

Diagnosis and medical treatment of lower urinary tract symptoms in adult men: applying specialist guidelines in clinical practice

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OBJECTIVE

- To review current treatment guidelines (international and national) on managing male lower urinary tract symptoms (LUTS) and to summarize them for easy application in clinical practice.

METHODS

- A group of European urology specialists from primary and secondary care reviewed current treatment guidelines for male LUTS.

RESULTS

- The most appropriate recommendations for managing male LUTS were identified

What's known on the subject? and What does the study add?

Several sets of comprehensive treatment guidelines (national and international) exist for managing male lower urinary tract symptoms (LUTS), but these are not widely adopted in primary and secondary care, and are not consistently applied across Europe.

This paper will improve the consistency of treatment approaches for adult males with LUTS by providing a clear, concise summary of existing treatment guidelines that can be easily adopted by urologists and primary care specialists.

from existing international and national guidelines, and were summarized and simplified for use as a quick reference guide for healthcare professionals managing LUTS in adult males.

CONCLUSIONS

- Current guidelines for managing male LUTS were developed by urologists and are too complex for easy application in routine practice.

- This brief summary of current guidance should help to achieve consistent adoption of recommendations for best practice, improve working relationships between primary care specialists and urologists and clarify which patients' treatments should be managed entirely by urology specialists.

KEYWORDS

lower urinary tract symptoms (LUTS), treatment guidelines, storage symptoms, voiding symptoms, overactive bladder

INTRODUCTION

In men, particularly in the elderly, LUTS are common and are often assumed to be directly or indirectly related to the prostate; however, current knowledge suggests that bothersome LUTS may also have other causes. These include those originating in the bladder, either overactive bladder (OAB) syndrome/detrusor overactivity or detrusor underactivity, and the kidney, which are manifested as nocturnal polyuria or polydipsia [1]. LUTS may be categorized

into three main groups: storage, voiding and post-voiding symptoms (Table 1) [2].

Storage LUTS are congruent with OAB, which is defined by the ICS as 'urgency, with or without urge incontinence, usually with frequency and nocturia' [2]. The EPIC population-based survey was conducted in Canada, Germany, Italy, Sweden and the UK in 2005, and used the 2002 ICS definitions [3]. The results showed that in men, storage LUTS were more prevalent

than either voiding or post-voiding LUTS (51.3%, 25.7% and 16.9%, respectively). Furthermore, a population-based survey of individuals aged ≥40 years in six European countries estimated the prevalence of OAB symptoms, with or without urgency incontinence, as 15.6% in men, and 17.4% in women (overall range 12–22%) [4]. A US survey of 5204 adults aged ≥18 years also estimated similar OAB prevalence rates in men and women of 16–17% [5]. The prevalence of LUTS increases with age and the prevalence of storage LUTS

TABLE 1 Classification of LUTS: storage, voiding and post-micturition symptoms

Storage	Voiding	Post-micturition (voiding)
<ul style="list-style-type: none"> • Frequency • Urgency • Nocturia • Incontinence 	<ul style="list-style-type: none"> • Slow stream • Splitting or spraying • Intermittency • Hesitancy • Straining • Terminal dribble 	<ul style="list-style-type: none"> • Post-micturition dribble • Feeling of incomplete emptying

increases with age among men specifically [6].

The negative impact of OAB symptoms and LUTS on health-related quality-of-life (HRQoL) is well documented [7–10], and has far-reaching effects on daily life that can adversely affect functionality and productivity at work [11]. Based on a prevalence of 18.6%, the social costs of OAB among community-dwelling adults in the USA have been estimated at nearly \$25 billion per annum, with the cost of managing OAB symptoms 2.6 times higher among adults aged <65 years than among adults aged ≥65 years [12]. Despite these economic data, the number of patients receiving treatment remains low. In analyses of a database of over 1 million men in the UK, diagnoses of storage and voiding LUTS were rare compared with population prevalence estimates, and only 6–7% of men diagnosed with storage LUTS received antimuscarinics [13], perhaps owing to the misconception that antimuscarinics are not as effective as α-blockers or 5α-reductase inhibitors in men, or fears about acute urinary retention (AUR). The undertreatment of men with OAB medication was also reported by Helfand *et al.* [14]; in their study, only 24.4% of men with OAB symptoms received appropriate treatment.

