Neurourology and Urodynamics

Management of LUTS in Patients With Dementia and Associated Disorders*

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Aims: To systematically review the management of lower urinary tract symptoms (LUTS) in patients with dementia and associated disorders. **Methods:** This systematic review was performed according to the PRISMA statement. Studies were identified by electronic search of Embase and Medline databases (last search August 2015) and by screening of reference lists and reviews. **Results:** Of 1,426 abstracts that were screened, 102 full-text articles were identified and assessed for eligibility. Seventy-six articles were then included in the quantitative synthesis. Urinary incontinence (UI) prevalence rates in dementia patients have varied considerably, ranging from 11 to 93%. In Alzheimer's disease patients, UI usually correlates with disease progression (late-stage dementia). In contrast, LUTS usually precede severe mental failure in Lewy body disease and in vascular dementia. Behavioral therapy, including toilet training and prompted voiding, may be especially useful in patients with unawareness UI. High-quality data to guide the choice of treatment strategies in this population are lacking. Current evidence suggests that antimuscarinics, especially oxybutynin, can be associated with cognitive worsening, due to the blockade of M1 receptors. Thus, the use of antimuscarinics that do not easily cross the blood–brain barrier or are more M2/M3 selective should be considered. No data are available for beta-3 agonists so far. **Conclusion:** Different types of dementia cause different LUTS at varying time points during the disease process and need singular therapeutic approaches. Treatment of LUTS should be tailored to individual patient needs and disease status, considering factors like mobility, cognitive function, and general medical condition. Neurourol. Urodynam. © 2015 Wiley Periodicals, Inc.

Key words: dementia; LUTS; systemic review

INTRODUCTION AND OBJECTIVES

Urinary incontinence (UI) and lower urinary tract symptoms (LUTS) are highly prevalent dementia patients, affecting the quality of life and imposing a substantial economic burden. The ICS Neuro-Urology Promotion Committee presents the results of the Dementia Working Group*, focused on the management of LUTS in patients with dementia and associated disorders.

DATA ACQUISITION

Data Sources and Searches

This systematic review was performed according to the preferred reporting items for systematic reviews and meta-analyse (PRISMA) statement.[1] We systematically searched MEDLINE and EMBASE databases to retrieve English language studies (from 1997 to August 2015). The 2011–2014 abstract volumes of the European Association of Urology (EAU), American Urological Association (AUA), and International Continence Society (ICS) were also retrieved and reviewed. No language restrictions were applied. We additionally searched the reference list of all included studies and any relevant review articles. MEDLINE and EMBASE search included the following medical subject heading (MeSH) terms: (i) dementia, (ii) vascular dementia, (iii) Alzheimer's disease, (iv) dementia Alzheimer's disease, (v) dementia with Lewy bodies, (vi) frontotemporal dementia, (vii) Creutzfeldt–Jacob disease, (viii) normal pressure hydrocephalus, (ix) Huntington's disease, and (x) Wernicke–Korsakoff syndrome. Each of these terms was crossed with (i) bladder dysfunction, (ii) sphincter dysfunction, (iii) urinary incontinence, (iv) urinary symptoms, (v) urinary retention, (vi) urinary infection, (vii) bladder catheter, and (viii) urological care.

Study Selection

We aimed to include all original studies that reported prevalence, characteristics, and treatment strategies for LUTS in female and male patients with dementia. Non-original articles, studies not published as full-text, and those not discriminating between different types of dementia were excluded. All identified abstracts were imported into

Abbreviations: AChEIn, acetylcholinesterase inhibitors; ALD, Alzheimer's disease; DO, detrusor overactivity; FTD, fronto temporal dementia; LBD, Lewy body disease; NPH, normal pressure hydrocephalus; VD, vascular dementia; UI, urinary incontinence.

*This is a report by members of the Dementia Working Group of the ICS Neuro-Urology Promotion Committee.

