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Female LUTS adaptations to COVID era: Lessons learned from the ICS TURNOVER (Transition of fUnctional uRology to New COVID ERa)

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A R T I C L E I N F O

Keywords:
COVID-19
Pandemic
Lower urinary tract symptoms
Female urology
Telemedicine

A B S T R A C T

Introduction: The COVID-19 pandemic has dramatically affected the Female and Functional Urology (FFU) practice, leading to massive waiting lists, while patients’ quality of life remains severely impaired. The aim of the present study is to develop consensual recommendations to guide clinicians on the management of FFU patients. The present paper focuses on female LUTS.

Methods: The authors used the Delphi methodology to develop a robust survey questionnaire, covering the principal topics in FFU, based on literature review and expert opinions. Regarding female LUTS, a 98-question survey was distributed among FFU specialists to obtain optimized recommendations, under the auspices of the International Continence Society (TURNOVER, ICS project). A quantitative analysis of the data was performed, categorizing the mean value from 0–10. Consensus achievement was defined as attaining ≥70% agreement.

Results: 98 ICS members completed the F-LUTS survey. Recommendations for the diagnosis and management of female LUTS are summarized. Video-consultation should be used for initial assessment, sending questionnaires and bladder diaries in advance to the patient to be filled out before the consultation. However, face-to-face visits are mandatory if POP or continuous incontinence are suspected, and prior to any surgical procedure, regardless of the health alert. Moreover, prescribing medications such as anticholinergics or β3 agonists in a telemedicine setting is not considered a safe practice. Follow-up teleconsultations can be used to assess the efficacy and treatment-related adverse events.

Urodynamic testing should be only performed if consequences on F-LUTS treatment are expected. The study should be postponed until the pandemic local behaviour flattens.

Invasive procedures should be postponed during a high alert. In case surgery is scheduled, outpatient clinics and local anaesthesia should be prioritized. Every patient should be screened for SARS-CoV-2 infection before invasive tests or procedures, following local authorities’ guidance.

Conclusions: During a pandemic, telemedicine offers a novel way of communication, maintaining medical care while preventing viral transmission. Non-urgent procedures should be postponed until the pandemic curve flattens. Ambulatory procedures under regional or local anaesthesia should be prioritized, aiming to reduce bed occupancy and risk of transmission.

Abbreviations: BTX, botulinum toxin; CIC, clean intermittent catheterization; FTF, face-to-face; FFU, Female and Functional Urology; HRQoL, health-related quality of life; LUTS, Lower urinary tract symptoms; F-LUTS, female lower urinary tract symptoms; OV, office visits; PFMT, pelvic floor muscle training; SNM, sacral neuromodulation; SUI, stress urinary incontinence; VV, virtual visits.

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https://doi.org/10.1016/j.cont.2022.100521

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1. Introduction

Lower urinary tract symptoms (LUTS) are a common and underrated health issue in women. Reported prevalence varies between 54%–64% depending on the population and definition used [1,2]. These symptoms cause severe suffering and embarrassment to the patients and have been related with lower levels of health-related quality of life (HRQoL). The EpiLUTS study demonstrated a robust association of LUTS with depression and anxiety. More specifically, storage LUTS had a significantly greater impact on HRQoL [3,4]. Female LUTS (F-LUTS) also carry a great economic burden, both from direct economic costs, derived from healthcare assistance, complications, and psychological assistance, as well as indirect cost, derived from absenteeism and lost productivity [5].

During the COVID-19 pandemic, Female and Functional Urology (FFU) has been particularly affected with a massive reduction of outpatient investigations and surgical procedures [6,7]. In fact, it has been reported that more than two thirds of the functional urology interventions had to be postponed during the first wave of the pandemic [8] leading to massive waiting lists, while the HRQoL of women with pelvic floor dysfunction remains significantly impaired [9].

At the onset of the pandemic, the EAU Guidelines Office emitted a series of recommendations to adapt the urology guidelines to the COVID-19 era [10]. It was advised to postpone surgical treatments or invasive studies for non-cancer conditions. LUTS investigations were deemed low priority except for suspected renal impairment or oncological causes and remote follow-up was introduced when possible. However, asymmetries among countries, regions and even hospitals, not only in the number of cases confirmed but in resources available make it impossible to be extremely specific with predictions and recommendations.

The scenario in the developed countries has improved in the last few months mainly due to the efficacy of the vaccination policy, but a great uncertainty about the future remains: the threat of future waves [11], uncertainty about vaccine efficacy on new viruses mutations, availability and uptake of vaccination in the developing world, threat of future viruses and pandemics, etc. Dynamic scales according to resource availability and health care pressure may be useful to draw strategies in prioritization in this new scenario of future pandemics. Therefore, novel strategies are needed to continue patient care even in times of worldwide crisis.

Due to the lack of evidence on the topic, a better way to obtain recommendations on COVID-19 adaptations would be to use a survey among specialists around the world. Authors decided to use the Delphi methodology to devise survey questionnaires on adaptations in FFU. A robust questionnaire covering every different aspect of FFU patient management during the COVID era (first visit, diagnosis, imaging and tests, invasive procedures, telemedicine, follow-up, medical therapy, emergencies and surgical treatment) was obtained [12]. Once the questionnaire has proven its validity and internal consistency, a worldwide survey among different specialists in FFU to obtain optimized recommendations. In this study we present the results of this global survey specifically focused on female LUTS.