National and international guidelines on the recommended treatment approaches for male LUTS have been introduced [1,15–17]. The majority of treatment guidelines (AUA, European Association of Urology [EAU], and International Consultation on Incontinence) have been developed by urologists, who recommend assessment and treatment paths for their urological colleagues. The current challenge is thus to address the gap between guidelines developed in secondary care and routine clinical management of

LUTS in primary care, where the majority of patients are assessed and treated. While the guideline developed by the National Institute for Health and Clinical Excellence (NICE) in the UK is aimed specifically at primary care physicians and specialist nurses, in practice the same gap needs to be bridged between specialist-developed guidelines and their adoption and practical implementation within primary care. The present paper reviews and interprets the current management guidelines for male LUTS and provides a simple and practical guide to their application.

METHODS

A group comprising urologists, surgeons and a primary care specialist from across Europe was convened to discuss the practicality of current treatment guidelines and to what extent they are applied in clinical practice. The group identified the most recently published (within 5 years) and widely adopted treatment guidelines developed in the English language (listed below) and reviewed their recommendations. The most appropriate recommendations were combined and summarized into a simple, practical guide to diagnosing and treating male LUTS across primary and secondary care specialities.

- AUA: Guideline on the management of BPH [16].
- EAU: Guidelines on the treatment of non-neurogenic male LUTS [1].
- International Consultation on Incontinence Recommendations of the International Scientific Committee: Evaluation and treatment of urinary incontinence, pelvic organ prolapse, and faecal incontinence [15].
- NICE clinical guideline 97. LUTS. The management of LUTS in men [17].

RESULTS

CASE FINDINGS

Physicians need to communicate well with their patients if they are to identify individuals who have LUTS. In general, men with LUTS can be identified opportunistically through routine health checks or from bothersome symptoms they proactively report to their doctor. Physicians should actively question all men aged ≥40 years as part of a general health check, or those with co-morbidities who are being actively monitored within primary care, to help identify LUTS.

Patients may think that their symptoms are trivial and might not realise that LUTS can generally be easily managed, so asking a few simple questions can help to bring any specific problems to the attention of a physician [18]. Should a patient answer 'yes' to any question listed below, and a diagnosis of LUTS is suspected, then further assessments should be performed to identify the cause and determine the most appropriate management option. These questions, although not formally validated, are used widely in clinical practice and can be easily translated and understood by patients.

Key points 1

Actively question all men aged ≥40 years as part of a general health check, or those with comorbidities and who are being actively monitored to identify potential LUTS

1. Do you have problems with your bladder?
2. Do any of the symptoms listed below bother you?
 - a. Do you need to get up more than once in the night to urinate?
 - b. Have you noticed it is more difficult to pass (void) urine, or do you have the need to pass urine more frequently or with greater urgency?
3. Would you like to receive treatment for your bladder symptoms?

MINIMUM DIAGNOSTIC REQUIREMENTS

Current treatment guidelines for male LUTS recommend an assortment of diagnostic

tests and initial assessments. Combining these various recommendations produces a comprehensive list of assessments that may be carried out in primary care by most non-specialists as well as urologists. The list is summarized in Table 2. A full medical history is essential and should include detailed use of medications (prescription and over the counter). Physical examination of the abdomen and genitalia, gross neurological examination and DRE are all required. In addition, urinary frequency-volume charts, and urine dipstick tests should be used, and post-void residual urine volume (PVR) should be quantified when incomplete bladder emptying is suspected and antimuscarinic treatment is intended [1,19].

After the completion of all these assessments, baseline symptoms should be assessed separately using the IPSS. This questionnaire can be self-administered by patients and provides a set of reference values to allow the accurate quantification of LUTS or subsequent changes in response to treatment. Specifically, a total score of 1–7 indicates mild symptoms, a total score of 8–19 moderate symptoms and a total score of 20–35 severe symptoms. In addition, PSA testing can be offered at the physician's discretion if LUTS are suggestive of benign prostate enlargement (BPE), the prostate feels abnormal on DRE, or the patient is concerned about prostate cancer. However, assessment of PSA levels is most useful in patients who require treatment for BPE or to identify those men who are at risk of disease progression. Patients with symptoms or signs indicative of prostate cancer should be referred for and managed within specialist care.

