BJU Int 2024; **133:** 513–523 doi:10.1111/bju.16233

BJUI
BJU International

Review

Post-prostatectomy incontinence: a guideline of guidelines

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Aim

To provide a comprehensive review of guidelines from various professional organisations on the work-up and management of post-prostatectomy Incontinence (PPI).

Materials and Methods

The following guidelines were included in this review: European Association of Urology (EAU 2023), American Urological Association/Society of Urodynamics, Female Pelvic Medicine and Urogenital Reconstruction (AUA/SUFU 2019), International Consultation on Incontinence (ICI, 2018), the Canadian Urological Association (CUA, 2012) and the Urological Society of India (USI, 2018).

Results

In general, the guidelines concur regarding the significance of conducting a comprehensive history and physical examination for patients with post-prostatectomy incontinence (PPI). However, there are variations among the guidelines concerning the recommended additional investigations. In cases of troublesome PPI, male slings are typically recommended for mild to moderate urinary incontinence (UI), while artificial urinary sphincters are preferred for moderate to severe UI, although the precise definition of this severity remains unclear. The guidelines provided by AUA/SUFU and the ICI have offered suggestions for managing complications or persistent/recurrent UI post-surgery, though some differences can be observed within these recommendations as well.

Conclusion

This is a first of its kind review encompassing Guidelines on PPI spanning over a decade. Although guidelines share overarching principles, nuanced variations persist, posing challenges for clinicians. This compilation consolidates and highlights both the similarities and differences among guidelines, providing a comprehensive overview of PPI diagnosis and management for practitioners. It is our expectation that as more evidence emerges in this and other areas of PPI management, the guidelines will converge and address crucial patient-centric aspects.

Keywords

male stress incontinence, urinary incontinence, clinical practice guidelines, incontinence, men, radical prostatectomy

Introduction

Prostate cancer is the commonest cancer in men with >52 000 prostate cancer cases being diagnosed in the UK every year [1]. Of these, 15% of patients undergo radical prostatectomy (RP) for treatment of prostate cancer each year [2]. As per data from the Prostate Testing for Cancer and Treatment (ProtecT) study, moderate–severe urinary incontinence (UI) after RP occurs in 19% patients at 6 months and 13% at 6 years [3]. The literature on post-prostatectomy incontinence (PPI) reports a prevalence of 2.5–90% depending on the definition used and the duration of follow-up [4]. UI after RP has a very severe impact on quality of life in the first 6 months after surgery and continues to have a severe impact after 6 months of the surgery [5]. In addition to poorer quality of life, UI in general is associated with a higher prevalence of depression and anxiety, and is associated with increase in falls, fragility, pressure ulcers, among other conditions [6].

The mechanism of PPI is not fully understood but is thought to be secondary to a combination of factors including internal sphincter deficiency and underactivity, injury to the external rhabdosphincter, neural impairment, urethral support defects,

decreased membranous urethral length, and venous sealing effect [4,7]. Risk factors described for PPI include advanced age, obesity, preoperative bladder dysfunction before RP, prostate volume, storage dysfunction such as detrusor overactivity (DO) or poor compliance, which are associated in up to 30–40% patients, patient comorbidities, and previous benign prostate surgery [4,7].

The diagnosis of PPI is currently largely based on expert opinions [8]. There are significant gaps in our knowledge, due to the high variability in the reported rates of PPI, the fact that the pathophysiological mechanism is not fully understood, the lack of a universal consensus on the necessary diagnostic evaluation and the optimal and timely selection of the appropriate treatment [9]. With a wide variation in definitions used, range of diagnostic tests, and myriad of treatment options available, many professional organisations have created guidelines to help clinicians provide care for patients with PPI. Conflicting guidelines from different professional bodies can also confuse and frustrate practitioners [10], this can be secondary to different healthcare systems in different countries, or a lack of strong evidence base to make uniform recommendations.

Our aim was to review the guidelines available on the evaluation and treatment of patients with PPI and compare them to provide a comprehensive update on the management of these patients based on the guidelines.