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bibliography management software (EndNote X7, Thomson Reuters, 1500 Spring Garden Street, Fourth Floor Philadelphia, PA 19130) and sorted according to inclusion and exclusion folders by drag and drop. Abstracts of all identified studies were independently reviewed by two authors (MAA and HM). Studies reporting on LUTS in patients with dementia were reviewed in full text.

RESULTS

Initial records identified through database searching included 1,913 articles; 32 additional records were identified through other sources. After duplicates removal (n = 519), 1,324 out of 1,426-screened articles were excluded because they were not related to the management of LUTS in patients with dementia. In all, 76 of 102 full-text articles were included in the quantitative synthesis, due to their implication on prevalence, evaluation or management of LUTS in patients with dementia.[2–77] Twenty-six articles were excluded because they did not bring additional information on LUTS in patients with cognitive impairment (18 review articles, four comments to original article, two case-reports, two animal models). The study selection procedure is described in Figure 1.

Most of studies focused on four subtypes of dementia: Alzheimer disease (ALD), vascular dementia (VD), Lewy body disease (LBD), and normal pressure hydrocephalus (NPH). Table I shows the classification of dementia according to the etiology.[2]

Prevalence of LUTS in Patients With Dementia

It is difficult to distinguish LUT problems caused by bladder aging from those due to other concomitant diseases.[2] It has been shown that in geriatric patients with dementia, urinary incontinence (UI) is much more frequent than in non-dementia patients.[3–9]

UI and its prevalence have been the focus of most studies on LUTS in dementia, which have relied on both patient and caregiver reports. Possibly, due to differences in patient selection among these studies, incontinence prevalence rates have varied considerably, from 11% to 93% in individuals with dementia.[9–24]

Ouslander et al. found that 65% incontinent subjects had fewer than three episodes per week, 11% had three to six episodes per week, and 24% had incontinence once a day or more.[16] McLaren et al. found that 90% incontinent subjects had at least one episode during the 3-week assessment period, 78% had one episode a week, and 40% had incontinence once a day.[23]

Alzheimer's disease (ALD) is the most common type of dementia in clinical and autopsy surveys. The onset of incontinence usually correlates with the disease progression.[25] In ALD, a plateau refers to a patient's remaining on a mild level of cognitive decline for more than 2 years. Plateau in an early stage of ALD may be useful to identify patients with a more favorable course in terms of disease progression and lower urinary tract dysfunction.[26]

The cardinal features of vascular dementia include history of stroke, fluctuating course, focal neurological symptoms, wide-based gait, and the presence of arteriosclerotic risk factors such as hypertension.[27] Of these features, Kotsoris et al. found that LUTS, which were presented by 50% of patients, frequently preceded the development of dementia by 5 years or more. Similarly, gait disturbance, noted in 24%, preceded the development of dementia by 2 years or more.[28]

It has been shown that prevalence of DO in patients with vascular dementia is high. Sakakibara et al. have performed urodynamics in 19 individuals, which demonstrated DO in 70% and a low-compliance curve in 10%.[29] Sakakibara et al. also found that persons with multi-infarction were more likely to have increased post-void residual (PVR) with an average volume of 93 ml than those without (50 vs. 9%, respectively).[7]

Although not many studies have specified the types of dementia, Mori et al. examined 46 institutionalized dementia patients, 31 of whom had Alzheimer's, 11 of whom had vascular dementia, and 4 of whom had both; they found detrusor overactivity (DO) in 58, 91, and 50%, respectively.[30] Sugiyama et al. reported DO in 40% of 20 patients with Alzheimer's disease. In particular, DO was noted in 8 of 13 incontinent patients and in 0 of 7 continent patients.[8]