2. Methods

This project consisted of 4 phases, following the Delphi methodology for developing reporting guidelines [13]. In the first stage, an extensive PubMed search was performed, and related data were extracted. Detailed information is provided in a previously published narrative review that described the limited available data in the urological literature on COVID-19 and the experience of Female and functional urological and Urogynaecological experts worldwide [14].

In the next two steps, a questionnaire was created based on the available evidence, covering the main topics in functional urology: Female LUTS, male LUTS, pelvic organ prolapse (POP), chronic pelvic pain (CPP), and neuro-urology. Finally, a standard reporting template was designed and approved by the panel, covering every aspect of patient management during the COVID era: first visit, diagnosis, imaging and tests, invasive procedures, telemedicine, follow-up, medical therapy, emergencies, and surgical treatment. Content validity, face validity and internal consistency are described in a previously published article [12]. Regarding female LUTS, of a total of 106 generated questions in the first round, nine questions did not achieve the consensus of expert panels, and finally, 98 questions were approved for the next phase. Content validity was reasonable for F-LUTS questionnaire (CVI scores from 0.78) and internal consistency acceptable (Cronbach’s alpha 0.81).

Internet survey

Once the questionnaire proved its validity, the survey was distributed among different specialists in FFU to obtain optimized recommendations. This 98-question survey on F-LUTS was distributed under the auspices of the International Continence Society (TOURNOVER ICS project, https://www.ics.org/news/1191). Newsletters were sent to ICS members to take part in the survey, as well as some links and advertisements in social media (Twitter®). The survey was opened for 12 months. When a plateau in number of responses were obtained the F-LUTS survey was closed, and the results analysed. The survey was subdivided into 8 relevant sections: first visit (12), diagnosis (12), invasive procedures (10), telemedicine and follow-up (16), medical therapy (18), emergencies (8), surgical therapy (22). In addition, each question should be answered according to 3 different levels of pandemic alert: mild, moderate, and high, according to COVID-19 hospital admission levels and impact on health resources (appendix table 1).

Each question was answered on a scale from 0 to 10 (0=absolutely disagree, 5=neutral, 10=completely agree). A quantitative analysis of the collected data was performed, categorizing the mean value from 0–10. The level of consensus was then categorized as follows: Total disagreement (0–2), Partial disagreement (3–4), Neutral (5), Partial agreement (6–7), Total agreement (8–10).

Mean agreement (MA) was calculated as the mean value of agreement on a scale from 0–10. Final agreement (FA) was defined as the percentage of answer that obtained a mean value > 5, corresponding to the addition of partial and total agreement. Consensus achievement was defined as attaining ≥ 70% agreement on each question, based on previous literature. In order to estimate the diversity of the sample, the 95% confidence interval was calculated for both quantitative (mean) and categorical variables.

General demographic information (age, gender, country, medical speciality, and place of professional activity) was retrieved from respondents.

3. Results

98 ICS members (67 male, 31 female) completed the F-LUTS survey. The respondents’ demographics are compiled in Appendix 2. Most responses came from Spain (20), Belgium (14), Brazil (11), Colombia (14), India (6), Turkey (6) and USA (5). Most of respondents were urologists (85, 86.7%) and with a professional activity in a University Hospital (58, 59.79%).

The recommendations for the diagnosis and management of female lower urinary tract symptoms are summarized in Tables 1–4. The complete survey is shown in Appendix 3.

3.1 First visit (Table 1)

The Panel agreed that video-consultation should be used for initial assessment. Detailed clinical history is fundamental for an accurate diagnosis of F-LUTS. However, this is perfectly possible by teleconsultation. Moreover, questionnaires and bladder diaries should be sent in advance to the patient to be filled out before the consultation; therefore,
The study can be optimized in a single visit having the maximum information. Apps and websites can be used for PROMS and Bladder diaries.

However, clinical examination remains an essential part of assessment of patients with LUTS, including the evaluation of oestrogen status, pelvic floor muscle function, pelvic organ prolapse, and stress or continuous urinary incontinence. The Panel agreed that a face-to-face (FTF) visit is mandatory if POP or continuous incontinence (fistula) are present or suspected.

The initial assessment should be telemedicine (videoconsultation) if symptoms related to recurrent or continuous urinary incontinence. The Panel agreed that a face-to-face (FTF) visit is mandatory if POP or continuous incontinence (fistula) are present or suspected.

Face-to-face visit is necessary prior to a surgical procedure.

A face-to-face visit is mandatory if POP or continuous incontinence (fistula) are present or suspected.

Telemedicine can approach patients and caregivers.

Follow-up consultations can be used to assess conservative treatment.

Every patient that visits the hospital for an outpatient clinic with clinical examination or invasive diagnostic study should be screened (patient interview and temperature check) for SARS-CoV-2 infection.

