March 2022, P1 procured the services of a private physiotherapist, complaining of SUI and UUI, later stating that the symptoms emerged one week after the conclusion of the COVID-19 quarantine, at the start of February 2022. Subsequently, P1 sought additional medical attention from a local

Community Health Centre after observing significant hair loss and skin alterations; there were no signs of neurological impairment.

The physiotherapeutic assessment revealed that P1 was sexually active - with three prior gestations, three normal deliveries and no abortions (3G, 3ND, 0A), menopausal (20 years) and without any previous urinary infections. P1 expressed fatigue from mild exertion and irritative symptomologies including nocturia, and overflow and urge incontinence. P1 applied two pads/day to contain the fluid loss. No complementary exams were provided. Notwithstanding, P1 also informed of being diagnosed with clinical depression for over 10 years, with the condition exacerbating over the last two years. Consequently, this factor incited the continuous administration of the pharmaceuticals, desvenlafaxine (50 mg/day) and bromazepam (3 mg/night).

The physical examination revealed normal tonus and trophism although tension points were identified in the levator ani muscle. Intravaginal probing registered electroneuromyography (ENMG/EMG) signals, 16 mV on average. This exam demonstrated the integrity of the neural pathways that innervate the pelvic floor. Accordingly, there was notable synergy of the PFM with visible voluntary contractions, receiving a grade 4 on the Oxford grading scale. When monitored on the pressure biofeedback unit the contractions reached 5.5 cm H₂O, without support. P1 maintained contractions at 2 cm H₂O for 2 seconds (sec) in three quick sets of rapid contractions, with muscle fatigue impeding the execution of the 4th set. The abdominal, gluteal muscles and the PFM contracted simultaneously, which made it possible to observe the center of the vaginal cavity and the uterine cervix. Additionally, transvaginal digital palpation (TDP) identified and classified the Grade 1 uterine prolapse of P1.

P1 disinclined to complete a urinal diary and was reluctant to adhere to the physical therapy treatment guidelines proposed to strengthen the PFM. It is understood that the depressive component influenced the adherence to the therapy. Despite the absence of the urinal diary and complementary exams, the prognosis was determined to be MUI based on the presented symptomology during the filling phase and the dyspnea on exertion.

Case 2

Case 2 was a 61-year-old Brazilian woman (P2), with no comorbidities, BMI of 28.3 kg/m² (overweight) and known dependency of phenobarbital (50 mg/day) since the 1970s, after a childhood fall which deviated

the skull and caused fainting spells. In 2006, P2 underwent UI corrective surgery with no indication of significant losses of fluid. In February 2022, P2 contracted COVID-19 and presented mild symptoms including, runny nose, chills, and fatigue for the first 3 days. Moreover, during the same week, while self-isolating, P2 experienced an intense and incessant involuntary loss of urine, which prompted P2 to seek help from a local physiotherapist on 15 March 2022.

The physiotherapeutic assessment revealed an active sexual life, with 7G, 4ND and 3A. There was reported mild dyspnea on exertion and additional irritative symptomologies such as, nocturia and overflow and urge incontinence. There was no clinical evidence of neurological impairment. As a result, P2 was compelled to use eight pads in a span of 24 hours. After physical examination (TDP), there were no visible change in tonus or trophism of the perineal muscles, and no manifestation of prolapse. There was apparent synergy of the PFM with notable voluntary contractions, receiving a grade 3 on the Oxford grading scale. The intravaginal probing registered low EMG signals, 7 mV on average, demonstrating the integrity of the neural pathways that innervate the pelvic floor, but the low value demonstrates low muscle recruitment. When monitored on the pressure biofeedback device the contractions reached 2 cm H₂O, with 3 sec of support. P2 maintained one set of contractions for a maximum of 3 sec, followed by a gradual onset of fatigue until all contractions ceased. The gluteal muscles and the PFM contracted simultaneously.

At request, a urinal diary was completed to allow for bladder training. The diary described the perpetual correlation between the fluid intake (2.5 L) and output of P2, and urinary frequency of 7–8 times/day and 1–2 times/night. Additionally, this permitted the analysis of the bladder compliance, and the diurnal and nocturnal urinary frequency within normal parameters, while considering their increased intake of coffee and soda. P2 showed SUI symptomology and was advised to reduce the intake of the aforementioned fluids that irritate the bladder. At the end of the second week of therapy, which was realized once per week accompanied by the prescribed daily routine, there was notable regression in pad utilization, from 8/day to 3/day, and a subsequent improvement in quality of life. P2 continues to follow the prescribed routine and is examined during each physiotherapeutic appointment, using the pressure biofeedback unit, to quantify the increase of force of the PFM; in consequence these measures can strengthen the tonic and phasic muscle fibers that constitute the PFM.