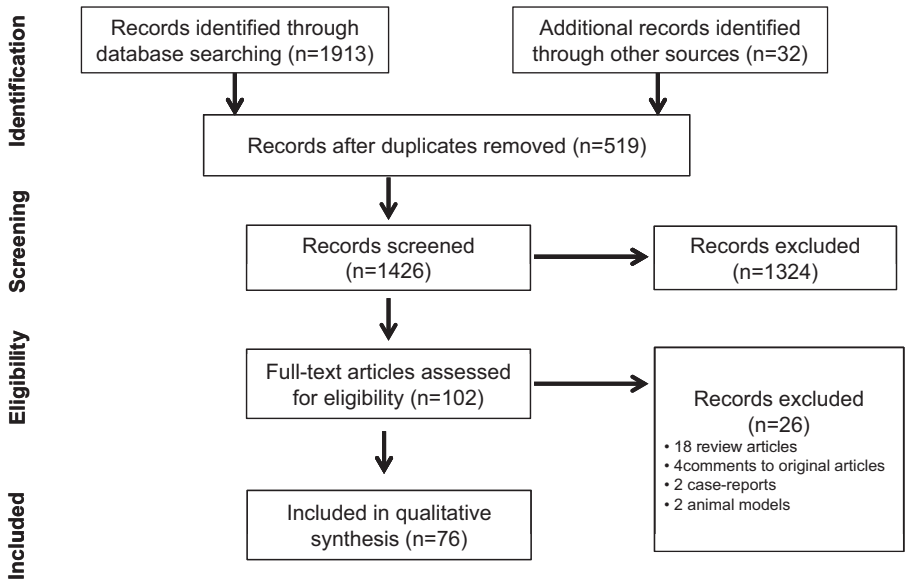

Fig. 1. PRISMA flow diagram.

TABLE I. Classification of Dementia According to the Etiology

Neurodegenerative diseases	Other causes
Alzheimer disease (ALD) (60%)	Cerebro vascular (20%) Normal pressure hydrocephalus (NPH)
Lewy body disease (LBD) (10%)	Neoplasia, trauma, Chronic intoxications
Cortico-basal degeneration	CNS[a] infections (lues, AIDS[b])
Progressive-focal degeneration	Non-infection-associated inflammations Pseudodementia in psychiatric diseases Other structural defects: cerebral hypoxia, radiation

[a]CNS, central nervous system.
[b]AIDS, acquired immune deficiency syndrome.

Sakakibara et al. examined LUT function in 11 LBD patients. All patients had LUT symptoms: UI in 10 (urgency type in seven; functional type due to dementia and immobility in two; both urgency and stress type in one) and OAB symptoms in nine. DO was demonstrated in five of the seven patients undergoing EMG cystometry, a low compliance detrusor in two (storage phase), an underactive detrusor in four, an acontractile detrusor in one, and detrusor–sphincter dyssynergia in one (voiding phase).[6]

Both idiopathic normal pressure hydrocephalus (NPH) and vascular dementia manifest with gait disturbance, dementia, and UI. Nevertheless, NPH is less common than vascular incontinence (approximately one-tenth the prevalence). LUTS have been reported in up to 93% of the patients with NPH. According to Sakakibara et al.,[9] storage symptoms were more common than voiding symptoms (93 vs. 71%). The most frequent LUTS were urgency (64%), frequency (64%), and incontinence (57%).[9]

Recommendations for the Urological Management of LUTS in Patients With Dementia and Related Diseases

LUTS in dementia patients can be caused[1] by the dementia itself,[2] by the neurological and urological pharmacotherapy, and[3] by the ageing bladder or comorbidities. This systematic review focused on the different patterns of LUTS in patients with dementia, as well as in possible interactions between neurological and urological pharmacotherapy.

LUTS caused by dementia itself, including conservative non-pharmacological treatment strategies. Evaluating the characteristics of LUTS, as well as their association with severe cognitive decline, may be useful in differentiating between different types of dementias.

UI is associated with severe cognitive decline in pure ALD but usually precedes severe mental failure in LBD.[31] This temporal pattern of cognitive decline and incontinence could be useful for the neurological diagnosis.

From the clinical point of view, patients with dementia with Lewy bodies tend to develop urgency and urgency incontinence more early than do patients with ALD. Urodynamics also showed a higher prevalence of detrusor overactivity in patients with LBD, when compared to ALD patients.[31] Del-Ser et al.[32] found that the onset of UI was significantly earlier in patients with LBD (3.2 years after dementia onset) than in patients with Alzheimer's disease (6.5 years after dementia onset).