Table 1

| First visit | Mean agreement mean (IC95%) | Final agreement FA % (IC95%) |
|-------------|-----------------------------|-----------------------------|
| Alert       | Mild | Medium | High | Alert | Mild | Medium | High |
| The initial assessment should be telemedicine (videoconsultation) | 6.5 (5.6–7.3) | 7.8 (7.2–8.5) | 7.8 (7.2–8.5) | 58.9 (47.6–70.2) | 80.6 (71.4–89.7) | 85.9 (77.8–94.0) |
| Patients should be risk assessed before attending to face-to-face consultations. | 6.6 (5.7–7.5) | 7.8 (7.1–8.4) | 8.6 (8.0–9.2) | 61.1 (49.9–72.4) | 78.6 (69.0–88.2) | 88.7 (81.4–96.1) |
| Face-to-face visit is necessary prior to a surgical procedure. | 9.4 (8.9–9.8) | 9.0 (8.5–9.5) | 8.7 (8.0–9.3) | 95.9 (91.3–100) | 90.3 (83.4–97.1) | 87.5 (79.9–95.1) |
| A face-to-face visit is mandatory if POP or continuous incontinence (fistula) are present or suspected. | 9.4 (9.1–9.8) | 9.0 (8.5–9.4) | 8.3 (7.6–8.9) | 95.9 (91.3–100) | 93.0 (87.0–98.9) | 81.7 (72.7–90.7) |
| Questionnaires should be sent in advance to the patient to be filled out before the consultation including bladder diaries and PROMs. | 7.6 (6.9–8.3) | 8.2 (7.6–8.8) | 8.7 (8.1–9.3) | 72.6 (62.4–82.8) | 83.1 (74.4–91.8) | 88.7 (81.4–96.1) |
| Apps and websites can be used for PROMS and Bladder diaries. | 8.6 (8.1–9.1) | 8.8 (8.3–9.2) | 8.9 (8.5–9.4) | 87.7 (80.1–95.2) | 88.9 (81.6–96.1) | 90.1 (83.2–97.1) |
| COVID-19 testing, according to local guidance, should be undertaken for symptomatic and at-risk patients before invasive tests or procedures. | 8.5 (7.9–9.1) | 8.9 (8.4–9.5) | 9.3 (8.8–9.8) | 81.9 (73.1–90.8) | 90.1 (83.2–97.1) | 94.4 (89.2–99.7) |
| Every patient that visits the hospital for an outpatient clinic with clinical examination or invasive diagnostic study should be screened (patient interview and temperature check) for SARS-CoV-2 infection. | 7.8 (7.1–8.6) | 8.4 (7.8–9.1) | 8.9 (8.3–9.4) | 75.3 (65.5–85.2) | 84.5 (76.1–92.9) | 88.7 (81.4–96.1) |
| Telemedicine and follow-up | 5.82 (4.9–6.7) | 6.93 (6.1–7.7) | 7.96 (7.2–8.7) | 48.21 (35.1–61.3) | 65.45 (52.9–78.0) | 74.55 (63.0–86.1) |
| Ideal candidates for virtual visits are established patients not requiring physical examination. | 7.95 (7.2–8.7) | 8.02 (7.2–8.8) | 8.27 (7.5–9.1) | 80.36 (69.9–90.8) | 83.64 (73.8–93.4) | 83.64 (73.9–93.4) |
| Telemedicine can approach patients and caregivers. | 7.59 (6.7–8.4) | 7.85 (7.0–8.6) | 8.09 (7.3–8.9) | 75.00 (63.7–86.3) | 74.07 (62.4–85.8) | 75.93 (64.5–87.3) |
| Follow-up consultations can be used to assess conservative treatment | 8.57 (8.0–9.1) | 8.69 (8.1–9.2) | 8.54 (7.8–9.2) | 87.50 (78.8–96.1) | 87.27 (78.5–96.1) | 87.04 (78.1–96.0) |
| Behavioural recommendations and medical first line treatment for de novo neuro-urological patients after telemedicine evaluation should be initiated. | 6.80 (5.9–7.7) | 7.45 (6.7–8.2) | 8.11 (7.4–8.8) | 60.71 (58.9–82.9) | 70.91 (59.8–82.9) | 80.00 (69.4–90.6) |
| Follow-up consultations can be used to assess oral pharmacotherapy (efficacy and adverse events) | 8.02 (7.3–8.7) | 8.18 (7.5–8.9) | 8.27 (7.5–9.0) | 80.36 (69.9–90.8) | 81.82 (71.6–92.0) | 83.64 (73.9–93.4) |
| Telemedicine with validated questionnaires can be used to select patients for face-to-face or telephone consultation after Functional surgery. | 6.63 (5.8–7.5) | 7.20 (6.4–8.0) | 7.84 (7.1–8.6) | 62.50 (49.8–75.2) | 69.09 (56.9–81.3) | 78.18 (67.3–89.1) |
| If symptoms related to recurrent or complications (pelvic pain, vaginal bleeding, dyspareunia, urinary infection, etc.) are suspected after telephone consultation, face-to-face visit with physical exam is mandatory. | 9.64 (9.4–9.9) | 9.20 (8.8–9.6) | 8.76 (8.2–9.3) | 98.21 (94.7–100) | 98.18 (94.6–100) | 92.73 (85.9–99.6) |
| Telemedicine can be used after COVID experience | 7.88 (7.0–8.7) | 8.00 (7.2–8.8) | 8.04 (7.2–8.9) | 78.57 (67.8–89.3) | 76.36 (65.1–87.6) | 78.18 (67.3–89.1) |
| Behavioural therapy (including bladder training and pelvic floor exercises) can be recommended by telemedicine. | 7.16 (6.3–8.0) | 7.85 (7.1–8.6) | 8.55 (7.9–9.1) | 73.21 (61.8–84.8) | 78.18 (67.3–89.1) | 87.27 (78.5–96.1) |

(continued on next page)
Diagnosis-related questions in which consensus was reached, including non-invasive and invasive tests.