TREATMENT STRATEGIES

Once a diagnosis and the origin of LUTS has been established, a management programme should be developed that is acceptable to the physician (primary care or urologist) and the patient. Men with mild to moderate uncomplicated LUTS and minor bother only, should be conservatively managed within primary care with lifestyle advice (e.g. reduction or adjustment of fluid intake, avoidance of caffeine, alcohol or artificial sweeteners), exercises (e.g. bladder training and pelvic

TABLE 2 Minimum diagnostic assessments for men with suspected LUTS

Assessment	Reason
1. Medical history	<ul style="list-style-type: none"> To identify all possible causes of symptoms and any comorbidities. <p>Patients with neurogenic disorders (e.g. cerebral infarction, multiple sclerosis, Parkinson's disease, pelvic disorders/surgery, diabetes mellitus) should all be referred to specialist care.</p>
2. Current medication	<ul style="list-style-type: none"> To ensure medication is not causing or exacerbating symptoms. <p>The following drug classes are known to exert anticholinergic-type effects and cause LUTS: antihistamines (e.g. diphenhydramine and hydroxyzine), muscle relaxants (e.g. baclofen and hyoscyamine), tricyclic antidepressants (e.g. amitriptyline and nortriptyline), loop diuretics (e.g. furosemide and torasemide) plus certain herbal remedies and over-the-counter products, such as cold and flu remedies.</p>
3. Physical examination (abdomen/genitalia)	<ul style="list-style-type: none"> To assess any potential physical causes of LUTS (e.g. phimosis, meatus stenosis, penile cancer or chronic urinary retention).
4. Gross neurological examination	<ul style="list-style-type: none"> To exclude neurogenic disorders with possible influence on the bladder.
5. DRE	<ul style="list-style-type: none"> To estimate prostate size and exclude prostate cancer, rectum cancer, intestinal or pelvic floor disorders or prostatitis.
6. Urine dipstick test	<ul style="list-style-type: none"> To detect blood, glucose, leucocytes and nitrite. <p>Patients with haematuria (after exclusion of UTI) should be referred for specialist care to exclude specific bladder conditions (e.g. urothelial cell carcinoma or bladder stones).</p>
7. Urinary frequency-volume chart	<ul style="list-style-type: none"> To assess whether there is a true increase in voiding frequency and/or volume, and the extent of the problem. To exclude polydipsia and nocturnal polyuria. <p>Assessments can include time and approximate volume of void.</p>
8. PVR	<ul style="list-style-type: none"> To assess the amount of urine remaining in the bladder immediately after voiding and estimate the risk of developing AUR. <p>Patients with PVR >200 mL should not receive antimuscarinic therapy. If PVR assessment is not available, patients should be asked whether they have a sensation of incomplete emptying after urination [2,15,29].</p>

floor muscle exercise), containment products (e.g. pads or collection devices) and regular monitoring.

Pharmacotherapy should be offered to men with bothersome LUTS when conservative management options have been unsuccessful or are not appropriate [1,15–17]. It is important to consider comorbidities and ongoing treatments before selecting drug treatment for LUTS. Several pharmacological treatment options are available for men with moderate to severe LUTS, including monotherapy with α -blockers, 5 α -reductase inhibitors, antimuscarinics, vasopressin analogues and, in specific clinical situations, drug combinations.

Monotherapy

α -blockers should be offered as a first-line treatment to men with bothersome LUTS who request treatment. These drugs have a rapid onset of action and may therefore be considered for intermittent use in patients with symptoms that do not need long-term treatment and are of fluctuating intensity. All α -blockers are equally effective at adequate doses and work independently of prostate size or PSA level [20], even though they do not affect prostate size [21]. Some drugs within the class require initial dose titration (doxazosin and terazosin), whereas others do not (alfuzosin, silodosin and tamsulosin). Selection of the individual agent is at the physician's discretion.