It has been shown that detrusor overactivity could be temporarily improved by a lumbar puncture and later abolished by a shunt operation in patients with NPH. Urodynamic testing after lumbar puncture may predict the outcome of a shunt operation in these cases.[33] According to Sakakibara et al., a positive spinal tap test may predict successful outcome of shunt surgery, and the recovery rate of bladder function after shunt surgery ranges 30–70% of patients.[34]

Non-pharmacological treatment. The onset of incontinence in Alzheimer's disease patients is frequently associated with cognitive impairment, suggesting its central nervous system origin.[35] Therefore, conservative treatment strategies such as behavioral therapy, toilet training, and prompted voiding should be considered early in the course of disease. However, there is only limited evidence to support specific behavioral strategies for dementia patients[36–42] (Table II).

Hutchinson et al. suggested that caregivers of patients with Alzheimer's disease should assess toileting behaviors. This would permit them to provide physical and cognitive assistance while attempting to avoid accidents and catastrophic events.[43] The conservative treatment should be tailored to individual patient needs and disease status, taking into account factors like mobility, cognitive function, and general medical condition.[44] There is suggestive, although inconclusive, evidence of short-term benefit from prompted voiding.[45] Additionally, patients with mild or moderate Alzheimer's disease may learn how to use urine alarms and prompts, which could avoid major urinary leaks.[41]

However, Jirovec reported that 6 weeks of scheduled toileting did not improve incontinence in a group of demented and dependent nursing home residents, although poor staff compliance with the toileting program contributed to the negative outcome.[36] More recently, Jirovec and Templin reported a decrease (unspecified amount) in incontinence at 6 months compared to baseline in 28 of 44 participants (64%) in a randomized controlled trial (RCT).[39]

Available evidence suggests that more severely demented and less mobile individuals with bladder abnormalities are the least likely to benefit from toileting programs. Cost-benefit studies have indicated that the labor costs of toileting programs may be higher than the savings in laundry costs to the nursing home. However, carefully selecting patients who can most benefit from toileting regimens is one possible way of reducing conflict between the cost and dryness.[46]

Environmental settings may also be important for managing functional incontinence. Chanfreau-Rona et al. assessed whether enhanced visual cues, such as painting the toilet doors bright orange and displaying large pictures of a lady sitting on a toilet, would have an impact on incontinence in severely demented women in a psychogeriatric ward.[47] Enhanced visual cues, without including mobility aids and easy toilet access, did not improve UI in these patients.

Pelvic floor muscle exercises (PFME), sometimes combined with biofeedback, have been used successfully to treat stress incontinence in older women. It has been shown that for the procedure to be effective, the patient must actively contract and relax the pubococcygeal muscles up to 80 times a day for several months.[48] However, no PFME protocol was properly assessed in dementia patients. On the other hand, severe cognitive and physical deterioration may limit response to PFME protocols in dementia patients.[49]

LUTS caused by the neurological pharmacotherapy (and possible interactions with urological pharmacotherapy). First-line medical treatment for moderate and mild dementias comprises acetylcholinesterase inhibitors (AChEIn); second-line treatment, especially for more severe dementias, is memantine. The aim of AChEIn is to enrich acetylcholine levels in patients

TABLE II. Main Results of Studies on Behavioral Strategies for Dementia Patients With Urinary Incontinence

