Do alpha-1 antagonists help men become catheter-free after acute urinary retention?

A scoping review concerning what is written in scientific literature on the use of alpha-1 antagonists in the treatment of acute urinary retention in adult men.

By:

Hawre Salih

Resident in general practice

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Tjörn primary care centre

Literature study 2024

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Supervisor:
Staffan Svensson, MD PhD, Specialist in clinical pharmacology and general practice

Studies director:
Henrik Nyström, Specialist in general practice

Summary

Background

Acute urinary retention is a urological emergency characterized by a sudden and often extremely painful inability to urinate. The usual first-line treatment usually involves bladder catheterization, which may be urethral, suprapubic, or intermittent. It is unclear to what extent and how alpha-1 antagonists are used in acute urinary retention in men.

Aim

To compile what scientific literature describes about the use of alpha-1 antagonists in men suffering from acute urinary retention.

Method

Scoping review wherein a broad literature search was carried out in the databases PubMed and Embase.

Result

Searches in PubMed and Embase identified 97 articles, of which five were duplicates and were removed. After reviewing the titles, 71 articles were deemed irrelevant and excluded. Of the remaining articles, 12 were excluded after reading the abstract. The remaining 9 articles were then reviewed in their full text and five were included in the study. All the included studies described the use of alpha-1 antagonists in the treatment of acute urinary retention in adult men, but there were many questions about the effectiveness, duration, and cost of such treatment.

Conclusion

There is relatively little research on using alpha-1 antagonist drugs as an adjunct to bladder catheterization in acute urinary retention in men, and their application varies across countries and regions.

List of abbreviations

AUR: Acute urinary retention

BPH: Benign prostatic hyperplasia

TWOC: Trial without catheter

A1A: Alpha-1 antagonists

HRQoL: Health-related qualify of life

PVRV: Post voiding residual volume

UTI: Urinary tract infection

TURP: Transurethral resection of the prostate

UC: Urinary catheter

BP: Blood pressure

OD: once daily

RCTs: Randomized controlled trials

Background

Definition and types of acute urinary retention

Acute urinary retention (AUR) is characterized by a sudden and painful inability to voluntarily pass urine (1). In men, AUR can be divided into spontaneous, typically due to BPH, and precipitated AUR, which is triggered by other factors such as surgery, anaesthesia, medications, etc (2) although benign prostatic hyperplasia (BPH) is often involved (3).

Incidence of acute urinary retention

The incidence of AUR among men is estimated to be 3,0–6,8 per 1000 persons per year (4,5). A man in his 70s has a 10% risk and a man in his 80s has a 30% risk of experiencing an episode of AUR (5,6,7). Conversely, AUR is infrequent in females, approximately three cases of AUR occur per 100,000 females each year (8). It is the commonest urologic emergency worldwide, often caused by BPH (9,10).

Complications of acute urinary retention

Possible complications of AUR include pain, impaired bladder contraction, urinary tract infection (UTI), renal injury, incontinence, urosepsis and increased risk of further AUR episodes (11). Even a single episode of AUR can cause permanent bladder damage and long-term symptoms (11). AUR appears to have a significant effect on patients' health-related quality of life (HRQoL), with this impact lasting well beyond the initial occurrence (12).

Management of acute urinary retention

First-line treatment for AUR is urinary catheterization (UC) whether urethral, suprapubic, or intermittent. If less than 800-1000 ml of urine is drained without affecting creatinine or electrolytes, the patient can be discharged with follow-up care (13). Management options afterward include:

1. Early surgery (e.g., TURP) but it carries risks such as bleeding, infection, and recurrence of symptoms (14).
2. Long-term UC (indwelling or intermittent), which can lead to complications like UTIs and sepsis (15).
3. Trial Without Catheter (TWOC), where the UC is removed to check if normal urination has been restored (16).

Trial without catheter

Trial without catheter (TWOC) is a procedure where patients' catheter is removed by trained staff to assess whether they can urinate and fully empty their bladder (17).

It is stated to be nowadays a standard practice for men with BPH and AUR (18). It should be carefully planned, considering the timing of UC removal, environment, ongoing bladder function assessment, and a backup plan if the TWOC fails (19,20).