Case 3

The third case was an elderly 63-year-old Brazilian woman (P3), with a BMI of 31.9 kg/m² (obese), hypertensive and diabetic, which elicited the continuous prescribed administration of the pharmaceuticals losartan (50 mg) and metformin (500 mg). On 2 June 2021, P3 was diagnosed with COVID-19 but was not hospitalized due to non-acute symptomatology such as, mild fatigue, dyspnea, and frailty.

Initially, P3 procured the services of a physiotherapist to facilitate the post-COVID-19 rehabilitation process. In August 2021, at the time of the physiotherapeutic assessment of global muscle strength, cardiorespiratory fitness, and neurological condition, there were no ascertained dysfunctions or sequelae from the disease. Nonetheless, P3 noticed significant urinary loss in stressful situations and those of urgency, which galvanized the idea of UI.

The urogynecological evaluation revealed normal sexual activity, menopausal and with a history of 3 gestations and 3 cesarean deliveries (3G, 3CD). P3 was evaluated in a public health center that did have an EMG, however after TDP assessment no neural pathway impairment was identified. Furthermore, there were visible voluntary contractions of the PFM and no sign of prolapse, receiving a grade 3 on the Oxford grading scale, utilizing TDP. P3 maintained contractions for 4 sec along with co-contractions of the abdominal, gluteal and adductor muscles. Thereafter, two maximal contractions were executed for 4 sec before there was a noted decline in force. Although P3 reported signs of UUI, the documented clinical symptomology was analogous to SUI, with no other types of UI being identified.

At request, a urinary diary was initiated but not completed. After the first month of therapy, which was realized twice per month, there was documented urinary loss during specific occasions such as while under stress. Eventually, there was a gradual reduction of fluid losses, which was prioritized during training, but only in particular circumstances including, handling water or scaling steps.

P3 remained in therapy until November 2021 to strengthen the muscle fibers and complete functional training. Moreover, when there were no further losses, P3 was discharged with a prescribed daily home routine.

Conclusions

The pandemic and post-pandemic periods have substantiated how consequential adequate therapy can

be for the physical and mental impairment of the patients, especially the individuals affected by the possible long-term adverse effects of the acute form of the SARS-CoV-2 infection. Consequently, emphasis should be placed on more holistic and multidisciplinary methodologies for the collation of information to ameliorate the diagnoses of the adverse effects associated with the disease [8,9]. Muscle weakness is one of the more notable symptoms, which is exhibited in the acute form of COVID-19 that compromises the respiratory musculature [10,11]. The main symptoms of the skeletal muscles are weakness, fatigue, pain, and injury after COVID-19 manifestation. Skeletal muscle cells exhibit high expression of protein responsible to SARS-CoV-2 entrance in the cell; thus, it is plausible to suggest that the virus may trigger directly skeletal muscle myopathies, without the neurogenic pathway [12]. Here, we deliberate on the circumstances of three adult women (post-SARS-CoV-2 infection) with UI associated with PFM weakness and substantiate anti-inflammatory treatments under neurogenic conditions and training the PFM in SUI as auspicious therapies.

Globally, there is exiguous documented information, in the scientific literature, regarding PFM fatigue and the resulting SUI concomitant with SARS-CoV-2 infection in women [13]. In the investigated case reports, some form of UI derived from muscle weakness was detected in the patients. Two of the three individuals underwent physiotherapy, one being discharged after the discontinuance of the UI and the other is still in therapy and exhibiting positive results. The other patient with MUI, disinclined to therapy because of the mood disorder and depression. Although the actual case report examined a particular sample of adult women who suffered from UI post-COVID-19, the methodology used corroborates the importance of classifying the link between the two ailments to improve and encourage future research about the possibility of clinical variations as UI, after infection by SARS-CoV-2 contributing to greater awareness in diagnostic workup and allowing for earlier treatment and management.

Interestingly, most studies in the scientific literature focus on patients who were hospitalized and had severe COVID-19. Furthermore, there are no experimental studies or studies that biopsied muscle tissue and thus described the cellular and molecular mechanisms of skeletal muscle injury. Some authors suggest that the pathophysiology of musculoskeletal complications is associated with a persistent pro-inflammatory syndrome called “cytokine storm” [13]. Future studies investigating the epidemiology of UI with SARS

COV2-associated skeletal muscle weakness regardless of the neurogenic pathway will give detailed understanding of musculoskeletal sequelae in long-term COVID and will be essential for the proper disease treatment.

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