Structural and functional aspects of sensory-motor Interaction in the urinary bladder

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The clinical problem
The overactive bladder syndrome (OAB) is defined by the International Continence Society (ICS) as urinary urgency which is accompanied by urinary frequency and nocturia, with or without urgency urinary incontinence\(^1,2\). OAB is a significant problem in terms of quality of life and costs, especially in aging societies as in the Netherlands. The aetiology and underlying pathophysiology is heterogeneous and not well understood. The mainstay of current therapy, is antimuscarinic drugs which have limited efficiency and poor compliance due to side effects. Therefore there is need for better therapeutic modalities for patients with OAB symptoms. About only half of OAB patients have urodynamically proven detrusor overactivity (overactive contractions of the bladder). OAB has a greater impact on people’s quality of life than diabetes\(^2,4\) and an economic burden and cost comparable to rheumatoid arthritis and asthma\(^5\). Therefore, OAB deserves more research resources and research efforts. Those affected by the symptoms of OAB tend to curtail their participation in social activities and isolate themselves and are predisposed to depression\(^6\). Furthermore, there is probably an underestimation of the prevalence due to embarrassment\(^7,10\).

Prevalence
OAB affects nearly 100 million people in the Western world (33 million in the US and 66 million in the European Union)\(^11,12\) and has severe effects on quality of life and ability to work. OAB has an incidence of, up to 17% in the Western population\(^11\) and an overall prevalence of 16.6% in Europe\(^12\). The prevalence of OAB in the United States is estimated 26 to 33% in men and from 27 to 46% in women\(^13\).

Socio-economic burden
The total economic cost of OAB is high. In 2002 the costs in the US were approximately $12.7 billion which increased to €22 billion/year in 2005. Less than 3% of the patients regain long lasting continence. Therefore, the above mentioned costs are likely to be an underestimation and most probably, the problem is much larger\(^10,12-14\). The exact economic costs and prevalence of OAB in the Netherlands are unknown. However, it has been calculated that about €200 million are spent annually on protective material such as incontinence pads. In Germany, the direct annual costs have been estimated to be the same as costs of other chronic diseases such as dementia or, diabetes mellitus\(^15\). Other studies have compared the major costs of OAB to rheumatoid arthritis and asthma\(^5\). From those who suffer from OAB, only 28% sought help and only half of those, currently receive treatment. Less than 3% of the patients regain long lasting continence. Therefore, the above mentioned costs are likely to be an underestimation and most probably, the problem is much larger\(^10,12-14\). As the incidence of OAB...
increases with age, it will become an even more important problem in the coming years in our aging society. Hence, OAB is a major problem affecting a large number of individuals and there is an urgent need for new insights into the problem and innovative therapeutic modalities.

**Current therapies for OAB**

Since OAB symptoms have been shown to be associated with detrusor overactivity, it was argued that drugs affecting contractility would alleviate symptoms\(^{16}\). Activity in the bladder smooth muscle is initiated by muscarinic receptor stimulation. The current treatment mainly consists of antimuscarinic agents, which have a slightly better effect than placebo, but poor patient compliance, due to their side effects and the lack of sufficient efficacy\(^{10,16}\). Therefore, it is desirable that alternative treatment methods are developed and made available for patients.

**Knowledge exchange and impact**

The results of our study can be beneficial for many. First place the patients suffering from OAB who can benefit from better treatment. As there is a strong correlation between OAB and/or incontinence on one side, and depression on the other side, not only the OAB problem could be tackled, but also depression in these patients can eventually be treated more effectively. Furthermore, there is a potential benefit in the overall aging problem. As OAB increases with aging and as we require self-reliance from elderly people, better OAB treatment will allow them to participate more widely in the society. Another potential beneficial effect is the cost reduction for insurance companies that currently have to pay for incontinence pads and for ineffective treatment modalities for years. In addition care costs for an aging population increases dramatically due to urinary incontinence. The cost reduction will indirectly be beneficial for the society as it will reduce health costs. Moreover, there will be potentially less sick leave, which will again reduce costs for the society. In addition, if OAB is treated more effectively, less incontinence material will be used and disposed which besides the cost reduction will be beneficial for the environment. The results of our study are relevant and interesting for researchers and science in general. Our results can further be used to design specific research in related disorders. A better understanding of bladder physiology and pathophysiology of OAB could be helpful in research in the field of detrusor underactivity, for which currently there is no treatment available. Bladder pain syndrome is another example of a condition that can benefit from the results presented in this thesis. Patients affected experience tremendous negative effects on their quality of life due to symptoms of OAB with the addition of major invalidating pain symptoms. Moreover, a large group of patients with partial or complete spinal cord lesions suffer from bladder impairment as well as patients with dementia and Alzheimer’s disease. All these conditions could benefit from results of our study. A better categorization of OAB patients could also be helpful for clinicians writing or using clinical guidelines for treatment of voiding disorders such as OAB.
References