Although there is no definitive clinical evidence for the best timing for TWOC, it is commonly done two weeks after UC insertion (21), although some suggest performing it within 2-3 days (22). In practice, one can allow all patients with AUR to maintain their UC until their follow-up appointment (within a week) due to the elevated risk of recurrent urinary retention (13).

Successful TWOC is usually defined as the ability to void without needing re-catheterization within 24 hours (16) but is sometimes defined as having less than 100 ml of post-void residual volume (PVRV) (23). The volume of urine retained or drained immediately after UC serves as a key factor in bladder recovery (24). Increased PVRV together with prolonged retention is usually associated with a less favourable recovery of bladder muscle function, i.e., reduces the chance of becoming catheter-free (24).

Use of alpha-1 antagonists in acute urinary retention in men

Some clinical trials support using A1A (like tamsulosin or alfuzosin) to increase the chances of a successful TWOC in men with AUR (16,25,26). Meanwhile other studies describe real-world practices but do not definitively conclude whether A1A should or should not be used (18,27).

Definition and mechanism of actions of alpha-1 antagonists

Alpha-1 antagonists (A1A) work by relaxing smooth muscle in the prostate and bladder neck (28), facilitating urine flow in patients with obstructive uropathy due to BPH (29,30). These medications, which end in "-osin," include alfuzosin, doxazosin, terazosin, tamsulosin, prazosin, and silodosin, and are all approved by the FDA for the treatment of BPH (31). In Sweden, the first four are available according to FASS.se (32). Since A1A takes approximately 72 hours to become fully effective, it is sensible to start the treatment right after UC placement to enhance its benefits for a prompt TWOC (33).

Side effects of alpha-1 antagonists

Reflex tachycardia can occur as a compensatory response to a sudden drop in blood pressure (BP). This mechanism, however, is more pronounced in older individuals, making them more susceptible to falls (31). The A1A drugs are generally recommended to be taken at night (34).

Caution is advised for elderly patients and those with severe liver or kidney impairment, as well as individuals who have had cataract surgery, due to the risk of Intraoperative Floppy Iris Syndrome (29,35), particularly with tamsulosin (36).

Aim of this study

To compile what the scientific literature describes about the use of A1A in men suffering from AUR.

Specific research question

To compile what scientific literature describes about the effectiveness and duration of use of A1A in men suffering from AUR.

Method

Design of the study

This literature study has been carried out in the form of a scoping review - a mapping of literature overview - which aims to map and provide an overview of the state of knowledge in the research area (37). The literature search is in itself an important component, and the search should be rigorous, reproducible, and transparent. The idea of a scoping review is to get a broad overview of the current state of knowledge. Therefore, all studies, regardless of structure, that match the research question are included in the study. There is no requirement for quality review of included studies, which, however, makes it more difficult to comment on, for example, the current state of evidence. In these cases, a systematic review is preferable to a scoping review (37).

The method is based on five steps:

1) Identify the research question

2) Identify relevant studies

3) Select studies

4) Map the data

5) Compile and report the results

Selection and search strategy

The aim of the study was formulated according to the PIO:

Patients: Men with AUR who have undergone UC.

Intervention: an A1A.

Outcome: success in TWOC.

The article searches were carried out around the turn of the month September / October 2024 in the databases PubMed and Embase. Given that the initial search strings for alpha blockers returned almost 400 hits, we specified the alpha-1 antagonists as search string instead and this returned only 97 hits. The search string, used in both databases PubMed and Embase, were ("urinary catheters " [MeSH Terms]) OR ("urinary catheterization"[MeSH Terms])) AND ("Adrenergic alpha-1 receptor antagonists" [pharmacological action]).

Inclusion criteria: clinical studies concerning AUR in adult men in relation to receiving A1A who underwent TWOC; all types of articles regardless of study design and without limitation of period, studies in English and Swedish.

Exclusion criteria: Animal studies, studies in languages other than English or Swedish, studies that dealt with chronic urinary retention, studies that examined AUR in children, women or both men and women together, studies on critically ill patients in which TWOC is neither reasonable nor possible. Articles about the use of A1A but with medical conditions other than AUR for example double J-stent. Articles for which only abstracts were available at the Västra Götaland Region's E-library.

Selections were made by first removing duplicates. In the next step, articles were screened for titles, and then abstracts, in relation to inclusion and exclusion criteria. The remaining articles were read in full.