First:
✓ The initial assessment should always need a physical examination
✓ The initial assessment should be face to face
✓ The initial assessment should be telemedicine (phone call)
✓ Informed consent is mandatory for video consultations.

Telemedicine:
✓ Telemedicine is a feasible option for the follow up after Functional surgery during COVID pandemic.
✓ Telephone consultation after functional surgery, could establish if patient is satisfied and have no recurrence or complications, doing possible to avoid face-to-face visit.
✓ Telemedicine, using appropriate questionnaires, is a feasible option to evaluate de novo urinary symptoms after functional surgery.
✓ Online Pelvic floor exercises should be first option for SUI
✓ Smartphone applications can be used to help teach and track Kegel exercises

Table 2
Diagnosis-related questions in which consensus was reached, including non-invasive and invasive tests.

| Diagnosis | Mean agreement (IC95%) | Final agreement FA % (IC95%) |
|-----------|------------------------|-----------------------------|
| You can request a diagnostic test after a virtual consultation without a face-to-face consultation. Do you agree with this? | 7.1 (6.3–7.9) 7.5 (6.8–8.2) 8.1 (7.4–8.7) | 61.6 (50.5–72.8) 69.0 (58.3–79.8) 76.1 (66.1–86.0) |
| How confident do you feel requesting diagnostic tests without a face-to-face consultation | 6.1 (5.3–6.8) 7.1 (6.5–7.8) 7.7 (7.1–8.4) | 61.1 (49.9–72.4) 72.2 (61.9–82.6) 78.6 (69.0–88.2) |
| Imaging and non-invasive tests | | |
| Urinalysis is a fundamental test that should be performed in the assessment of Female LUTS. | 9.1 (8.7–9.3) 8.8 (8.2–9.1) 8.5 (7.8–7.0) | 95.5 (90.4–100) 89.2 (81.7–96.8) 86.4 (78.1–94.6) |
| When necessary, Postvoid residual can be assessed at distance (by ultrasound preferably) by trained nurses/physicians in female LUTS assessment | 7.2 (6.4–8.3) 7.6 (6.9–8.6) 7.9 (7.2–8.5) | 72.7 (62.0–83.5) 78.8 (68.9–88.7) 86.2 (77.8–94.6) |
| Perform US without delay in female LUTS patients with gross haematuria | 8.9 (8.3–9.4) 8.8 (8.3–9.3) 8.7 (8.2–9.4) | 90.9 (84.0–97.8) 90.8 (83.7–97.8) 90.9 (84.0–97.8) |
| Invasive procedures | | |
| Urodynamic testing should be performed only when it can have therapeutic consequences in the assessment of female LUTS | 8.4 (7.7–9.1) 8.6 (7.9–9.2) 8.5 (7.7–9.2) | 85.7 (77.1–94.4) 88.5 (80.5–96.5) 85.2 (76.3–94.1) |
| If the patient has an indication for urodynamic study during the pandemic, the study should be postponed until the COVID local behaviour flattens in the assessment of female LUTS patients. | 5.5 (4.7–6.4) 6.6 (5.9–7.4) 8.1 (7.4–8.8) | 48.8 (36.2–60.7) 63.5 (51.6–75.4) 81.0 (71.3–90.6) |
| The urodynamic study of the initial evaluation May not be performed in asymptomatic patients with normal free uroflowmetry and PVR | 7.8 (7.0–8.6) 8.1 (7.4–8.8) 8.1 (7.4–8.8) | 77.8 (67.5–88.0) 83.9 (74.7–93.0) 82.3 (72.7–91.8) |
| Cystoscopy for gross haematuria should be performed without delay in the assessment of female LUTS | 8.9 (8.3–9.5) 8.4 (7.8–9.1) 7.9 (7.1–8.6) | 90.6 (83.5–97.8) 87.3 (79.1–95.5) 81.0 (71.3–90.6) |

Non-agreement:
✓ Invasive diagnostic procedures can be indicated after telemedicine encounter with the patient.
✓ How confident do you feel initiating conservative and medical therapy without a face-to-face consultation
✓ Home flow tests should be used routinely
✓ Teleconference with the patient on a primary care set with the help of a nurse as required
✓ Telemedicine is only suitable for follow-up in female LUTS
✓ Free uroflowmetry is a mandatory test in the assessment of female LUTS
✓ Ultrasound is not necessary for the first female LUTS assessment, except for when you suspected any special related symptom.
✓ Urodynamic testing should be performed always in the assessment of female LUTS
✓ If the patient has an indication for urodynamic study during the pandemic, the study should be performed straight forward with no delay in the assessment of female LUTS
✓ Urodynamic testing should be performed only after failure of conservative/pharmacological treatment (Urodynamics can be deferred if initial treatment is conservative/pharmacological).
✓ Urodynamics can be deferred if initial treatment is botulinum toxin injections.
✓ If SUI surgery is considered urodynamics should be deferred until a Face-to-face visit
✓ If the patient is asymptomatic, COVID PCR-test should not be carried out before any ambulatory invasive procedures such as urodynamics and cystoscopy.