5 α -reductase inhibitors (dutasteride and finasteride) may be offered to men who have moderate to severe LUTS and an enlarged prostate (>40g or a PSA level >1.4 ng/mL) [22] and who are considered to be at increased risk of disease progression, to help avoid the need for prostate surgery and to reduce the risk of AUR. These drugs reduce prostate size by 15–25% and circulating PSA levels by \approx 50% [23]. Patients should be advised that the clinical effects of these drugs will not become apparent until after a minimum treatment duration of 6–12 months. Long-term therapy should therefore be discussed with the patient before treatment initiation.

Antimuscarinics (e.g. fesoterodine, tolterodine and solifenacin) may be used to manage storage symptoms (OAB) in men with LUTS [1]. Although the majority of patients included in clinical trials of these agents have been women, men with storage symptoms experienced similar benefits and side effects with antimuscarinics in these studies. Antimuscarinics are efficacious both as first-line therapy for prominent storage LUTS and as second-line treatment for those men who have previously failed other medications. Antimuscarinics are not advised (or cautious prescribing is recommended) in men with relevant BOO, as identified from the patient history, IPSS, and/or evidence of clinically significant PVR (>200 mL). Efficacy and safety profiles of drugs within the class are similar; however, physicians may wish to consider the available formulations and dosage options when choosing a specific agent [24]. For example, newer agents that are available in once daily formulations (e.g. propiverine, solifenacin and tolterodine) are generally better tolerated than older drugs, e.g. oxybutynin, and the option of dose titration with some agents (e.g. darifenacin, fesoterodine and solifenacin) might be desirable for specific patients.

Oral agents that decrease night-time urine production (vasopressin analogue and loop diuretics) may be offered to men with nocturnal polyuria if other medical causes have been excluded (e.g. intake of diuretics at night time, polydipsia or diabetes) and other treatments have provided no benefit for this specific condition. The vasopressin analogue desmopressin is taken once daily before sleeping, and careful dose titration is required. The patient should also be advised

to stop drinking fluids from at least 1 h before using desmopressin until 8 h thereafter. Serum sodium concentrations should be carefully monitored, particularly in men aged \geq 65 years or those who have values below the normal range [1,17]. (See follow-up and safety measures for further details.) Alternatively, late afternoon administration of a diuretic, which produces a diuresis in the early evening, can also reduce nocturnal production of urine, thereby reducing nocturnal frequency.

Key points 2

Pharmacological treatment options for men with bothersome moderate to severe LUTS, after consideration of comorbidities and current medication

- **α -blockers:** bothersome LUTS, request for fast symptom relief; or those with fluctuating severity of symptoms
- **5 α -reductase inhibitors:** enlarged prostate (>40 mL), high risk of disease progression
- **Antimuscarinics:** predominant storage symptoms, request for fast symptom relief
- **Vasopressin analogue and loop diuretics:** isolated or predominant nocturnal polyuria

Combination therapy

For some patients, monotherapy will be insufficient to control all LUTS adequately. Combination treatment has been shown to be more efficacious than either type of monotherapy, but additional adverse events and costs have to be weighed against improved efficacy. The combination of an α -blocker and a 5 α -reductase inhibitor may be considered for men with bothersome moderate to severe LUTS, enlarged prostate (>40 mL or PSA >1.4 ng/mL) [22] and reduced urinary flow rate, with high risk of BPH disease progression. The α -blocker is responsible for fast LUTS relief and the 5 α -reductase inhibitor for prevention or delay of disease progression. For men with moderate to severe LUTS with remaining storage symptoms after treatment with either monotherapy, the combination of an α -blocker with an antimuscarinic should be considered.

Key points 3

Monotherapy is inadequate for some patients with moderate to severe LUTS. In such patients, tailored combination therapy can be considered.

- **α -blocker + 5 α -reductase inhibitor:** enlarged prostate, reduced flow, high risk of AUR or prostate surgery
- **α -blocker + antimuscarinic:** storage symptoms persist after initial α -blocker monotherapy

Concomitant medications

Patients should be advised that the use of other medications can affect the efficacy and safety of antimuscarinics (e.g. cold and influenza medications containing phenylpropanolamine and diphenhydramine). As already suggested, physicians should question patients about current prescription and over-the-counter medication, but also remind patients to seek their advice before starting new medication. Some examples of drugs known to affect the efficacy of LUTS medication are included in Table 3. In addition, the importance of continuing recommended exercises and lifestyle changes should be reinforced (e.g. modification of fluid intake, avoidance of caffeine, alcohol and artificial sweeteners).