References	Publication year	Study type	LE[a]	N	Most relevant results
Jirovec[36]	1991	Case series	4	N/R	Six weeks of scheduled toileting did not improve incontinence in a group of demented and dependent nursing home residents, although poor staff compliance with the toileting program contributed to the negative outcome.
Gitlin et al.[37]	1993	Prospective study	4	17	An occupational therapist delivered intervention in five visits over 3 months to family caregivers. The intervention focused on behavioral strategies. "Toileting schedule" was poorly accepted.
Adkins et al.[38]	1997	Case report	4	2	Prompted voiding can be implemented by family caregivers. Intervention reduced incontinence for both participants.
Jirovec et al.[39]	2001	Randomized controlled trial	2b	118	Individualized scheduled toileting was agreed with carer. The authors reported a decrease (unspecified amount) in incontinence at 6 months compared to baseline in 28 of 44 participants (64%) in the experimental group.
Engberg et al.[40]	2002	Randomized controlled study (cross-over design)	2b	19	Prompted voiding achieved 60% reduction in daytime incontinence episodes.
Lancioni et al.[41]	2011	Case report	4	3	The use of the alarm system and caregivers' prompts was effective in helping the three patients reduce their large urinary accidents to zero or near zero levels.
Drennan et al.[42]	2012	Systematic review	4	3[b]	There was insufficient evidence from any studies to recommend any strategies.

[a]Level of evidence.
[b]Three studies included in the quantitative analysis.

with memory problems, especially at the M1 receptors in the brain, which are responsible for cognition and memory. Three AChEIn are currently used in daily practice, donepezil (Aricept®), galantamine (Reminyl®), and rivastigmine (Exelon®).

However, AChEIn have not only an effect in the central nervous system (CNS), they are also active in the periphery. Several publications have investigated the influence of AChEIn on urinary tract function, especially on bladder activity. According to Starr,[50] acetylcholinesterase inhibitor treatment was associated with significant worsening of UI. This has also been reported by Gill et al.,[51] who found that there is approximately a 7% risk of precipitating UI, and current incontinence may be significantly worsened. According to Hashimoto et al.,[52] there was no significant difference in regard to peripheral activity between rivastigmine and donepezil.

The worsening of urgency and urgency incontinence in these patients, after having received one of these drugs, is often misinterpreted as a sign of disease progression. Therefore, neurologists, geriatricians, and urologists should take a careful history to identify which medicaments are taken, in order to avoid such misinterpretations. Although a clinician prescribes AChEIn to improve cognitive function and memory, the same patient may also suffer from symptoms of overactive bladder, especially from urgency, urgency incontinence, and frequency, and may, therefore, be referred to urological care.

First-line treatment for symptoms of the overactive bladder comprises behavioral therapy and antimuscarinics. The ability of antimuscarinics to cross the blood–brain barrier and to be bound to the M1-receptors is different among them; it has been demonstrated that oxybutynin passes the blood–brain barrier easily and is bound to the M1-receptors. A placebo-controlled study[53] documented the deterioration of short-term memory, in an amount that corresponds to brain ageing over 10 years, when 10 mg of oxybutynin ER was described during 3 weeks. Due to the risk of cognitive decline and delirium associated with antimuscarinic agents in dementia patients, Gill et al.[51] noted "the argument could be made that it would be more appropriate to reduce the dose of the cholinesterase inhibitor rather than add an antimuscarinic drug to the treatment of patients who developed urgency and urgency incontinence." Trospium, however, does not cross the healthy blood–brain barrier, as demonstrated by Staskin et al.[54] in a group of healthy people above the age of 70. Darifenacin and solifenacin do pass the blood–brain barrier but are less bound to M1-receptors, therefore, fewer CNS side effects could be expected.[55] Propiverine, respectively its main metabolite, passes the blood–brain barrier only to a minor extent as shown in two Japanese studies.[56,57]

In general, antimuscarinic-induced cognitive impairment is considered reversible on discontinuation of antimuscarinic therapy. However, a few studies suggest that antimuscarinics may be associated with an increased risk for dementia.[58]

These CNS side effects of some antimuscarinics become crucial when they are prescribed to dementia patients already on AChEIn. There are case reports on tolterodine showing that, when added to dementia patients being already on AChEIn, a dramatic deterioration of cognition occurred, expressed by delusion and agitation.[59,60] The deterioration was reversible once the antimuscarinics were withdrawn or replaced by another antimuscarinic that does either not pass the blood–brain barrier or is less bound to the M1-receptor.