LUTS: low urinary tract symptoms. PVR: postvoid residual. SUI: stress urinary incontinence.
The need of weight loss can be established by telemedicine.

| Medical therapy | Mean agreement mean (IC95%) | Final agreement FA % (IC95%) |
|-----------------|-----------------------------|-----------------------------|
|                 | Alert                       | Mild | Medium | High | Alert | Mild | Medium | High |
| Weight loss     | 8.5 (7.9–9.1)               | 8.9  | (8.4–9.3) | 9.1  | (8.7–9.5) | 87.5 (78.9–96.2) | 89.1 (80.9–97.3) | 90.9 (83.3–98.5) |

Lifestyle changes and new drinking habits can be recommended by telemedicine.

| Follow-up visits should be carried out using telemedicine unless patient condition demands physical exam |
|---------------------------------------------------------------|
| 8.9 (8.4–9.5) | 9.1 | (8.7–9.6) | 9.3 | (8.9–9.7) | 92.9 | (86.1–99.6) | 94.5 | (88.5–100) |

It is safe to prescribe/modify medications in a telemedicine encounter with the patient.

| Anticholinergics should not be used for frail elderly patients and cognitive impairment in telemedicine. |
|---------------------------------------------------------------|
| 8.4 (7.7–9.1) | 8.3 | (7.6–9.0) | 8.2 | (7.5–8.9) | 83.0 | (72.9–93.1) | 82.7 | (71.4–93.0) |

Beta-3 agonists Can be given in the first consultation, or combined treatment with anticholinergics in follow-up in telemedicine.

| Beta-3 agonists can be prescribed in a patient with no history of High blood pressure or with controlled high blood pressure in TM setting |
|---------------------------------------------------------------|
| 7.0 (6.1–8.0) | 7.5 | (6.6–8.3) | 7.8 | (6.9–8.6) | 71.7 | (59.6–83.8) | 75.0 | (63.2–86.8) |

Strategies to avoid UTI not requiring in-person visits are recommended (vaginal oestrogen, D-mannose).

| In case of urinary retention after BTX injection CISC may be preferable to an indwelling catheter when possible |
|---------------------------------------------------------------|
| 9.1 (8.6–9.7) | 9.1 | (8.5–9.6) | 8.8 | (8.2–9.4) | 92.5 | (85.9–99.6) | 92.3 | (85.1–99.6) |

| Non-agreement |
|----------------|
| Pelvic floor Rehab as a home care treatment by a trained physiotherapist can be an option. |
| Remote teaching of the CISC technique with video-consulting and online instructional videos can be attempted. |
| Patients after MUS or native tissue POP repair without symptoms can be managed with telephone follow-up. |
| Discussing and scheduling an invasive procedure with the patient can be done using telemedicine™ |
| Anticholinergics can be given in the first consultation, or dose escalation vs. combined treatment with beta-3 agonists in follow-up in TM |
| Beta-3 agonists should not be prescribed in telemedicine if previous history of cardiac arrhythmia. |
| Antimicrobials can be prescribed during telemedicine consultation with no information regarding previous PVR |
| Percutaneous PTNS can be maintained. Electrodes/Needles should be sent to primary care. |
| CISC should be taught before BTX injection to anticipate the possibility of urinary retention. |

BTX: Botulinum toxin. CISC: Clean Intermittent Self Catheterization. TM: telemedicine. UTD: urinary tract infection.
may be prescribed in telemedicine in a high-risk setting, provided that the patient has controlled or no high blood pressure. Strategies to avoid urinary tract infections not requiring in-person visits are also recommended (vaginal oestrogen, D-mannose, methenamine).  

Regarding the possibility of urinary retention after BTX injection, clean intermittent catheterization (CIC) may be preferable to an indwelling catheter when possible. No agreement was reached over remote teaching of the CIC technique; it seems more reasonable to teach patients in a FTF consultation. However, there is no consensus by the panel on which is the right timing to train patients for CIC, before BTX injection, or only when the patient presents with urinary retention.

3.5. Surgery and Emergencies (Table 4)

Infected sling, mesh or prosthesis is considered an emergency for patients with signs of sepsis. It is agreed that treatment should not be postponed regardless of the pandemic. In cases of acute abdomen or

### Table 4

Questions related to surgical therapy and emergencies, in which consensus was reached.