Results

Results of the literature searches

The PubMed search initially yielded 61 hits. All of these were reviewed at title level and after exclusions according to established criteria, 15 were selected to be read at abstract level. Ten of them were excluded in accordance with the inclusion criteria. Then five articles were selected for full text reading. After reading the full articles, four of them were finally included in the study. The rest of them did not match the aim of the study or PIO or were too broad in their parameters. The Embase search initially yielded 36 articles, five articles were removed being duplicates already found in PubMed. All the remaining 31 articles were reviewed at title level and after exclusions according to established criteria, six were selected to be read at abstract level. Two of them were excluded due to the inclusion criteria. Then four articles were selected for full reading. After reading the full articles, one article was selected to be included in the study. The rest of them did not match the purpose of the study or PIO or were too broad in their parameters.

Ethical considerations

In this study, only data from already published articles have been collected. All the included articles have received ethical approval before the study was carried out. Therefore, no separate ethical review for this study was necessary.

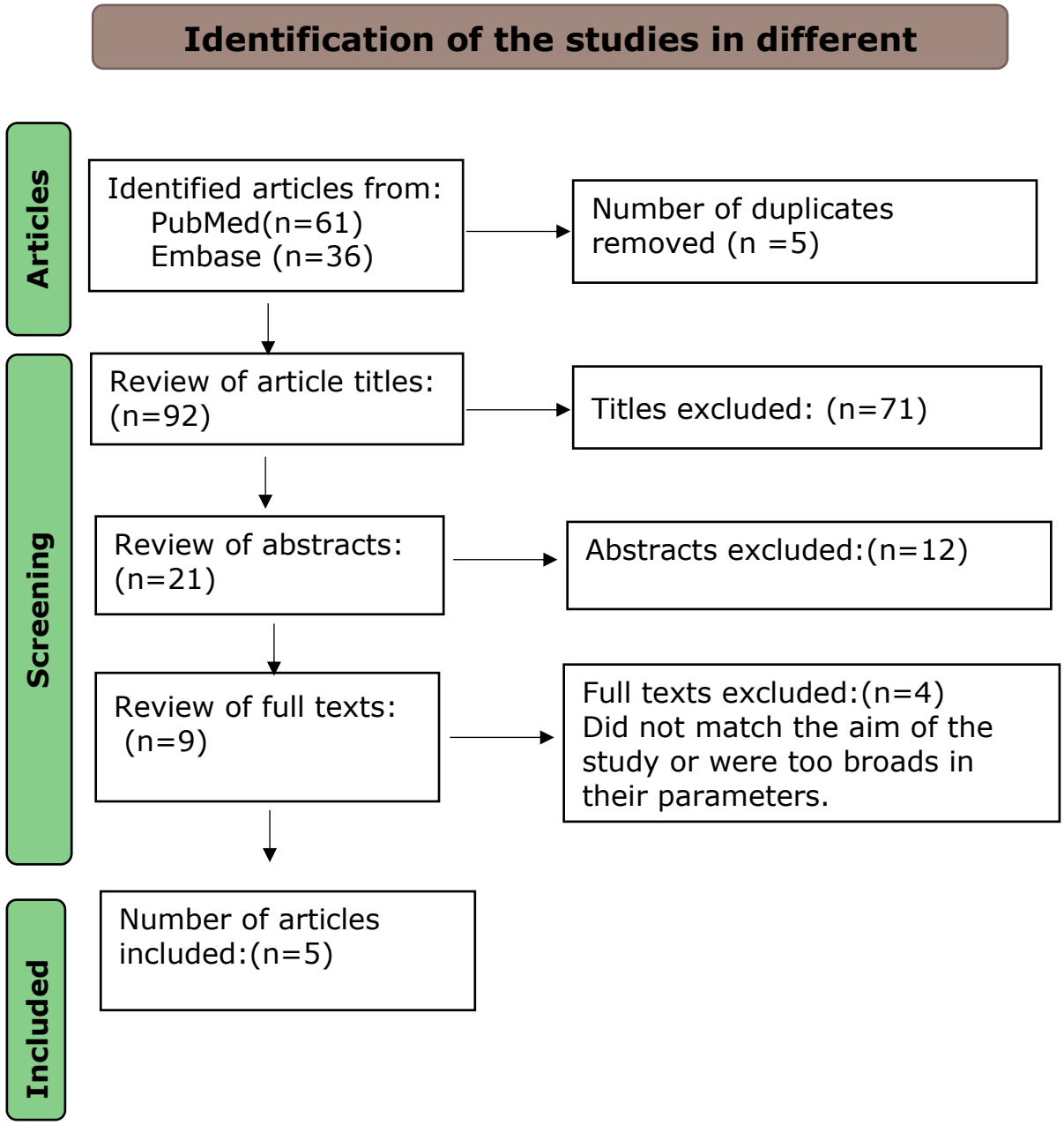

Figure 1. Flow chart of selected articles in the database search.

Table 1: Articles included in the literature study.

Authors	Study design	Populations	Main findings/conclusions
Fisher et al. 2014(16)	A systematic review and meta-analysis. Nine randomised clinical trials were included in this review. Eight studies compared A1A with placebo and one study compared an A1A with no treatment.	1044 adult men of any age who received either A1A, placebo, or no treatment before TWOC after an AUR episode were included.	There was some evidence that A1A reduce the risk of suffering another episode of AUR after successful TWOC, though it remains unclear whether they reduce the need for future surgery on the prostate, whether or for how long treatment should be continued after successful TWOC and whether the costs of treatment in such situations are justified.
Fitzpatrick et al. 2012 (18)	A prospective, multicentre, worldwide survey.	6074 men with painful AUR from France, Asia, Latin America, Algeria and the Middle East.	The study showed that UC followed by a TWOC is the standard practice worldwide and that alfuzosin 10 mg OD before TWOC doubles the chances of success.
