

# Safe urodynamic practices in times of COVID-19: What can be accomplished and what can be added?

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## Abstract

**Aim:** To present feedback, after applying national and international urodynamic study (UDS) recommendations for safe practice during the COVID-19 pandemic.

**Methods:** We created a checklist to assess the feasibility of performing UDS recommendations for safe practice during the COVID-19 pandemic from the first week of May 2021 to the last week of July 2021.

**Results:** One hundred patients were analyzed during the study period. We observed that all preventive recommendations for the steps that precede UDS could be followed in full. However, some guidelines for performing the exam were not feasible in all patients. We have successfully adopted other safety measures for all patients.

**Conclusions:** The COVID-19 pandemic will likely persist for several more years. We believe that continuous improvement, revision, and updating of existing protocols and guidelines for the safe practice of UDS in times of COVID-19, as we propose in this study, should be encouraged.

## KEYWORDS

coronavirus, COVID-19, guideline, urodynamic study

## 1 | INTRODUCTION

The COVID-19 pandemic has disrupted urological practice substantially. Reductions in the number of surgeries, medical consultations, and elective procedures are examples of impediments due to the social distancing necessary to control SARS-CoV-2 transmission.<sup>1,2</sup> In this context, the performance of urodynamic studies (UDS) has also been encumbered.

Because UDS are generally indicated to diagnose nonurgent conditions, many patients postponed their UDS, and many physicians, in turn, reduced the frequency of performing or simply stopped performing these exams in

recent months.<sup>1,2</sup> However, as UDS are considered the gold standard for the diagnosis of various lower urinary tract disorders,<sup>3</sup> we do not yet know the long-term health consequences of this reduced access to care.

Better knowledge of COVID-19 and its transmission dynamics, as well as the introduction of diagnostic methods and vaccines, have led to the publication of recommendations for the safe practice of UDS, to facilitate the delivery of urologic care even in times of pandemic disease. We present our feedback, after applying these recommendations in daily practice, and offer pertinent recommendations for future implementation.

## 2 | MATERIALS AND METHODS

After authorization from the local Research Ethics Committee, we prospectively analyzed the manner in which UDS were conducted from the first week of May 2021 to the last week of July 2021 in our urodynamic center, using the latest version of Dynamed™ (Dynamed™), urodynamic equipment (Dynapack Slim™ Hardware and Urocommander™ Software), and following the recommendations for good practice endorsed by the International Society of Continence (ICS).<sup>4–6</sup>

We created a checklist to assess the feasibility of performing UDS based on national<sup>7</sup> and international<sup>8</sup> recommendations for safe practice during the COVID-19 pandemic (Table 1).

Statistical analysis was performed using GraphPad Prism™ software, version 7, applying Kolmogorov–Smirnov's test for normality analysis. For data with a Gaussian distribution, a comparative intergroup evaluation Student's *t*-test was used. However, for data with a non-Gaussian distribution, the Kruskal–Wallis test was used, adopting the standard significance value of  $p < 0.05$ .

## 3 | RESULTS

One hundred patients were analyzed during the study period. Results are shown in Table 2.

We observed that all preventive recommendations for the steps that precede UDS could be followed in full (Table 2). However, some guidelines for performing the exam were not feasible in all patients.

Maintaining the recommended distance of 2 m between the examiner and the patient was not possible in 28 patients (approximately 30% of cases), due to the dislodging of urethral catheters caused by the loss of adhesion of the catheter to the patients' skin. This occurred in patients who had urinary leakage at minimal effort and/or continuous urination that moistened the region where the adhesive tape was applied, forcing the examiner to approach the patient during the procedure.

The replacement of cough by Valsalva maneuver was not possible in 44% of the patients, due to inadequate generation of intra-abdominal pressure that confounded assessments for exertion-related and post-prostatectomy urinary incontinence. Furthermore, examination in the standing position was impossible for patients for whom the combination of perineal electromyography with UDS was indicated (12 patients).

The other recommendations applicable during UDS, as shown in Table 2, could be applied to 100% of the patients. It is noteworthy that ventilation of the examination room was

facilitated by keeping the windows open, after confirming that the patient's privacy would be maintained.