| Surgical therapy | Mean agreement mean (IC95%) | Final agreement FA % (IC95%) |
|------------------|-----------------------------|-----------------------------|
| Ambulatory BTX injections for refractory OAB should be maintained. | 8.8 (8.2–9.3) | 7.8 (7.2–8.5) | 6.4 (5.5–7.4) | 90.6 (82.7–98.4) | 73.1 (61.0–85.1) | 59.6 (46.3–73.0) |
| First stage focal neumodulation for refractory OAB should be maintained. | 8.2 (7.6–8.8) | 6.4 (5.7–7.1) | 4.2 (3.2–5.1) | 83.0 (72.9–93.1) | 53.8 (40.3–67.4) | 30.8 (18.2–43.3) |
| Recommendations of local authorities should be followed to start elective surgeries for SUI. | 9.3 (8.9–9.7) | 9.3 (8.9–9.7) | 9.4 (9.0–9.7) | 94.3 (88.1–100) | 94.2 (87.9–100) | 96.2 (90.9–100) |
| Consider in-office BTX treatment with local anaesthesia (outpatient). | 7.8 (6.9–8.6) | 7.8 (7.0–8.6) | 7.6 (6.7–8.5) | 73.6 (61.7–85.5) | 73.1 (61.0–85.1) | 73.1 (61.0–85.1) |
| If BTX injection is done organize a call within 2 weeks. Consider PVR estimation. | 7.9 (7.1–8.7) | 8.2 (7.5–8.9) | 8.6 (8.0–9.1) | 83.0 (72.9–93.1) | 82.7 (72.4–93.0) | 88.5 (79.8–97.1) |
| Delay first stage SNM | 4.3 (3.4–5.1) | 6.2 (5.4–7.0) | 8.0 (7.2–8.8) | 22.7 (19.9–45.4) | 56.9 (43.3–70.5) | 82.4 (71.9–92.6) |
| Perform second stage when it is safe for the patient regarding COVID. | 7.9 (7.1–8.7) | 7.8 (7.0–8.7) | 7.8 (6.9–8.7) | 75.0 (63.2–86.8) | 74.5 (62.5–86.5) | 78.4 (67.1–99.7) |
| Sacral neumodulation should not be prioritized during pandemic peak phase because of the significant resources needed (two procedures, operative dressing, …). | 5.5 (4.6–6.5) | 6.8 (6.0–7.7) | 8.3 (7.5–9.0) | 47.2 (33.7–60.6) | 71.2 (58.8–83.5) | 80.8 (70.1–91.5) |
| Delay enterocystoplasty in OAB. | 5.7 (4.8–6.7) | 7.1 (6.3–7.9) | 8.6 (7.8–9.3) | 52.8 (39.4–66.3) | 73.1 (61.0–85.1) | 88.5 (79.8–97.1) |
| Delay urinary diversion in OAB if renal function is normal. | 6.9 (6.0–7.9) | 7.5 (6.7–8.4) | 8.4 (7.7–9.1) | 67.9 (55.4–80.5) | 71.2 (58.8–83.5) | 82.7 (72.4–93.0) |
| Out-patient clinics is preferred in SUI surgery. | 7.3 (6.5–8.2) | 7.7 (7.0–8.5) | 7.7 (6.9–8.6) | 67.0 (55.4–80.5) | 76.9 (65.5–88.4) | 75.0 (63.2–86.8) |
| It is safe to perform SUI surgery during the pandemic. | 7.9 (7.2–8.7) | 6.5 (5.7–7.3) | 4.4 (3.4–5.3) | 84.9 (75.3–94.5) | 59.6 (46.3–73.0) | 30.8 (18.2–43.3) |
| Range your belief about performing SUI surgery during pandemic in a scale from 0 to 10. | 8.2 (7.6–8.8) | 5.9 (5.1–6.7) | 3.8 (2.8–4.7) | 86.8 (77.7–95.9) | 50.0 (36.4–63.6) | 28.8 (16.5–41.2) |
| Emergencies | | | | | | |
| Infected slings/mesh/prosthetics is an emergency for patients with signs of sepsis (<24 h). | 9.8 (9.7–9.9) | 9.8 (9.7–9.9) | 9.8 (9.7–9.9) | 100 (100–100) | 100 (100–100) | 100 (100–100) |
| Consider urgent surgery if renal function is deteriorated. | 7.9 (7.2–8.7) | 7.8 (7.1–8.5) | 7.4 (6.7–8.1) | 75.5 (63.9–87.1) | 76.9 (65.5–88.4) | 71.2 (58.8–83.5) |
| When surgery is planned, pre-operative screening for COVID-19 should be performed as recommended by local official authorities. | 9.4 (8.9–9.9) | 9.5 (9.1–10.0) | 9.6 (9.1–10.0) | 92.5 (85.3–99.6) | 96.2 (90.9–100) | 96.1 (90.8–100) |
| Informed consent for COVID-19 should be obtained from patients. | 8.5 (7.7–9.2) | 8.5 (7.7–9.2) | 8.5 (7.7–9.2) | 79.2 (68.3–90.2) | 78.8 (67.7–89.9) | 78.8 (67.7–89.9) |

### Non-agreement

#### Surgical therapy
- Idiopathic OAB BTX treatment should be done with high priority (<4 weeks).
- Idiopathic OAB BTX treatment should be done with intermediate priority (1–3 months).
- Idiopathic OAB BTX treatment should be done with low priority (>3 months).
- Consider reversion of BTX or PINS to behavioural modifications and medications until the patient can return for face-to-face office visits.
- BTX injections can be undertaken safely, and follow-up can be carried out using telemedicine.
- In patients who underwent first stage, consider removal of the electrode or cutting the external extension.
- Consider urgent/emergent cystectomy in patients with uncontrollable haematuria.
- Open exploratory laparotomy should be chosen over laparoscopic or robotic approaches in patients with acute abdomen.
- Evaluation of urinary retention in women should be considered an emergency.

**BTX: botulinum toxin. OAB: overactive bladder. SNM: sacral neumodulation. SUI: Stress urinary incontinence.**
emergent abdominal surgery, no consensus was reached on whether open exploratory laparotomy should be chosen over laparoscopic or robotic approaches in the pandemic setting. When surgery is planned, pre-operative screening for COVID-19 should be performed as recommended by local official authorities.

There is consensus that surgical or invasive procedures, such as first stage sacral neuromodulation (SNM), enterocystoplasty, urinary diversion, or BTX injection should be postponed in case of high alert.

Regarding BTX injections, outpatient setting with local anaesthesia should be considered. After BTX injection, a telephone visit should be scheduled within 2 weeks. The post void residual (PVR) should be checked, preferably with an ultrasound scan.

If the advanced tined lead test-stage SNM was performed, the second stage should not be postponed, due to risk of infection.

It is agreed that stress urinary incontinence (SUI) surgery should be postponed in-medium and high pandemic alert. However, if SUI surgery is scheduled, consider outpatient clinics for this purpose.