However, Isik et al.[61] treated dementia patients with Alzheimer's disease and UI (mean age: 79 years), who already were on the acetylcholinesterase inhibitor galantamine (up to 24 mg/day), in combination with trospium 50–60 mg/day for the symptoms of the overactive bladder. No change of cognitive function (as demonstrated also by the Mini-Mental State Score) during a 6-month follow-up was observed. Similar results were reported with propiverine in an early study from 1996, available only as an abstract of the 26th Annual Meeting of the ICS in Athens: Kluge et al.[62] reported in a randomized, placebo-controlled study, that Propiverine 15 mg bid given to 69 healthy male volunteers, aged 20–30 years, did not change arousal concentration, motivation, and mood compared to placebo. In 2009, Sakakibara et al.[56] published a study on the combined use of donepezil and propiverine in elderly individuals with dementia: no further deterioration of cognition or dementia was observed. This has been also reported in a study,[63] which showed no influence of propiverine ER 30 mg

once daily on cognitive function in elderly female and male patients with overactive bladder. Therefore, clinicians must know that AChEIn may induce or increase urgency and UI, a phenomenon, which is often misinterpreted as disease progression. In demented individuals being already on AChEIn, antimuscarinics that cross the blood–brain barrier and/or are bound to the M1-receptors in a significant amount may cause serious interactions with rapid deterioration of memory and cognition, which is reversible. A possible field of research should be the treatment of OAB in these patients with mirabegron, a beta-3-receptor-agonist, which does not interfere with M1 receptors. Table III shows the main results of studies on the concomitant use of antimuscarinics and AChEIn.[51,56,59–61,64–66]

LUTS in dementia patients caused by the ageing bladder itself or by comorbidities, including surgical treatment for refractory LUTS. Etiology of LUTS in dementia patients may be multifactorial, not only related to the neurological disease itself or pharmacotherapy. Comorbidities should be properly evaluated. Kuwabara et al.[67] studied post-void residual (PVR) volumes in 82 institutionalized dementia patients; 45 had Alzheimer's disease, 19 had vascular dementia, 5 had normal pressure hydrocephalus, and 13 had other causes. Eighty-three percent of the patients had urinary urgency or incontinence. They found PVR > 100 mL in 6 patients (8%), consisting of Alzheimer's disease in five and vascular dementia in one. However, the cause of the high PVR in those patients was assumed to be drug induced in one, prostate hypertrophy in one, frontal lobectomy for preexisting schizophrenia in one, and unknown in two.

Clinicians shall consider urinary tract infections (UTIs) in the differential diagnosis. The symptoms and signs necessary to meet minimum criteria to support antimicrobial initiation for UTIs are frequently absent in nursing home residents with advanced dementia. Antimicrobial therapy is prescribed for the majority of suspected UTIs that do not meet these minimum criteria. Urine specimens are frequently positive regardless of symptoms. These observations underscore the need to reconsider the diagnosis and the initiation of treatment for suspected UTIs in advanced dementia.[68]

There is limited evidence on outcomes of surgical procedures to treat refractory LUTS in dementia patients. In the context of benign prostate enlargement, Yonou et al.[69] evaluated 13 were dementia patients between 74 and 96 years old, who were candidate for transurethral resection of the prostate (TURP). Four out of 13 patients had urinary retention. Their mental condition was well controlled with ketamine and diazepam during and after surgery. Postoperative complications included acute myocardial infarction in 1, multiple gastric ulcers in 1, and decubitus in 1. None died within 3 months after TURP, 3 died there after, and 10 patients were alive at the mean follow-up period of 26 months. Six patients reported good urination, 3 reported some improvement in urination after surgery, although requiring intermittent catheterization, and 1 developed mild incontinence.