Guidelines Reviewed

A systematic review was conducted using MEDLINE, the Excerpta Medica dataBASE (EMBASE), Emcare, Cumulative Index of Nursing and Allied Health Literature (CINAHL), Cochrane (Reviews and Trials) and Scopus search engines to identify guidelines addressing PPI from 1 January 2010 to June 2023. Only guidelines available in English were considered for inclusion. Additionally, the websites of major international and national societies were manually searched to ensure comprehensive coverage. The detailed search strategy is provided in Appendix 1.

Guidelines provide recommendations on the evaluation of PPI and the role of conservative as well as surgical management. All guidelines tend to undergo a similar development process, beginning with a systematic review of literature, grading of the available evidence, followed by formulation of recommendations with different definitions and strengths (Appendix 2: Tables A1, A2). They serve as a practical review of the evidence-based management of the 'index patient' [11].

The Appraisal of Guidelines for Research and Evaluation II (AGREE II) tool was used by two authors (N.B. and A.P.) to grade the guidelines (Appendix 3: Table A3).

Table 1 Guidelines reviewed.

Guidelines	Year of publication
European Association of Urology	2023
American Urological Association/Society of Urodynamics, Female Pelvic Medicine and Urogenital Reconstruction	2019
International Consultation on Incontinence	2018
Canadian Urological Association	2012
Urological Society of India	2018

Results

The following guidelines were included in this review: European Association of Urology (EAU) [12,13], AUA/Society of Urodynamics, Female Pelvic Medicine and Urogenital Reconstruction (AUA/SUFU) [14], International Consultation on Incontinence (ICI) [15], the Canadian Urological Association (CUA) [16], and the Urological Society of India (USI) [17] (refer to Table 1 for details).

The guidelines pertaining to PPI were published alongside 'Urinary Incontinence guidelines' in the CUA in 2012 and USI in 2018 and incorporated within the 'Male Non-Neurogenic Lower Urinary Tract Symptoms' section of the EAU guidelines in 2023, following which they published a separate document on PPI guidelines. The AUA/SUFU guideline and the ICI guideline published PPI as a distinct topic in 2019 and 2018, respectively. The CUA guidelines are awaiting an update to reflect the latest developments in PPI management. The definitions of recommendation strengths for various guidelines are provided in Appendix 3.

Pre-Treatment Information

The AUA/SUFU guideline offers crucial insights into patient counselling before RP, setting it apart as the sole guideline providing such information. The recommendations encompass counselling patients preoperatively on factors affecting continence, risk of sexual arousal incontinence postoperatively, and continence rates and recovery after surgery. The risk factors influencing PPI, included in the guidelines are: age, prostate size, membranous urethral length, nerve preservation, and body mass index. The guideline highlights a 30% risk of climacturia (also known as orgasm-associated UI) after RP (Grade B), while UI risk reaches 70% in patients undergoing salvage RP after radiotherapy.

Patients preparing for RP should receive counselling that PPI is typically expected in the short term, with significant improvement toward baseline by 12 months after surgery. However, some cases may experience persistent symptoms

Table 2 Evaluation of PPI as per the different guidelines.

Test	Guidelines recommending it and strength of evidence	No recommendation
History and examination	EAU (Strong), ICI (Recommendation A), CUA (Grade B), AUA/SUFU (Clinical Principle) USI (Clinical Principle)	
Validated questionnaire	EAU (Strong)	AUA/SUFU, ICI, CUA, USI
Bladder dairy	EAU (Strong), ICI (Grade B), CUA (Grade B), USI (Grade strong)	AUA/SUFU
Urine analysis	ICI (Grade B), CUA (Grade B), USI (Grade strong)	EAU, AUA/SUFU
Pad test	EAU (Strong), AUA/SUFU (Clinical Principle), ICI (Grade B), CUA (Grade B)	USI
PVR	EAU (Strong), AUA/SUFU (Clinical Principle), ICI (Grade B), CUA (Grade A), USI (Expert Opinion)	
UDS	EAU (Weak), AUA/SUFU (Conditional Recommendation, Grade C), ICI (Grade C), CUA (Grade B), USI (Grade Moderate)	
Cystourethroscopy	AUA/SUFU (Expert Opinion), ICI (Grade B), CUA (Grade B), USI (Grade moderate)	EAU

For strength of recommendation, refer to Appendix 2 for details.

requiring treatment. The CUA guidelines support this stating PPI can begin immediately after catheter removal, but continence can be achieved as within a few weeks and can take a year or more to recover.