4. Discussion

The COVID-19 pandemic completely paralysed functional Urology activity and forced clinicians as well as local and international authorities to develop new pathways and innovative ways of communication. With the aim of improving the future management of FFU patients, especially in the new pandemic scenario, consensual recommendations are needed to guide clinicians. For this reason, the authors developed a robust questionnaire covering the principal topics in functional urology, following the Delphi methodology and based on literature review and expert opinions. In the present paper, F-LUTS recommendations are discussed. The results of the remaining topics in functional Urology (male LUTS, POP, CPP, and neuro-urology) will be subject for discussion in a separated paper.

During a pandemic, the principal objectives are to increase the availability of inpatient and intensive care unit beds, to redistribute the healthcare personnel to areas of greater activity, and to avoid saturation of the health care systems. Naturally, it is also priority to minimize viral exposure by reducing inpatient visits and non-urgent activity. There is general agreement that non-urgent surgeries for benign conditions should be postponed during high alert, whereas emergent situations such as infected prostheses need urgent treatment regardless of the pandemic.

In the field of FFU, most clinical situations are viewed as benign conditions or quality of life issues. In most of the treatment schemes proposed in the emerging literature on the COVID-19 pandemic, functional urological surgery is entirely delayed [10]. However, in a prolonged and fluctuating pandemic scenario, there are cases that should be considered for management to avoid the physical and psychological damage that these problems can lead to. In this context, when surgery is needed, outpatient procedures under local anaesthesia should be favoured whenever possible to spare the use of ventilators and the inherent risk of virus spread and reduce the number of hospital admissions.

However, elective BTX, SNM, SUI surgery, urinary diversion or enterocystoplasty, without renal function deterioration or upper urinary tract risk should be delayed in a high-risk scenario. Once risk level declines, functional urology procedures should be resumed, again prioritizing ambulatory procedures. BTX injection can be performed as an outpatient procedure, under intravesical local anaesthesia, as recommended by the ALLURA group [15]. It has been shown to be a well-tolerated procedure, avoiding intravenous sedation or general anaesthesia. A minimum follow-up is required, including postvoid residual measurement within 2-weeks postoperatively. Although SNM may also be performed as an ambulatory surgery, it has further requirements, such as two stages within a 4-week period, fluoroscopic control, close follow-up for efficacy evaluation and programming or even lead removal. For this reason, the authors believe SNM should not be resumed until low alert is reached. In this setting, home transcutaneous posterior tibial nerve stimulation may be a valid alternative, avoiding office visits. It has demonstrated to be a feasible, well-tolerated and efficacious treatment in overactive bladder patients, although compliance is low in the long-term [16,17].

More complex abdominal surgeries such as urinary diversion or bladder augmentation pose a non-negligible risk of complications, including need for intensive care admission, and a longer length of stay, which cannot be assumed in the pandemic setting. They also require general anaesthesia, with an inherent risk of aerosol viral spread during intubation, manual ventilation and extubation. The American Society of Anesthesiologists (ASA) published a series of recommendations to reduce risk of occupational exposure, including limiting fiberoptic intubation and considering rapid sequence intubation in order to avoid manual ventilation [18].

Regarding surgical approach, minimally invasive surgeries pose the theoretical risk of spreading SARS-CoV-2 particles within the CO2 aerosol and the surgical smoke created by electrocautery or laser vaporization. Although it is currently unknown whether CO2 contains SARS-COV-2 viable particles, it has already been described with other viruses [19]. This translates into a potential risk of transmission to health care personnel in proximity to the surgical field. In the present study, consensus was not reached on whether open surgery should be chosen over laparoscopic or robotic approaches. Open surgery is not without risk of viral transmission as smoke is also created when electrocautery is used. Moreover, it normally involves longer hospitalization and bed occupancy. Based on current knowledge, open approach cannot be recommended over the others.

High variability of responses regarding medical therapy is also observed, especially when it comes to the safety of prescribing medications such as anticholinergics or β3 agonists in a telemedicine setting. This becomes especially relevant in frail elderly patients and those cognitively impaired, who may be negatively affected by anticholinergic adverse effects. β3 agonists have demonstrated a better tolerance and may be prescribed in telemedicine in a high-risk setting.

Urodynamic test is a fundamental pillar in the study of lower urinary tract dysfunctions. However, due to its invasive nature, it is agreed that the study should be postponed during a pandemic. A guideline regarding adaptation of urodynamic investigations during COVID-19 alert proposes the use of priority criteria considering the circumstances of each case and whether the urodynamic study would be relevant for treatment decision-making [20]. With reference to F-LUTS, patients with pelvic organ prolapse, hydronephrosis or vaginal ulcers should be prioritized, although even in these cases the study could be delayed up to 3 months. During the investigation, further safety measures could be implemented, such as keeping a 2-metre distance from the patient, or using Valsalva instead of coughs, where possible. The Panel agreed that patients should be screened by temperature check and SARS-COV-2 infection before invasive tests. However, as the pandemic evolves, these measures may not apply to the post-pandemic scenario.

In respect of imaging, it is not considered part of the routine assessment in F-LUTS. However, ultrasound is earning its place in the study of LUTS and pelvic floor, as it combines and anatomic and functional understanding of the disease. In line with the European Guidelines, the Panel agreed that ultrasound is mandatory in patients with gross haematuria. Further imaging including computed tomography may be indicated in case of suspicion of fistula or upper urinary tract anomalies or malignancies.