McNeill et al. 2005 (25).	A multicentre randomized, double-blind, placebo-controlled trial.	360 patients underwent emergency UC and were blindly randomized to alfuzosin 10 mg OD or placebo in 3 days.	Alfuzosin 10 mg OD increased the likelihood of successful TWOC in men with a first episode of spontaneous AUR and should be continued beyond the acute phase, as it reduced the need for BPH surgery during a 6-month treatment period.

Malcolm et al. 2005 (26).	A randomized, double-blind, placebo-controlled, parallel-group, trial.	149 men (mean age 69.4 years) were randomly assigned to receive A1A or placebo after suffering from AUR.	Both tamsulosin 0,4 mg OD and alfuzosin 10 mg OD can be recommended for treating patients after UC for AUR and can significantly reduce the likelihood of the need for re-catheterization, at least acutely. It is however still not possible to predict which patients are likely to respond to and which are not; the study was not powerful enough to answer this.
Desgrandchamps et al.2006 (27).	A prospective cross-sectional survey.	2618 men (median age 72 years) presenting with non-febrile AUR were enrolled by 658 French urologists in a prospective cross-sectional survey.	The success rate of TWOC was significantly higher in men who received A1A (53.0% vs. 39.6%, P < 0.001) before TWOC. A1A before a TWOC significantly increases the chance of a successful TWOC. If the TWOC fails, only a quarter of men will have a successful second TWOC. All efforts should be made to reduce the duration of UC, to reduce the comorbidity.

Abbreviations:

BPH: Benign prostatic hyperplasia, A1A: Alpha-1 antagonist, AUR: Acute urinary retention, TWOC: Trial without a catheter, UC: Urinary catheter, OD: once daily

Results

Characteristics of included Studies

This review included five studies published between 2005 and 2014, comprising two randomized controlled trials (RCTs), two surveys, and one systematic review. The sample sizes ranged from 149 to 6074 men. All studies (16,18,25,26,27) assessed the use of A1A in managing AUR, though some raised concerns about their effectiveness, optimal duration, and associated costs (16,26).

Findings from individual studies

Fisher et al (16) concluded a randomised and quasi-randomised controlled trials of the use of A1A for AUR in men. Adult men of any age who needed UC because of an episode of AUR were included. At least one trial group managed with A1A versus any other type of management. Primary outcome was ability to void spontaneously after TWOC without the need for re-catheterisation within 24 hours (16).

The study by Fitzpatrick et al (18) was survey-based clinical research that evaluated the management of AUR in real life practice in a wide range of health care systems. Objectives of the study were to evaluate the management of AUR associated with BPH in real-life practice and to identify predictors of successful TWOC (18).