FOLLOW-UP AND SAFETY MEASURES

Men who are being assessed using watchful waiting or who are practising behavioural or lifestyle modifications should be reviewed at 6 months and then annually, provided there is no deterioration of symptoms or development of absolute indications for surgical treatment, i.e. urinary retention, recurrent UTIs, macroscopic haematuria caused by the prostate and resistant to drug treatment (antibiotics or 5 α -reductase inhibitors), bladder stones or upper urinary tract dilation with or without impaired renal function.

Once drugs have been prescribed, patients receiving α -blockers, antimuscarinics, or combinations of α -blockers with antimuscarinics or 5 α -reductase inhibitors, should be reviewed at 4–6 weeks after drug initiation to determine treatment response. If patients gain symptomatic relief in the absence of troublesome side effects,

α-blockers, antimuscarinics, or the combinations may be continued. Patients receiving 5α-reductase inhibitors should be reviewed after 12 weeks and at 6 months to determine treatment response and side effects.

For patients receiving oral desmopressin, serum sodium concentration should be measured at days 3 and 7 and after 1 month, because of an increased risk of hyponatraemia in those aged ≥65 years [1]. Measurement of serum sodium concentration is always indicated whenever dose adjustment has occurred. Thereafter, if serum sodium concentration has remained within the normal range, sodium levels should be measured every 3–6 months. Measurement of serum sodium concentration and assessment of frequency–volume chart are recommended at follow-up visits.

Patients who have bothersome LUTS that have not responded to conservative management or pharmacotherapy should be referred for specialist care. Similarly, patients should be referred for specialist assessment if they have LUTS complicated by recurrent or persistent UTI, hydronephrosis/renal impairment, bladder stones (absolute indications for prostate surgery), bladder diverticula, or suspected urological cancer.

Key points 4

Several trigger points should stimulate the review of treatment options and raise the possibility of referral to a specialist:

- Uncontrolled or increased LUTS, despite active treatment
- UTIs
- Macroscopic haematuria
- Deterioration of kidney function
- Unexplained, clinically significant increase in PVR
- Development of hesitancy or inability to pass (void) urine
- Clinical uncertainty and suspicion of prostate cancer

LUTS MANAGEMENT ALGORITHM

An overview of the minimum basic assessments required to diagnose and manage LUTS within primary care is shown in Fig. 1. This decision tree shows the various stages of clinical assessment required to

TABLE 3 Examples of drugs with known antimuscarinic effects that should be reviewed when prescribing antimuscarinics for storage LUTS in men (adapted from Rudolph et al. 2008) [30]

Drug class/action	Extent of antimuscarinic effect		
	High	Medium	Low
Antidepressants, antipsychotics	Amitriptyline	Despiramine	Haloperidol
	Imipramine	Nortriptyline	Mirtazapine
	Perphenazine	Olanzapine	Paroxetine
	Thioridazine		Pramipexole
	Thiothixene		Quetiapine
	Trifluoperazine		Risperidone
			Trazodone
Antiemetics	Fluphenazine	Prochlorperazine	Ziprasidone
	Promethazine		Metoclopramide
Antihistamines	Chlorpheniramine	Cetirizine	–
	Cyproheptadine	Loratidine	
	Diphenhydramide		
	Hydroxyzine		
	Meclizine		
Antimotility/antidiarrhoeal	–	Cimetidine	Ranitidine
Antispasmodics/muscle relaxants	Atropine products	Loperamide	
	Carisoprodol	Baclofen	Methocarbamol
	Dicyclomine	Cyclobezaprine	
	Hyposcyamide		
	Tizanidine		
Decongestants	–	Pseudoephedrine + triprolidine	–
Dopaminergic agents	Chlorpromazide	Amantadine	Carbidopa–levodopa
			Entacapone
			Selegiline

accurately diagnose LUTS and determine an acceptable management plan incorporating appropriate pharmacotherapy.