Additionally, the guideline conditionally recommends initiating pelvic floor muscle training (PFMT, a practitioner-guided training programme specific to the pelvic floor muscle group) or pelvic floor muscle exercises (self-guided programmes) before RP, ideally commencing 3–4 weeks before surgery to facilitate neuromuscular adaptation. They state both modalities are valuable in restoring function of the pelvic floor and assisting with continence recovery by supporting the muscle strength and enhancing blood flow to the sphincter to promote healing.

Evaluation of Patients Referred with PPI

History and Examination

All guidelines support a medical history and physical examination of men with PPI to categorise the UI, severity of the UI, the degree of bother, evolution over time, and identify anyone needing a rapid referral, e.g., patients with neuropathy or pelvic diseases. The EAU guidelines use specific validated questionnaires to quantify UI severity; however, they mention the evidence on their sensitivity is limited and there is no evidence to suggest such questionnaires would affect treatment outcome. A single questionnaire was not recommended, but a reference is made to the sixth ICI review on patient-reported outcome measures (PROMs), which includes the International Consultation on Incontinence Questionnaire (ICIQ)-Short Form and ICIQ-Male LUTS among others.

The ICI guidelines mention the use of a cough stress test to check for leakage per urethral meatus after straining or coughing, a brief neuro-urological examination, and an assessment of manual dexterity for the use of a control pump for artificial urinary sphincter (AUS). The AUA/SUFU guidelines suggest taking all reasonable measures to confirm PPI on physical examination with or without provocative testing.

Variation exists between guidelines on recommendations of further tests (Table 2).

Urine analysis is recommended by all guidelines to rule out infection, haematuria, and signs of inflammation. Bladder diary or voiding diaries are recommended to measure symptom severity, frequency, extent of UI episodes, voided volume and 24-h and nocturnal urine volume.

Pad testing is recommended by all guidelines, to be used in specific circumstances. It is endorsed by the ICI guidelines to objectively quantify the PPI severity, with the home 24-h test being most accurate for quantification and diagnosis of PPI due to its reproducibility. The ICI mentions the clinical relevance of this test, as men with higher pad weights of >200 g/day have lower success rates after transobturator sling placement. The CUA recommends a 24-h pad test as the most accurate reflection of severity of the UI and mentions that the ICS standardised 1-h pad test is more widely adopted in clinical setting. The EAU guidelines state the usefulness of pad tests for predicting outcome of treatment is uncertain but can be used to quantify severity of UI and monitor response to treatment, they can also help predict future continence in men after RP in the early postoperative period. The AUA/SUFU recommends ancillary tests for patients where the nature of UI cannot be confirmed on initial history and examination including pad tests.

A blood test for renal function is recommended by the ICI only if renal function compromise is suspected or in the presence of polyuria.

An assessment of the post-void residual urine volume (PVR) is recommended by all guidelines, although the EAU suggests caution to its application in men as the prevalence, severity, and clinical application of PVR in men with UI is uncertain.

Table 3 Management of PPI as per guidelines.

Treatment	Guidelines recommending it and strength of evidence	No recommendation
Conservative PFMT	EAU (Weak), ICI (Grade C), CUA (Grade B), AUA/SUFU (Grade B), USI (Grade Strong)	
Lifestyle	EAU (Weak)	AUA/SUFU, ICI, CUA
Pads/sheaths	EAU (Weak, palliative), AUA/SUFU (Clinical Principle)	CUA, ICI, USI
Duloxetine	EAU (Weak), USI (Grade Moderate)	AUA/SUFU, ICI, CUA
Bulking agents	EAU (Weak, Do Not Offer), ICI (Grade C), AUA/SUFU (Grade B), USI (Grade Weak)	CUA
AUS	EAU (Strong, Moderate–Severe), ICI (Grade B), CUA (Grade A), AUA/SUFU (Grade B), USI (Grade Strong)	
Male sling	EAU (Weak, Mild–Moderate), AUA/SUFU (Grade B), ICI (Grade C), CUA (Grade C), USI (Grade Moderate)	
PRoACT	EAU (Weak), AUA/SUFU (Grade B), ICI (Grade D), CUA (Grade D)	USI

Imaging (ultrasonography [US], MRI, CT) is only recommended by the EAU guidelines to improve understanding of the anatomical and functional abnormalities causing UI assisting in management. The ICI mentions transurethral US and MRI of the external sphincter as modalities undergoing development.