Kuwahara et al.[70] studied the efficacy and the safety of photoselective vaporization of the prostate (PVP) with GreenLightPV in eight patients with severe heart disease (American Society of Anesthesiology score of three or greater) and in four patients with severe dementia (Performance status of three or greater). The mean age was 81 years old (range 67–94) and the mean prostate volume was 63.8 ml (range 19–120). Urethral catheter was used in eight patients because of chronic urinary retention. All patients could urinate after catheter removal and were discharged on the day following operation. Mean peak flow rate increased to 18 ml/s and mean post-void residual urine decreased to 46.9 ml at 3 months. No postoperative complications (urinary retention, hematuria, urinary tract infection, etc.) were observed.

Concerning the surgical treatment of refractory urgency urinary incontinence, there is also a lack of high-quality studies. Jiang et al.[71] retrospectively evaluated efficacy and safety of

TABLE III. Main Results of Studies on the Concomitant Use of Antimuscarinics and Acetylcholinesterase Inhibitors (AChEIn)

References	Publication year	Study type	LE*	N	Most relevant results
Piecoro et al.[64]	1998	Case report	4	2	Abrupt discontinuation of antimuscarinics or anticholinergics with high antimuscarinic properties in patients receiving long-term acetylcholinesterase inhibition therapy may be associated with a reduction of seizure threshold.
Edwards et al.[59]	2002	Case report	4	3	Concomitant use of tolterodine and AChEIns (donepezil and rivastigmine) caused cognitive deterioration. After tolterodine was discontinued, patients returned to their baseline status within 24–48 hr.
Siegler et al.[60]	2004	Case report	4	1	Combination was clinically effective.
Gill et al.[51]	2005	Population-based retrospective cohort study	3	44,884	Older adults with dementia who were dispensed cholinesterase inhibitors (n = 20491) had an increased risk of subsequently receiving an antimuscarinics (4.5% vs. 3.1%; $P < 0.001$; adjusted hazard ratio, 1.55; 95% confidence interval, 1.39–1.72).
Barton et al.[65]	2008	Case series	4	100	Twenty-eight out of 100 patients referred to a memory disorders clinic for evaluation were being treated with a cholinesterase inhibitor at the time of their evaluation; of these, 4 (14%) were also taking > or =1 medication with anticholinergic properties.
Sink et al.[66]	2008	Prospective cohort	3	376	Dual use of AChEIn and antimuscarinics (oxybutynin or tolterodine) may result in greater rates of functional decline than use of AChEIn alone.
Sakakibara et al.[56]	2009	N/A	N/A	N/A	Combined use of donepezil and propiverine in elderly individuals with dementia: no further deterioration of cognition or dementia was observed.
Isik et al.[61]	2009	Prospective cohort	3	36	Subgroup of ALD patients who received combination of trospium and galantamine. Trospium increased satisfaction and reduced the number of nocturia episodes and pads/day. The mini-mental state scores were not significantly changed at 6-month follow-up.

intravesical onabotulinum toxin A injection in 40 elderly patients with chronic central nervous system lesions and overactive bladder, including cerebral vascular accidents,[23] Parkinson disease,[9] and dementia,[8] versus 160 controls. Improvement of urgency severity scale, increased bladder capacity, and increased post-void residual volume were comparable between the groups at 3 months.

Bail et al.[72] have studied potentially preventable complications for dementia patients compared with non-dementia patients in the perioperative period. Hospitalized dementia patients had higher rates of complications than non-dementia patients, including urinary tract infections, pressure ulcers, delirium, pneumonia, physiological and metabolic derangement, sepsis, and failure to rescue ($P < 0.05$).

DISCUSSION

Urinary incontinence is common in patients with dementia and is more prevalent in demented than in nondemented older individuals. Despite of the fact LUTS are highly prevalent in dementia patients, high-quality data to guide the choice of treatment strategies in this population are lacking. Most studies are classified as LE 3/4.