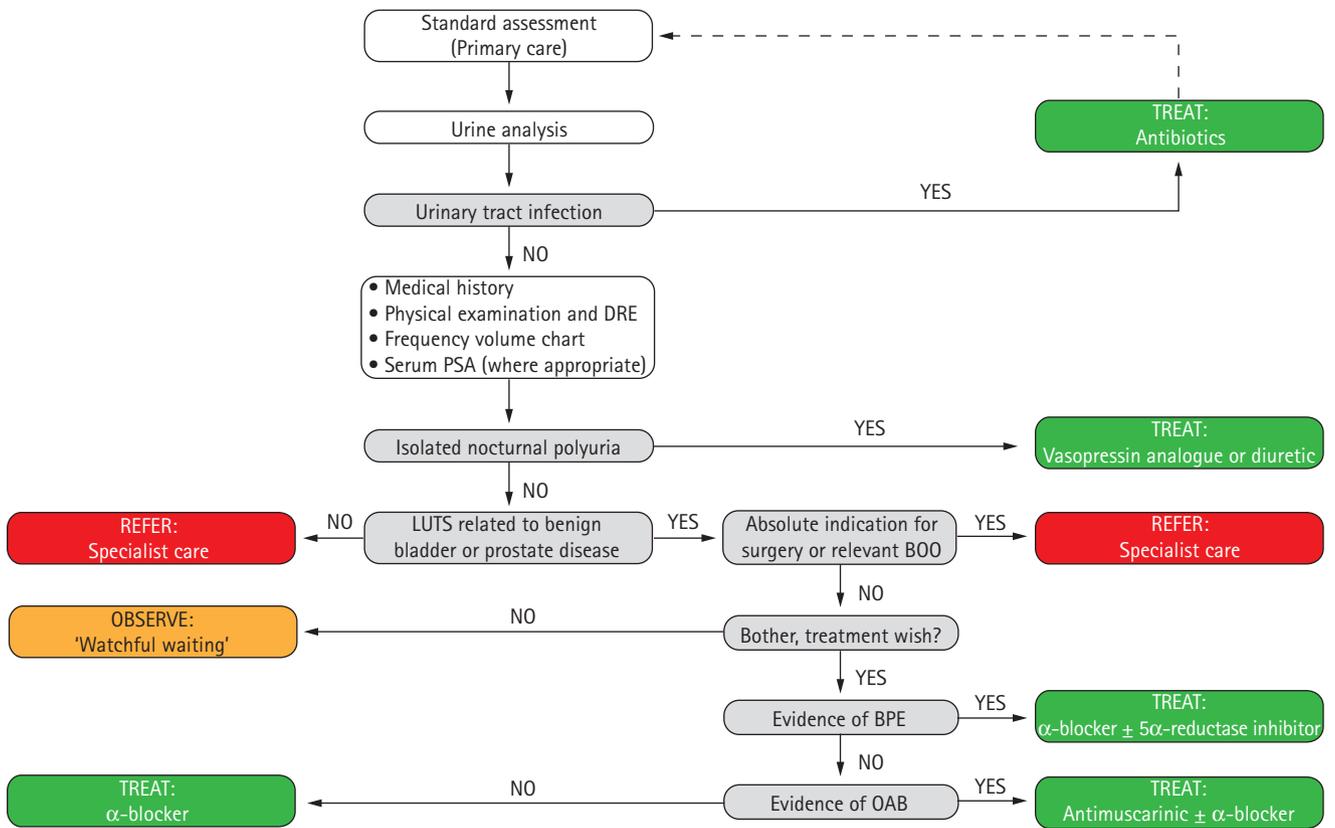
Urine analysis should be used to exclude infection as a cause of LUTS, followed by assessment of complete medical history, frequency–volume charts, and PSA levels wherever appropriate. Patients suspected of having a malignant or complicated bladder or prostate disease, or those who have severe symptoms from BOO or require surgery, should be managed by a specialist. All other patients can be treated with appropriate pharmacotherapy or monitored for progressive disease within primary care or by a urologist.