The role of urodynamics studies (UDS) is discussed by all guidelines. The CUA recommends this in patients who fail conservative and pharmacological treatment, while the ICI mentions multichannel UDS maybe useful prior to invasive treatment of UI. The ICI mentions the role of UDS to assess the Valsalva leak point pressure (VLPP) and to identify DO, as sphincter incompetence occurs as the main cause of PPI and is present in more than two-thirds of patients while isolated bladder dysfunction is present in <10%, and both co-exist in a third (ranging from 30% to 40%). They mention the use of VLPP or cough or abdominal LPP pressure, or by retrograde LPP. The VLPP values can be misguiding in men after RP due to bladder neck stenosis, as the urethral catheter (vesical pressure line) can create obstruction, they mention the value of UDS has been questioned by some reports recently.

The AUA/SUFU recommend UDS if the cause of UI is uncertain or when there is doubt as to whether the patient has stress UI. The EAU guidelines recommend use of multichannel cystometry, video-UDS, and tests on urethral function, e.g., urethral pressure profilometry on an individual basis when invasive treatment is being considered. The USI recommends invasive UDS in men before surgical treatment.

Cystourethroscopy can be useful to exclude urethral strictures, bladder neck contracture, and to check the bladder. It is recommended by the AUA/SUFU, CUA and USI guidelines prior to surgical intervention, the EAU guidelines do not mention it, while the ICI recommend it on an individualised basis. The optimal timing for performing this prior to surgical intervention has not been mentioned in any of the guidelines. It is worth noting the UDS may often allude toward a diagnosis of urethral stricture or bladder neck contracture, as there might be difficulty inserting the filling line.

Management of PPI (Table 3)

Conservative Treatment

All guidelines recommended PFMT as the initial treatment for PPI. The ICI recommends this for a period of 6–12 months depending on whether progress is noted by the patient, the EAU guidelines suggest offering it for speedier recovery from UI alone or in combination with biofeedback and/or electrostimuation. The EAU mention lack of evidence with lifestyle advice but suggest that clinicians can offer this along with a review of medications that can worsen the UI. The USI recommend this for rapid return of continence and advise against routine use of biofeedback or pelvic floor stimulation therapy.

Conservative options such as absorbent pads, penile compression devices, and catheters must be offered as first-line management options to men with PPI as per the AUA/SUFU guidelines, while the EAU only recommends this as a palliative option.

Medication in the form of duloxetine is mentioned in the EAU and USI guidelines for men with PPI, while ensuring patients are counselled about side-effects and its off-label indication in Europe. Urethral bulking agents are only recommended if other effective treatments for PPI are contraindicated: this is consistent across all guidelines, due to their low cure rates, the USI recommends this as appropriate for short-term relief in men with mild PPI.

Surgical Management

The importance of shared decision-making with all treatment options offered is stressed by the AUA/SUFU guidelines. The definition of 'cure' is variable in all studies in the literature ranging from 'no pad use' to '1 security pad/24 h', while some use a specific definition of 'urine loss of <2 g/24-h pad test' (EAU). The USI recommends a minimum interval of 6 months after the initial prostate surgery to consider further surgery for PPI. The USI also recommend providing information on significant re-operation rates with all current surgical options.

A male transobturator sling is recommended to men with mild–moderate (<400 g/day as per the CUA, undefined as per the EAU) UI by all guidelines; however, previous pelvic radiotherapy, severe UI, or transurethral surgery may worsen the outcome as per the EAU guidelines. The EAU guidelines also recommend non-adjustable transobturator slings, as sling adjustability has limited evidence of benefit. The ICI guidelines recommend this as a less invasive procedure or non-mechanical device in mild–moderate UI as a viable alternative to an AUS, provided patients have not failed previous AUS surgery, have not had radiotherapy, and have normal bladder contractility. The CUA state the advantages of a sling compared to an AUS that include physiological voiding, less expensive, possible option for poor cognition patients, and no need for manual dexterity. The AUA/SUFU recommend considering a sling in patients who have not undergone radiation, have minimal night-time UI or inability to use an AUS due to poor hand dexterity or cognitive abilities. The USI recommends slings for mild–moderate PPI.