The study by McNeill et al (25) was the result of a double-blind controlled placebo study, carried out by the "Alfaur study group" which was sponsored by Sanofi-Aventis. Patients got emergency UC and were blindly randomized to alfuzosin 10 mg OD or placebo for 3 days (first phase). All patients with successful TWOC, regardless of treatment, were then again blindly randomized to alfuzosin 10 mg OD or placebo for 6 months (second phase). The need for BPH surgery (primary endpoint) was assessed after 1, 3, and 6 months of treatment (25).

The study by Malcolm et al (26) was a randomized, double-blind, placebo-controlled, multicentre, parallel-group study. Men with AUR secondary to BPH were catheterized and then, if they fulfilled the entry criteria, were randomly assigned to receive either 0.4 mg tamsulosin hydrochloride in a modified-release capsule OD, or a placebo. After up to eight doses the UC was removed and the ability to void unaided assessed (26).

The study by Desgrandchamps et al (27) is a cross-sectional survey conducted on 2618 men (median age 72 years) presenting with non-febrile AUR, who were enrolled by 658 French urologists. It examined the management of AUR and outlined the standard practices for treating men with BPH who present with AUR (27).

Alpha-1 antagonists and successful trial without catheter

In the Fisher study (16) four trials favoured A1A and one trial favoured placebo. The result of the meta-analysis of five trials showed a statistically significant benefit of A1A compared to placebo. This was irrespective of whether the A1A used was alfuzosin or tamsulosin (16).

Fitzpatrick's study (18) showed that UC followed by a TWOC has become a standard worldwide and that A1A prior to TWOC doubles the chances of success. Prolonged UC was associated with an increased morbidity (18).

McNeill et al (25) concluded that alfuzosin 10 mg OD increased the likelihood of successful TWOC in men with a first episode of spontaneous AUR and should be continued beyond the acute phase, as it reduced the need for BPH surgery during a 6-month treatment period (25).

Malcolm et al (26) concluded that men who received UC for AUR can void more successfully after UC removal if treated with tamsulosin 0,4 mg OD and are less likely to need re-catheterization. The side-effect profile was similar for tamsulosin and placebo, and consistent with known pharmacology. From these results tamsulosin can be recommended for treating men after UC for AUR and can reduce the likelihood of the need for re-catheterization (26).

The Desgrandchamps study found that TWOC after an average of 3 days of UC has become standard practice for men with BPH and AUR in France (27). Additionally, administering A1A before a TWOC significantly enhances the likelihood of a successful outcome (27).

Discussion

Overall, this scoping review on the benefit of A1A in men suffering from AUR shows that this area is relatively little researched. We included a total of five studies of different designs. Two of the studies are randomised controlled trials (25,26), two are prospective surveys (18,27) and one (16) is a systematic review and meta-analysis. The initial search strings of alpha-blockers, i.e. not alpha-1 blockers, returned almost 400 hits, but when we limited the search to A1A this returned just 97. In the end, only five studies were included.

Main findings of the included review are that tamsulosin 0,4 mg OD can help men urinate more successfully after TWOC and become UC-free, and these men are less likely to need re-catheterization (26). It is also reported that alfuzosin 10 mg OD increased the likelihood of successful TWOC in men with a first episode of AUR and reduced the need for BPH operation during a 6-month treatment period (25).

For comparison, it may mentioned that Swedish regional guidelines from both Dalarna and Stockholm counties state that the treatment of AUR should focus on managing the underlying cause of, for example, BPH and the importance of follow-up and prevention, especially when managing chronic conditions such as BPH, where continued therapy such as A1A can prevent recurrence of AUR (3,13). These guidelines recommend starting treatment immediately and continuing it after UC-removal. The Stockholm guideline highlights that alfuzosin 10 mg OD and doxazosin 4 mg OD have been found helpful in facilitating UC-removal in emergency settings, though the optimal duration of treatment is unclear (13).

There are many similarities between the Swedish guidelines and the included studies regarding the management of men who suffer from AUR. However, there are some differences when we go down to the details, for example Fischer et al (16) stated that TWOC success was the ability to void spontaneously without the need for re-catheterization within 24 hours in the primary phase, but for example in the Swedish guideline from Dalarna it is written that treatment effect must be seen within 6 weeks and must then be evaluated and they recommend the first TWOC after about 3 days (3).