INCIDENCE OF AUR

The occurrence of AUR as a consequence of using antimuscarinic agents is a concern often voiced by clinicians. The assumed

increased risk of AUR during antimuscarinic treatment is based on pathophysiological considerations but has not been proven scientifically. AUR rates with antimuscarinics are generally low and similar to those reported in men with untreated LUTS. Epidemiological data estimate the incidence of AUR in community dwelling men at 0.5–2.5% per year, which is cumulative and increases with age [25]. The presence of BPH (enlarged prostates) and high serum PSA levels further increases the risk of developing AUR, whether or not patients are receiving treatment. A meta-analysis of antimuscarinic trials conducted in men and women with OAB reported an incidence of urinary retention of 1.1% overall, compared with 0.2% for placebo [26]. More recently, a review on the use of antimuscarinics in men with LUTS suggestive of BOO concluded that voiding difficulty and AUR occur infrequently across antimuscarinic monotherapy studies [24].

FIG. 1. Male LUTS management path.



As already discussed, in men with BOO, antimuscarinic drugs are contraindicated (or should be prescribed with caution); however, it is reasonable to consider an antimuscarinic in men unless there is striking evidence of severe BOO [27]. One meta-analysis suggests that antimuscarinic use in men with LUTS suggestive of BPH is safe and associated with a small (clinically insignificant) increase in PVR, but not AUR [28]. Treatment guidelines suggest that antimuscarinics can be safely combined with α -blockers where symptom relief has been insufficient with the monotherapy of either drug [1,17]. Cautious co-prescribing is recommended in the EAU guidelines in those suspected of having BOO, with PVR measurement advised as a follow-up assessment. Many other drug classes are also known to exert antimuscarinic effects (e.g. antidepressants, antihistamines and loop diuretics) and should be carefully monitored or avoided when using antimuscarinics. It is important to know all patients' prescribed and over-the-counter medication before starting an antimuscarinic to avoid unnecessary serious side effects

such as AUR. A summary of commonly prescribed drugs with antimuscarinic effects is shown in Table 3.

Based on current evidence, the risk of AUR from antimuscarinics is low and similar to that observed with placebo, provided that all recommended assessments have been performed, there is no striking evidence of BOO, and patients are appropriately monitored.

Key points 5

Several triggers should indicate that a patient has developed urinary retention during treatment for moderate to severe LUTS

- General discomfort or severe lower abdominal pain
- Bloating of the lower abdomen or belly
- A persistent need to urinate, but inability to pass (void) urine
- Constant, urgent need to urinate
- Small urinary portions
- Night-time urinary incontinence

If urinary retention is suspected, discontinue antimuscarinic therapy immediately and refer for specialist care. In severe cases, consider immediate bladder catheterization. Timely and appropriate intervention should resolve urinary retention and avoid the need for prostatic surgery.

SURGICAL PROCEDURES

Surgery is appropriate for patients with moderate-to-severe LUTS who have not responded to drug treatment, or who have developed AUR or other BPH-related complications (see absolute indications for surgery). Only patients with particularly bothersome symptoms who insist on first-line treatment with the most immediately effective therapy should be considered for surgery without prior medical management.

Voiding symptoms

For men with LUTS secondary to BPE/BOO, patients should be offered TURP, transurethral vaporization of the prostate, or

holmium laser enucleation of the prostate. Transurethral incision of the prostate can be considered for men with a prostate volume <30 mL, and open prostatectomy for men with a volume >80 mL.

Storage symptoms

Men with predominant storage symptoms suggestive of detrusor overactivity, but without BOO, should be offered sacral nerve stimulation, bladder wall injection with botulinum toxin or cystoplasty. Urinary diversion may be considered for patients with intractable urinary tract symptoms (where all other procedures have failed), and implantation of an artificial sphincter can be considered for stress urinary incontinence.

Key points 6

Surgery should only be considered for men whose symptoms have not responded to conservative management and pharmacotherapy, or where these options were unsuitable or unacceptable to the patient. Surgical options should be discussed within specialist care.

- Recurrent urinary retention, recurrent UTI, or recurrent macroscopic haematuria attributable to BPH or BPE
- Dilatation of the upper urinary tract or impaired renal function attributable to BPH or BOO

DISCUSSION

National and international guidelines for the management of male LUTS and OAB have been developed [1,15–17]; these are comprehensive, but somewhat impractical and complicated for everyday use. The suspected under-reporting of male LUTS and suboptimal use of pharmacotherapy in practice may be at least partly attributable to low adoption of these over-complicated guidelines in clinical practice.