It is important to note all the guidelines except the EAU update were published prior to the MASTER trial (International Randomised Controlled Trial Registry identifier ISRCTN49212975) publication in 2021 [18]. The MASTER trial compared male transobturator sling and the AUS for PPI treatment and found no evidence of difference with high satisfaction and quality-of-life improvement with both procedures. Secondary outcomes were in favour of the AUS.

An AUS is recommended by all guidelines for men with moderate–severe UI in the absence of cognitive impairment and lack of manual dexterity. The EAU recommend referring these patients to specialist centres experienced in AUS implantation. The CUA in 2012 recommend the AUS as a 'gold standard' treatment for severe PPI and radiation therapy, although radiation may increase the risk of long-term complications. The EAU guidelines state there is a risk of urethral atrophy and/erosion increases after previous radiotherapy, penoscrotal approach, older age, and the longer interval between RP and UI surgery. The AUA/SUFU guidelines recommend insertion through a single cuff perineal approach, they recommend this over a sling in patients with primary adjuvant or salvage radiotherapy. The ICI recommend the AUS as the most predictably successful surgery for PPI treatment in men with sphincteric insufficiency including those with severe UI, who have had previous radiotherapy and who have had prior sling or AUS implantation. The USI recommends an AUS for mild–moderate and severe PPI.

Non-circumferential compression with the adjustable continence therapy system for men (ProACT™; Uromedica, Inc., Plymouth, MN, USA) can be offered as per the EAU and AUA/SUFU guidelines, although cure can be achieved with a high risk of complications and greater need for explantation within first 2 years compared to the sling and the AUS. The CUA state variable results with the para-urethral inflatable devices making recommendation impossible, which is also the approach taken by the ICI guidelines.

None of the currently published guidelines comment on antibiotic prophylaxis specifically for PPI surgery or the preoperative aseptic techniques recommended in this cohort of patients.

Complications after Surgery

The AUA/SUFU and ICI guidelines discuss complications after surgery. Both guidelines provide useful flowcharts on managing complications after AUS failure.

Sling Failure

In men with inadequate continence after sling implantation the AUA/SUFU recommend placing an AUS (with or without sling explant), while in those with infection/erosion explanting as much sling as possible followed by AUS placement 3–6 months later. The ICI recommend the AUS as a treatment of choice for persistent PPI after slings because it can provide circumferential urethral compression necessary for adequate coaptation even with diminished urethral compliance. It is also possible that pre-existing DO and reduced bladder compliance may result in poorer intermediate-term outcomes in men with a fixed transobturator sling and is worth addressing [19].

Mechanical Failure

It is a strong recommendation to inform patients about risk of loss of efficacy over time at rates of 24% at 5 years and 50% at 10 years. The ICI suggest re-examining the pump in patients with recurrent UI after AUS implantation, if the pump is not pumping or inadequately pumping to perform radiographic studies to check for contrast in the system. It is worth noting most UK practitioners use saline in the system; hence, this would not be applicable to the UK. They recommend surgical revision for the mechanical problem including tube kinking, fluid loss, or an obstructed system although there is an option of removing all components and placing a new one in the same setting provided the patient is healthy as per the AUA/SUFU guidelines.

Infection

With infection both guidelines agree urgent removal of the entire device and replacement at a later stage (3–6 months as per the AUA/SUFU) has good outcomes.

Erosion of the AUS

The ICI suggest unrecognised intraoperative urethral injury may precipitate cuff erosion, this can be diagnosed with cystoscopy in men with recurrent or persistent UI after AUS placement. Similar to infection, the eroded sphincter must be explanted urgently with a possible replacement 3–6 months later as per both guidelines. While the AUA/SUFU recommend removal of the entire device, the ICI suggest removal of only the eroded sphincter cuff may be sufficient if there is no infection. For the management of the urethra, the AUA/SUFU guidelines suggest leaving a urethral catheter for ~3 weeks, while the ICI report the optimal management is unclear and primary repair may be superior to catheterisation. The ICI recommend placing a new cuff away from the eroded site.