The included studies questioned whether costs for treatment with A1A in AUR are justified both for patients and healthcare (16,18,26), but this is not mentioned in the Swedish guidelines. A possible explanation is perhaps that the cost of A1A is not an important issue, at least for the patients here in Sweden because everyone is usually entitled to high-cost protection, and the drugs are off-patent and therefore relatively cheap.

We have already pointed out that there are no internationally agreed outcome measures for the definition of success with a TWOC, i.e. what is acceptable PVRV after TWOC, and this was also clear when comparing the Swedish guidelines and studies in this review (16,18,25,26). In one study , for example, patients were allowed to go home after a successful TWOC, which was defined as a PVRV of ≤200 ml (26), but in the Swedish

guideline from Dalarna a PVRV limit of <300 ml was used to decided, when patients can go home without UC (3).

Potential knowledge gaps in the chosen studies could include:
1-Limited long-term data: Most studies (16, 18, 26) focused on short-term outcomes (TWOC success within days to weeks). Only McNeill et al. (25) followed patients for 6 months, but even this study did not provide long-term data on recurrence rates, side effects, or bladder function.

2-Heterogeneity in study designs: The studies included RCTs, surveys, and a systematic review, making direct comparisons difficult. Surveys (18, 27) relied on self-reported data, which may introduce bias or inconsistency.

3-Inconsistencies in defining TWOC success: Fisher et al. (16) defined success as voiding without re-catheterization within 24 hours. Malcolm et al (26) set ≤200 ml PVRV as a criterion, while Swedish guidelines allow <300 ml. These variations make it hard to compare success rates across studies.

4-Lack of comparative studies: No study directly compared A1A with other treatment options like early surgery or prolonged catheterization. This limits conclusions about whether A1A is superior, equivalent, or inferior to alternative strategies.

5-Cost-effectiveness not well addressed: While some studies (16, 18, 26) questioned whether A1A costs are justified, none provided a full economic analysis. The financial impact may vary by healthcare system, and Swedish guidelines do not mention cost concerns due to high-cost protection policies.

6-Potential industry influence: McNeill et al. (25) (Alfaur study) was sponsored by Sanofi-Aventis, raising the possibility of bias in reporting positive effects of alfuzosin. While this does not invalidate the results, independent studies are needed for confirmation.

7-Limited generalizability: Most studies focused on older men with BPH, meaning the results may not apply to younger patients, women, or those with other causes of AUR (e.g., neurological conditions). More research is needed in different subgroups, such as men with comorbidities like diabetes or cardiovascular disease.

Discussion of method

The initial search strings for alpha-blockers, that is, not alpha-1 blockers, yielded almost 400 hits, but when we restricted the search to A1A, this

yielded only 97. It is possible that we have missed relevant studies found in the 400 hits. Since the selection was done manually, it is possible that relevant articles were again missed. Neither Swedish randomized controlled studies nor systematic reviews nor any Swedish article were found in the databases PubMed and Embase.

Future research

Although there are studies which support using A1A in men with AUR to facilitate TWOC, i.e. to become UC-free, there is still uncertainty about how long these men should keep their UC before the trial, the definition of a successful catheter-free trial, and the duration of A1A treatment. Primarily, randomized controlled and longitudinal studies with more structured procedures are needed to better identify those men who should be quickly referred for definitive treatment to avoid more men receiving long-term indwelling UC. In addition, qualitative studies within the subject would be of value as other dimensions and nuances of health can be better captured through this type of approach. It is likely that more comprehensive studies are needed on this topic and a better collaboration between urologists or hospital physicians/nursing staff and primary care physicians/nursing staff in terms of prescribing A1A and optimal management of men who suffer from AUR.

Future research on higher dose A1A and long-term outcomes of such treatment will further clarify the role of A1A in the broader treatment landscape.

Implications

There is a steady increase in the proportion of older men in the global population, Sweden being no exception, and as the problem of BPH and other causes of AUR increases with age, it is therefore expected that the number of such patients will increase proportionately.

Conclusion

Acute urinary retention is a common urological emergency, especially in older men with BPH. Treatment usually involves UC followed by TWOC to see if normal urination is restored.
There is relatively little research on using A1A drugs as an adjunct to UC in AUR in men, and the application of A1A varies across countries and regions.

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