

# Translational Research and Functional Changes in Voiding Function in Older Adults



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## KEYWORDS

- Urinary bladder • Voiding dysfunctions • Ischemia • LUTS • Overactive bladder
- Underactive detrusor • Urinary incontinence • Animal models

## KEY POINTS

- Lower urinary tract symptoms (LUTS) significantly increase with age and include a prevalence of overactive bladder symptoms and even impaired bladder contractility.
- The pathophysiology of LUTS in older adults is multifactorial and includes comorbid medical illness, neurologic and psychiatric conditions, medications, functional impairments, and environmental factors.
- Many age-related changes in bladder function have an origin that is myogenic, neurogenic, and/or ischemic.
- Many of the structural and functional changes observed in animal models of aging seem to be similar to those described in humans.
- Although several factors have been identified as playing a potential role in these age-related symptoms, the influence in any patient group is unknown.

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## INTRODUCTION

Aging-related bladder dysfunction and associated lower urinary tract symptoms (LUTS) represent an increasing problem in developed countries because of increased life expectancy. LUTS are generally divided into storage (irritative), voiding (obstructive), and postmicturition components. Storage symptoms include urgency, frequency, nocturia, and urgency incontinence (ie, the overactive bladder [OAB] syndrome). Voiding symptoms comprise reduced force of stream, hesitancy, inability to empty the bladder, and straining. Postmicturition symptoms include feeling of incomplete emptying and postmicturition dribble.<sup>1,2</sup> However, none of these symptoms is disease specific or has a high correlation with a specific urodynamic pattern. Most of these symptoms have been suggested to be age dependent, and are attributed to various factors, including reduced bladder capacity, changes in bladder sensation, and, on urodynamic investigation, detrusor overactivity (DO). However, the pathophysiology behind the dysfunctions is sometimes difficult to establish because what can be attributed to normal aging cannot be separated from what is caused by comorbidities. LUTS is an increasing problem: an estimated 45% of the 2008 worldwide population (4.3 billion) was affected by at least one LUTS, reducing the quality of life. By 2018, an estimated 2.3 billion individuals will be affected by at least one LUTS (18.4% increase).<sup>3</sup>

## FUNCTIONAL AGING-RELATED VOIDING CHANGES

Functional changes in the urinary tract occur with both normal aging and in elderly individuals with different types of diseases. The pathophysiology of LUTS in older adults is multifactorial and includes comorbid medical illness, neurologic and psychiatric conditions, medications, functional impairments, and environmental factors.<sup>4,5</sup>

### *The Overactive Bladder*

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The OAB symptom complex comprises urinary urgency, with or without urgency incontinence, usually with frequency and nocturia in the absence of other disorders.<sup>6</sup> Several articles have discussed different aspects of OAB in older adults<sup>5,7-10</sup> and it has been well established that the syndrome increases with age, and that aging alone can be considered a major risk factor for developing these symptoms.

The OAB syndrome as defined by the International Continence Society refers to idiopathic OAB.<sup>6</sup> Because the same symptoms can occur with known comorbidities probably involved in the pathophysiology of the symptoms, such as Parkinson disease, multiple sclerosis, spinal injuries, Alzheimer disease, and diabetes cystopathy, epidemiologic studies focusing on idiopathic OAB underestimate the true prevalence of the symptom complex. Because aging can be considered a major risk factor for developing the symptoms, current population forecasts predicting a worldwide increase in the proportion of people aged more than 65 years, with the greatest increase being in those aged more than 80 years,<sup>11</sup> also predict an increase in patients with OAB symptoms. According to Irwin and colleagues<sup>3</sup> (2011) an estimated 455 million individuals worldwide experienced OAB in 2008, with numbers of affected individuals anticipated to increase to 500 million by 2013 (10.0% increase) and to 546 million by 2018 (20.1% increase). It can be expected that the health care burden associated with OAB and other LUTS will increase and that the occurrence of OAB in the aging population will have important quality-of-life and economic consequences.<sup>4,12-15</sup>

Urinary incontinence, in addition to urgency, may be one of the most relevant symptoms, given that other comorbidities may also limit the ability to remain dry.<sup>16</sup> The impact on the quality of life in this population is vast; incontinence remains a risk factor for nursing home placement<sup>17-19</sup> and links with other conditions, including an

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