We have successfully adopted other safety measures in all patients (Table 3).

## 4 | DISCUSSION

We observed that not all recommendations for conducting UDS safely during the COVID-19 pandemic can be implemented in daily practice (Table 4). We also realized that even the recommendations that can be fully implemented may be difficult to apply under certain conditions.

The replacement of the cough maneuver by Valsalva maneuver, for example, is proposed in safety protocols to avoid the dispersion of aerosols, an important mode of COVID-19 transmission.<sup>9</sup> This intervention, however, was the most detrimental to good urodynamic practice, since in almost half of our sample, it precluded an adequate investigation of bladder function during states of high intra-abdominal pressure. Although the International Consultation on Incontinence (ICI) does not recommend Valsalva leak point pressure as a single factor to grade the severity of urinary incontinence, or to predict urinary stress incontinence (recommendation Grade C) and surgical treatment outcomes,<sup>10</sup> optimal urodynamic practice entails the investigation of the effects of pelvic floor stress and external urethral sphincter function under varying degrees of intra-abdominal pressure, requiring the use of cough during UDS in the vast majority of patients. Despite these findings, we believe that Valsalva (or other abdominal pressure rises maneuvers) should be tried first, and only then do coughs.

Close proximity between the examiner and the patient can facilitate COVID-19 transmission.<sup>11,12</sup> The ideal distance between the patient and examiner was not preserved in 28% of patients, due to repositioning of displaced urethral catheters, especially when the medial surface of the patient's thigh had been moistened after urinary incontinence during exercise testing. We believe that topical adhesives, such as benzoin tincture, could be used in patients with histories of urinary incontinence.

The use of the orthostatic position, which facilitates the identification of urinary losses at a distance, was not possible during perineal electromyography, thus obviating the maintenance of an adequate distance between physician and patients. Some studies have shown that performing electromyography in the orthostatic position could compromise the assessment of the test results.<sup>13–15</sup> Thus, we have a

**TABLE 1** Questionnaire designed to prospectively assess the feasibility of applying recommendations for the safe practice of urodynamic testing during the COVID-19 pandemic

Recommendation	Viability
<i>Before urodynamic studies (UDS)</i>	
Medical history by phone	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
History of symptoms and/or hospitalization for COVID-19	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
Case prioritization	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
Scheduling fewer UDS in each day and be with more time between individual appointments	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
Body temperature measurement	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
<i>During UDS</i>	
Adequate distance between examiner and patient	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
Replacement of cough by Valsalva maneuver	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
Use of personal protective equipment	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
Reduced number of people in the exam room	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
Room cleaning	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
Handwashing	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
Examination in standing position	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable
Examination room ventilation	<input type="radio"/> Viable <input type="radio"/> Viable with adaptations <input type="radio"/> Not viable

**TABLE 2** Results of the feasibility of applying UDS safe practice recommendations during pandemic

Recommendation	Viable	Not viable	<i>p</i>
Medical history by phone	100%	0%	<0.0001
History of symptoms and/or hospitalization for COVID-19	100%	0%	<0.0001
Case prioritization	100%	0%	<0.0001
Scheduling fewer UDS	100%	0%	<0.0001
Body temperature measurement	100%	0%	<0.0001
Adequate distance between examiner and patient	72%	28%	0.0002
Replacement of cough by Valsalva maneuver	56%	44%	0.0002
Use of personal protective equipment	100%	0%	<0.0001
Reduced number of people in exam room	100%	0%	<0.0001
Room cleaning	100%	0%	<0.0001
Handwashing	100%	0%	<0.0001
Examination in standing position	88%	12%	<0.0001
Examination room ventilation	100%	0%	<0.0001

Abbreviations: UDS, urodynamic studies.

**TABLE 3** Other measures taken to improve safety of UDS during the COVID-19 pandemic

Other adopted safety measures	
Before UDS	Scheduling exams outside of rush hours, avoiding long stays in urban transportation Patient and healthcare team testing for SARS-CoV-2 (RT-PCR) Requesting proof of COVID-19 vaccination
During UDS	Maintenance of minimal furniture necessary for urodynamic practice in the exam room

Abbreviation: UDS, urodynamic studies.

protocol in our urodynamics center not to perform the study in this position.