The COVID-19 pandemic has created the immediate need for alternative routes of communication and patient care. This Panel agreed that telemedicine is a valuable option during a pandemic, especially in high alert situation. It can prevent health workers and patients’ exposure to nosocomial transmission, while keeping accessibility to medical attention. It is especially important for patients at risk of severe illness, who benefit the most from social distancing. It also allows the clinicians to identify patients at risk or with need of onsite consultation or urgent evaluation or treatment. It has been most
beneficial in increasing access and overall improvement in follow-up which is significant for management of chronic conditions. Patients can be contacted via phone call, video call, e-mail, text message, specific software, or mobile applications. This Panel found videoconsultation more appropriate than phone call consultation, as video call may give more information to the clinician about the patient clinical condition and provide a more comfortable atmosphere for a first visit, facilitating the physician–patient relationship.

Before the pandemic emerged, telemedicine was already being implemented. Viers et al. published a prospective randomized trial of remote video visits in post-prostatectomy population [21]. For virtual visits (VV), they reported equivalence in timing efficiency, similar patient satisfaction (97% vs. 86%), and significantly reduced costs when compared to office visits (OV). However, these findings must be interpreted with caution, as only 24% of men identified actually completed the study.

It seems clear that telemedicine provides important benefits during a pandemic. But it may be still beneficial in a non-pandemic setting, which justifies its implementation in daily practice.

Telemedicine has demonstrated to be particularly satisfactory for follow-up care. In a cross-sectional survey of patients and clinicians participating in telehealth, 62.6% of patients and 59.0% of clinicians reported no difference in “the overall quality of the visit” between virtual and office visits. VV were vastly preferred to office visits by patients for convenience and travel time [22].

Patients in the rural areas or patients residing far away from the clinic may benefit in the long-term from telemedicine implantation as access to health care may be problematic for these individuals. It may also offer a cost benefit for patients through avoidance of travel costs and missed work as demonstrated by Demaerschalk et al. [23]. They compared VV to OV in a population of postoperative patients from different surgical specialties, and they found an estimated save of $888 per visit on average, with broader differences in patients residing far away from the clinic or in need of accommodation.

Despite the many advantages, clear drawbacks still present within telemedicine. Access to technology, particularly in the elderly or economically disadvantaged populations, limits its use. NHS digital figures show that nearly 40% of individuals had no access to online consultations at all in 2019 [24], limiting their access to adequate healthcare in an advancing telemedical society. Those with access may be unfamiliar with using it. This creates a significant health inequality within society, benefitting the younger and more affluent population. Viers et al. studied patients’ acceptance of telehealth and demonstrated that patients willing to participate in VV were younger (62 vs. 65 years), had a college education (77% vs. 65%), had previous exposure to videoconference technology (57% vs. 38%), compared to those that were unwilling [25]. This is particularly important in FFU where there is a great representation of elderly patients, patients with cognitive and physical disabilities. A study assessing the efficiency of telephone consultation in neuro-urology demonstrated that cognitive impairment, difficulty to obtain relevant information, and lack of physical examination were unfavourable to the efficiency of the teleconsultation [26].

The inability to perform physical examinations online is an important limitation of telehealth, which could lead to misdiagnosis. A self-examination directed by the physician during video visits has been contemplated; however, the authors believe that this may not be adequate, and office physical evaluation is key for an accurate diagnosis in certain situations (SUI, POP, surgical indication, postoperative complications). In addition, complementary test such as urinalysis or postvoid residual would need to be performed separately.

Billing telehealth has also been described as an important issue. Billing conditions vary in each country or even between regions/states within the same country. However, changes in telemedicine regulations are already being implemented. Confidentiality is another issue. The use of telemedicine and processing of patient’s personal data must follow each national privacy and data protection regulation. In Europe, the General Data Protection Regulation (GDPR) unifies the regulation on data protection and privacy within the European Union countries. The COVID-19 pandemic forced the introduction of telemedicine in the medical field, often lacking the appropriate protocols and platforms to do so. It is of vital importance using the proper channels with secure, medically licensed video consultation software for this purpose. Specific platforms, such as EPIC (Verona, WI, USA) medical record systems and NHS Attend Anywhere, have been developed.

We are now facing the “post pandemic era” where every country is moving back to normality with little chance of confinement despite some outbreaks of COVID-19. The medical community should take the opportunity to implement some of the learnings from the pandemic in its daily armamentarium, such as the development of telemedicine, that increases patient compliance to follow-up, home delivered pelvic floor rehabilitation or tele-assisted pelvic floor rehabilitation, switch of inpatient procedures to the outpatient setting and the use of less invasive anaesthetic procedures.

5. Conclusions

The Panel concludes that, during a pandemic, telemedicine offers a novel way of communication, maintaining medical care while preventing viral transmission. However, face-to-face visits cannot be completely omitted, as physical examination and diagnostic tests such as postvoid residual remain a compulsory part of functional urology evaluation. Non-urgent procedures should be postponed until the pandemic curve flattens. Risk factors for renal deterioration should be evaluated, as treatment in these patients should be readily performed. Ambulatory procedures under regional or local anaesthesia should be prioritized, aiming to reduce bed occupancy and risk of transmission.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Luis Lopez-Fando reports administrative support was provided by International Continence Society. Luis Lopez-Fando and Salvador Arlandis are Editorial Board Members of the Continence Journal.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.cont.2022.100521.

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