The prevalence of LUTS and OAB, and their impact on HRQoL and associated costs to society, are well documented [5,7–10], but the number of patients receiving treatment remains low. Current practice in primary care and by urologists may be inconsistent with guidelines, owing to misconceptions about the available treatments. For example, male patients with storage LUTS are often inappropriately prescribed α -blockers or

5α -reductase inhibitors to treat suspected underlying BOO, even though its actual incidence is low. By contrast, only 6–7% of men with storage LUTS in the UK [13] and \approx 24% of American men with a diagnosis of OAB [14] receive appropriate treatment, which may be attributable to the misconception that antimuscarinics are not as effective as α -blockers or 5α -reductase inhibitors in men, or misplaced fears regarding the risk of AUR. The current evidence base, although limited, shows that antimuscarinics can be used safely in men with LUTS and are not associated with an increased risk of AUR. The assessment and treatment path provided in the present review aims to further increase the quality of care provided by primary care specialists and urologists and to improve patient satisfaction.

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CONFLICT OF INTEREST

Matthias Oelke:
Apogepha, paid consultant to sponsor and study investigator
Astellas, paid consultant to sponsor and study investigator
GSK, paid consultant to sponsor
Ferring, paid consultant to sponsor
Pfizer, paid consultant to sponsor and study investigator
Teva, paid consultant to sponsor
David Castro-Diaz:
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AZ, study investigator
Allergan, study investigator and paid consultant
Astellas, study investigator, paid consultant and paid speaker
Isphen, study investigator
Medtronic, study investigator, paid consultant and paid speaker

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ONO, consultant
Mike Kirby:
Has received financial support from the pharmaceutical industry for research, advice, conference attendance and lecturing.
Astella, paid consultant
G.S.K., paid investigator, speaker and consultant
Pfizer, paid consultant and speaker
Takeda, paid consultant and speaker
Bayer, paid consultant and speaker
Lilly, paid consultant and speaker
MSD, paid consultant and speaker

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Abbreviations: OAB, overactive bladder; HRQoL, health-related quality of life; AUR, acute urinary retention; EAU, European Association of Urology; NICE, National Institute for Health and Clinical Excellence; PVR, postvoid residual urine volume; BPE, benign prostate enlargement.

APPENDIX: GLOSSARY

AUR	Painfully full, palpable or percussable bladder, when the patient is unable to pass any urine.
BOO	Mechanical obstruction during voiding, characterized by increased detrusor pressure and reduced urine flow rate (usually associated with BPE and predominant voiding symptoms in the absence of infection or obvious pathology)
BPE	Prostatic enlargement attributable to histological BPH (prostate volume >25 mL)
BPH	A histological diagnosis of non-malignant growth of epithelial or stromal cells of the prostate, common in older men,
DRE	Palpation of the rectum and prostate performed to detect abnormalities.
Frequency-volume chart	A record of the volumes voided, as well as the time of each micturition, day and night, for at least 24 h.
Hydronephrosis	Accumulation of urine in the collection system of the kidneys.
IPSS	An eight-question (seven symptom questions + one HRQoL question), written screening tool used to detect and quantify urinary symptoms (LUTS), to guide and control management.
LUTS	Symptoms during urinary storage or voiding defined from the individual's perspective. Symptoms are either volunteered by or elicited from the individual, or may be described by the individual's caregiver.
OAB	Urgency, with or without urge incontinence, usually with frequency (≥ 8 times per 24 h) and nocturia.
Polyuria	24-h urine output greater than 40 mL/kg body weight in adults.
Nocturnal polyuria	An increased proportion of the 24-h output (>33%) occurs at night usually during the 8 h while the patient is in bed (excludes the last void before sleep, but includes the first void of the morning). Usually accompanied by night-time micturitions (nocturia).
Polydipsia	Excessive and constant thirst associated with increased fluid intake and, consequently, polyuria. Most frequently associated with a disease (diabetes insipidus, diabetes mellitus) or habitual.
PSA	A protein produced exclusively by the prostate. Elevated levels in the serum are associated with diseases affecting the prostate (e.g. BPH/BPE, prostatitis, or prostate cancer).
PVR	The volume of urine left in the bladder at the end of micturition.