Examination room ventilation is one of the primary safety measures to prevent the spread of COVID-19.<sup>16,17</sup> Although we managed to keep a wide window open during all UDS without compromising patient privacy, we acknowledge that this approach is not possible in all settings. Some buildings do not have windows in urodynamic exam rooms, and weather conditions such as extreme cold may obviate this recommendation in some locations. In these cases, an upgrade of ventilation systems with portable air cleaners or disinfectants (such as UV lamps or high-efficiency filtration systems) to remove airborne pathogens, including SARS-CoV-2, could be useful.<sup>16</sup>

TABLE 4 Viability analysis of the proposed recommendations

Safety orientation	Viability	Comments
Medical history by phone	High	
History of symptoms and/or hospitalization for COVID-19	High	
Case prioritization	High	
Scheduling fewer UDS	High	
Body temperature measurement	High	
Adequate distance between examiner and patient	Moderate	Downward migration of urethral catheters during UDS may require repositioning by the examiner.
Replacement of cough by Valsalva maneuver	High	
Use of personal protective equipment	High	
Reduced number of people in exam room	High	
Room cleaning	High	
Handwashing	High	
Examination in standing position	Moderate	There is some evidence that patients undergoing perineal electromyography should not adopt the orthostatic position, due to the risk of compromising the results of this test.
Examination room ventilation	Moderate	Patient privacy must be considered when windows are open. Ventilation systems are influenced by the climate of the examination room location.

Abbreviation: UDS, urodynamic studies.

## 4.1 | Additions to protocols

We have implemented additional measures into our practice, and recommend that they be incorporated into the existing protocols.

### 4.1.1 | Reduction of furniture in the exam room

Mathematical models of indoor air circulation suggest that environments with lower occupancy present a diminished risk of COVID-19 transmission.<sup>18–21</sup> Thus, in addition to decreasing the number of individuals in the UDS room, we also recommend reducing the amount of furniture to further mitigate crowding.

### 4.1.2 | Testing and vaccination

Massive testing utilizing RT-PCR is an important strategy to control COVID-19 transmission.<sup>22</sup> Therefore, following the recommendations of the Centers for Disease Control and Prevention, we perform and recommend testing of all patients and health professionals who provide UDS.

Another adopted recommendation is complete COVID-19 vaccination of our staff, considering evidence available in our country that associates drastic reductions of COVID-19 incidence and mortality with massive vaccination of the population.<sup>23</sup>

### 4.1.3 | Scheduling at times of decreased vehicular traffic (avoiding rush hours)

The effect of crowding on COVID-19 transmission has been highlighted in several studies, such as the elegant publication by Geng et al.<sup>24</sup> Yasri and Wiwanitkit<sup>25</sup> have highlighted the potential for COVID-19 transmission during the use of public transportation. Consequently, we have implemented and recommended the scheduling of UDS patient appointments at times when vehicular traffic is less intense. Thus, patients who use public transportation will avoid travel in crowded vehicle interiors during rush hours.

## 5 | CONCLUSION

The COVID-19 pandemic will likely persist for several more years, especially due to vaccine hesitancy and barriers to vaccine access in some population groups.

Consequently, we believe that continuous improvement, revision, and updating of existing protocols and guidelines for the safe practice of UDS in times of COVID-19, as we propose in this study, should be encouraged.

### CONFLICT OF INTERESTS

The authors declare no conflict of interest.

### ETHICS STATEMENT

Study approval number by the local ethics committee: 77023617.6.0000.5284.

### AUTHOR CONTRIBUTIONS

**João A. Pereira-Correia:** Data collection. **Carlos M. P. P. Gomes:** Conception or design of the work; critical revision of the article. **Paulo H. N. Barbosa:** Conception or design of the work; critical revision of the article. **Bruno A. Salomão:** Conception or design of the work; critical revision of the article. **Heitor S. Moraes:** Conception or design of the work; critical revision of the article. **Valter J. F. Muller:** Data collection; data analysis and interpretation.

### DATA AVAILABILITY STATEMENT

Data Availability Statement is not available.

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