Urinary incontinence can result in medical morbidity, impaired self-esteem, early institutionalization, stress on caregivers, and considerable financial costs. Concerning UI severity, more than two-thirds of incontinent patients with dementia have at least one episode a week.[16,23] This figure contrasts with general population surveys of elderly individuals, of whom about 5% have urine loss at least once a week.[73]

In regards to differences between genders, although ALD occurs more commonly in women, previous studies did not find a significant difference in the prevalence of incontinence between men and women with dementia.[15,16,18] On the contrary, Ouslander et al.[74] reported that urinary incontinence was twice as prevalent in males as in females, and Palmer et al. found that male gender increased the probability of urinary incontinence by 68% 1 year after admission to a nursing home. These results are in line with the findings that men deteriorate mentally and physically more severely than women after admission to nursing homes. The presence of prostatic hypertrophy predisposing to urinary overflow, combined with the male predominance of multi-infarct dementia, may explain these findings.[75]

Patients with decreased motivation, cognitive disability, gait disorder, and DO are highly likely to be incontinent. However, a careful clinical evaluation with a measurement of post-void residuals seems to be sufficient to guide treatment in most cases. Correctly diagnosing the impaired contractility group with urodynamic testing is of therapeutic importance, because such patients may be at risk of acute urinary retention if anticholinergic medication is given.[76]

A dementia diagnosis does not preclude management of incontinence, but treatment options may be more limited in those with advanced dementia who are unable to retain information and modify behaviors.[77]

Antimuscarinics are frequently prescribed to dementia patients with UI and are especially useful in LBD and in VD. However, they may also help in bladder training programs by increasing bladder capacity in other types of dementia. It is possible that antimuscarinics are of greater benefit to less-impaired individuals, who are aware of, and able to tell the caregiver about, their urinary sensation or incontinence. Prompted and scheduled toileting for patients with decreased motivation and immobility appears to be an effective approach. Current evidence suggests that antimuscarinics can be associated with cognitive worsening, due to the blockade of M1 receptors. Thus, the use of antimuscarinics that do not easily cross the blood–brain barrier (such as trospium, propiverin) or more M2/M3 selective agents (darifenacin/solifenacin) should be taken into consideration.

Several reports showed that CNS side effects become crucial when such antimuscarinics are prescribed to dementia patients already on acetylcholinesterase inhibitors (AChEIn), due to the risk of acute cognitive deterioration.[51,56,59–61,64–66] Current evidence is heterogeneous and does not support any specific combination of antimuscarinics and AChEIn in terms of safety. According to Orme et al.,[77] factors such as age, frailty, and dementia should be considered a barrier to pharmacological management of LUTS in elderly patients, but consideration should be given to the total anticholinergic load. Oxybutynin has been shown to have significant adverse cognitive effects. On the other hand, there is no data available for mirabegron in this group of patients. Clinicians should be aware of the possible cognitive deterioration associated with polypharmacy.

Once there are no clinical trials to evaluate different surgical strategies for refractory urinary incontinence in dementia patients and considering the higher reported rates of perioperative complications in these patients, surgical approaches are usually reserved for individuals with good general status and ambulation.[69–72]

CONCLUSIONS

Our findings show that different types of dementia cause different LUTS at different times during the disease and need different therapeutic approaches. Therapy of LUTS caused by dementia itself is mainly conservative and includes behavioral therapy and bladder training program. There was insufficient evidence from any studies to recommend specific strategies or treatment protocols. Since the etiology of LUTS in dementia patients is multifactorial, future research is certainly needed and should be aimed at behavioral therapy protocols, medical treatment for overactive bladder, drug interactions, and patient profiling.

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The ICS Neurourology Promotion Committee (NUPC) consists of following members (2014): Emmanuel Chartier Kastler (current chairman), Helmut Madesbacher (former chairman), Marcio Augusto Averbeck, Waleed Altaweel, Andrei Manu-Marin, Melissa Davies, Jerzy Gajewski, Pablo Gomery, Thomas Kessler, Limin Liao, Brigitte Schurch, Ryuji Sakakibara, Jalesh Panicker, Enrico Finazzi-Agro, and Homero Bruschini. NUPC new members (as of 2015): Charalampos Konstantinidis, Pierre Denys, and Magdy Hassouna.

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