Atrophy of the Corpus Spongiosum

The ICI provide several therapeutic options for urethral atrophy including increasing cuff pressure around the atrophied urethra, higher balloon pressure in the reservoir, downsizing cuff diameter, or increasing the amount of fluid in the system. Downsizing the cuff diameter is the most common approach, they suggest transcorporal cuff placement as an option with an increased risk of erectile dysfunction. A transcorporal cuff placement should be considered if a 3.5-cm cuff size is measured in a previously irradiated patient, as it is associated with up to 21% risk of erosion [20].

Persistent or Recurrent UI

The AUA guidelines recommend history and examination in patients with persistent UI to check for deactivation or inadequately cycled device. Following this, they recommend cystoscopy to check cuff coaptation, cross-sectional imaging to rule out acute fluid loss (e.g., US or CT). In men with recurrent or persistent UI after AUS placement, where the device is functioning well and there is no erosion or infection, the ICI guidelines recommend UDS to check for bladder and urethral function. If there is loss of compliance or DO it can be treated, while sphincter weakness can be managed by downsizing the cuff, increasing balloon pressure, or implanting a second cuff as per the ICI and additionally moving the cuff location as per the AUA/SUFU. They recommend proximal relocation in case of a distally located cuff or larger cuff downsizing the cuff for better continence in those with persistent UI. Tandem cuff placement has been recommended as a salvage procedure for persistent UI. The ICI warn of the higher risk of additional complications and surgery in men with double cuff placement. The AUA/SUFU guidelines recommend cross-sectional imaging to check for the volume of the pressure regulating balloon and to action the above pathway in men with normal fluid levels of >20 mL.

Special Situations

The AUA/SUFU guidelines discuss special situations including offering a urinary diversion ± cystectomy where continence cannot be achieved by other means such as in those patients with multiple device failures, intractable bladder neck contracture, or severe DO. With hostile bladders, cystectomy with ileal conduit or continent catheterisable pouch is suggested to manage the UI while protecting upper tracts.

They recommend an AUS can be offered in men with urethral reconstruction and can be offered concomitantly in men undergoing surgical treatment for erectile dysfunction, but patients should be warned of the higher risk of complications in both situations. The AUA/SUFU state the possibility of decreased life span of the AUS due to altered blood supply after urethroplasty (depending on approach, e.g., transecting or not); however, a male sling would not be effective due to the post-surgical changes. Transcorporal cuff placement can be considered on account of the altered blood supply.

In men with bladder neck contracture or symptomatic vesico-urethral anastomotic stenosis, obstruction must be treated prior to surgical correction of PPI as UI can worsen after this. The CUA recommend treating bladder neck stricture and establishing patency for 6 months prior to surgical treatment of PPI. The USI also recommend stable patency of any anatomical narrowing prior to PPI surgery, although the duration is not specified. An AUS is considered a better option in this group as per the AUA/SUFU guidelines. The technique of managing the bladder neck contracture has not been mentioned.

Discussion

We present a comprehensive overview of the existing guidelines addressing PPI, with publications spanning approximately the past decade. Among these guidelines, the recently updated EAU guidelines offer the latest evidence-based insights into the assessment and treatment of PPI. In general, the guidelines concur regarding the significance of conducting a comprehensive history and physical examination for patients with PPI. However, there are variations among the guidelines concerning the recommended additional investigations. In cases of troublesome PPI, male slings are typically recommended for mild–moderate UI, while an AUS is preferred for moderate–severe UI, although the precise definition of this severity remains unclear. The guidelines provided by the AUA/SUFU and ICI have offered suggestions for managing complications or persistent/recurrent UI after

surgery, although some differences can be observed within these recommendations as well.

Hence, the assessment and treatment of PPI in men face challenges due to the scarcity of robust evidence in many aspects. The absence of a concise definition for PPI leads to considerable variability in reported incidence within the literature. Without a unanimous agreement on the definition of PPI, the evidence will remain diverse, making it difficult to achieve significant advancements in the field. While guidelines share overarching principles, nuanced variations persist, posing difficulties for clinicians managing these patients. This compilation of guidelines aims to consolidate and highlight both the similarities and differences among them, providing a comprehensive overview of PPI diagnosis and management for clinical practitioners.

It is important to note that currently, there are no specific UK-based guidelines dedicated to the evaluation and management of PPI. The guidelines provided by the National Institute for Health and Care Excellence (NICE), which primarily focus on UI and male LUTS, do not encompass this particular topic. Consequently, the summary outlined in this article is derived from consensus guidelines originating from American, European, and International sources.

While the guidelines generally reach similar conclusions, there is notable redundancy and duplication of effort among various guideline committees worldwide. A formal collaboration between these groups could enhance the effectiveness of the methodology. However, it is essential to consider country-specific variations in practices, as well as the availability of medications and technology.

Notably, the current guidelines lack explicit mention of post-RP survivorship programmes and their role in managing patients with PPI. Parry et al. [21] reported 9.3% of patients post-RP reported a bad UI score, with 4% having a 'big problem' with their urinary function, despite this the 3-year cumulative incidence of male UI surgery in the UK is 2.5% alluding to a significant number of patients living with severe bothersome UI and an unmet clinical need for UI surgery. It is important to ensure funding is provided to all aspects of prostate cancer treatment including postoperative care. Prostate cancer survivorship must be prioritised and funded appropriately to effectively tackle postoperative issues in men with prostate cancer [22].

Hence, in the future guidelines to capture this cohort of patients in the form of survivorship programmes would be essential. It is our expectation that as more evidence emerges in this and other areas of PPI management, the guidelines will converge and address crucial patient-centric aspects. Updates to several guidelines are forthcoming, which may address these points and further enhance the guidance provided.

Disclosure of Interests

None declared.

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Abbreviations: AGREE II, Appraisal of Guidelines for Research and Evaluation II; AUS, artificial urinary sphincter; CUA, Canadian Urological Association; DO, detrusor overactivity; EAU, European Association of Urology; ICI, International Consultation on Incontinence; ICIQ, International Consultation on Incontinence Questionnaire; LPP, leak point pressure; PFMT, pelvic floor muscle training; PPI, post-prostatectomy incontinence; RP, radical prostatectomy; SUFU, Society of Urodynamics, Female Pelvic Medicine and Urogenital Reconstruction; UDS, urodynamics studies; UI, urinary incontinence; US, ultrasonography; USI, Urological Society of India; VLPP, Valsalva leak point pressure.

Appendix 1

Search strategy for guidelines

Search strategy: MEDLINE, EMBASE, Emcare, CINAHL, Cochrane (Reviews and Trials), Scopus:

1. Urinary Incontinence, Urge/ or Urinary Incontinence, Stress/ or exp *Urinary Incontinence/ or "incontinen*".mp.
2. exp *Prostatectomy/ or "prostatectom*".mp. or "post-prostatectom*".mp.
3. 1 and 2
4. limit 4 to (male and humans and yr = "2010 - 2023" and english)

Inclusion criteria: only clinical practice guidelines from recognised national and international Urological Societies.

Exclusion: any other paper type, e.g., reviews, clinical trials, case reports, letter to editor etc.

Societies searched manually: CUA, AUA, NICE, EAU, Société Internationale d'Urologie, ICS, BAUS, Japanese Urological Association, Urological Society of India and Urological Society of Australia and New Zealand.

Appendix 2

Table A1 Definitions for levels of evidence in clinical guidelines.

	CUA	EAU	ICI	AUA/SUFU	USI
1	Meta-analysis of randomised trials or at least one randomised trial	(1a) Evidence obtained from meta-analysis of randomised trials (1b) Evidence obtained from at least one randomised trial	Meta-analysis of trials (RCTs) or a good quality randomised controlled trial, or 'all or none' studies in which no treatment is not an option	(A) Well-conducted and highly-generalisable RCTs or exceptionally strong observational studies with consistent findings	Systematic review of randomised trials or n-of-1 trials
2	One well-designed controlled study without randomisation or at least one other type of well-designed quasi-experimental study	(2a) Evidence obtained from one well-designed controlled study without randomisation (2b) Evidence obtained from at least one other type of well-designed quasi-experimental study	'Low' quality RCT or meta-analysis of good quality prospective 'cohort studies'	(B) RCTs with some weaknesses of procedure or generalisability or moderately strong observational studies with consistent findings	Randomised trial or observational study with dramatic effect including crossover studies
3	Well-designed non-experimental studies (comparative, correlation, and case reports)	Evidence obtained from well-designed non-experimental studies, such as comparative studies, correlation studies and case reports	Where a group of patients who have a condition are matched appropriately (e.g., for age, sex etc.) with control individuals who do not have the condition Good quality 'case series' where a complete group of patients all, with the same condition/ disease/ therapeutic intervention, are described, without a comparison control group	(C) RCTs with serious deficiencies of procedure or generalisability or extremely small sample sizes or observational studies that are inconsistent, have small sample sizes or have other problems that potentially confound interpretation of data	Non-randomised controlled cohort/follow-up study
4	Expert committee reports or opinions or clinical experience of respected authorities	Evidence obtained from expert committee reports or opinions or clinical experience of respected authorities	Includes expert opinion where the opinion is based not on evidence but on 'first principles' (e.g., physiological, or anatomical) or bench research The Delphi process can be used to give 'expert opinion' greater authority. In the Delphi process a series of questions are posed to a panel; the answers are collected into a series of 'options'; the options are serially ranked; if a 75% agreement is reached then a Delphi consensus statement can be made		Case-series, case–control or historically controlled studies

RCT, randomised controlled trial.

Table A2 Definitions used for grades of recommendation for the clinical guidelines' statements.

	CUA	EAU	ICI	AUA/SUFU	USI
A	Clinical studies of good quality and consistency addressing the specific recommendations and including at least one randomised trial based on Level 1 evidence (recommended)	Strong: the desirable effects of an intervention outweigh its undesirable effects or clearly do not or because of high quality evidence	Depends on consistent Level 1 evidence and often means that the recommendation is effectively mandatory and placed within a clinical care pathway. Grade A recommendation can follow from Level 2 evidence. However, a Grade A recommendation needs a greater body of evidence if based on anything except Level 1 evidence	Strong: are directive statements that an action should (benefits outweigh risks/burdens) or should not (risks/burdens outweigh benefits) be undertaken because net benefit or net harm is substantial	Strong*
B	Well-conducted clinical studies, but without RCTs consistent Level 2 or 3 evidence (recommended)		Depends on consistent Level 2 and or 3 studies, or 'majority evidence' from RCTs	Moderate: are directive statements that an action should (benefits outweigh risks/burdens) or should not (risks/burdens outweigh benefits) be undertaken because net benefit or net harm is moderate	Moderate*
C	Made despite the absence of directly applicable clinical studies of good quality Level 4 studies or majority evidence (optional)	Weak: narrow gradient between desirable and undesirable effects of an intervention or because of low quality evidence	Depends on Level 4 studies or 'majority evidence' from Level 2/3 studies or Delphi processed expert opinion	Conditional: are non-directive statements used when the evidence indicates that there is no apparent net benefit or harm, or when the balance between benefits and risks/burden is unclear	Weak*
D	Evidence inconsistent/inconclusive (no recommendation possible) or the evidence indicates that the drug should not be recommended		No recommendation possible – would be used where the evidence is inadequate or conflicting and when expert opinion is delivered without a formal analytical process, such as by Delphi	Clinical principle – statement about a component of clinical care that is widely agreed upon by urologists or other clinicians for which there may or may not be evidence in the medical literature Expert opinion – statement, achieved by consensus of the Panel, that is based on members' clinical training, experience, knowledge, and judgement for which there is no evidence	Clinical principle – a statement that is widely agreed upon by clinicians for which there may or may not be evidence in the medical literature Expert opinion – a statement agreed upon by the guidelines panel in the absence of evidence

**The strength of recommendation based on the extent of risk–benefit ratio of either taking or not taking an action.*

Appendix 3

Table A3 The AGREE II instrument scores obtained from two reviewers.

%	CUA	EAU	ICI	AUA/SUFU	USI
Domain 1 – Scope and purpose	92	92	100	100	81
Domain 2 – Stakeholder involvement	61	89	92	100	64
Domain 3 – Rigour of development	96	100	100	100	84
Domain 4 – Clarity of presentation	100	100	100	100	95
Domain 5 – Applicability	75	80	75	100	75
Domain 6 – Editorial independence	83	100	71	83	100
Overall rating	67	92	92	100	50