Asian Journal of Urology (2017) xx, 1–8

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/ajur

Review

Contemporary diagnostics and treatment options for female stress urinary incontinence

Q6 Allert M. de Vries*, John P.F.A. Heesakkers

Department of Urology, Radboud University Medical Center, Nijmegen, The Netherlands

Received 21 February 2017; received in revised form 13 June 2017; accepted 3 July 2017

KEYWORDS
Female;
Stress urinary incontinence;
Treatment

Abstract Stress urinary incontinence is not a deadly disease, but for the large population of women suffering from it, it is a very important issue. Especially in the continuously aging population all over the world, there is more and more need for treatment of this serious medical condition. Treatment of female stress urinary incontinence exists already for ages. In the 20th century invasive treatments like Burch colposuspension and pubovaginal slings were the mainstay of surgical treatments. The introduction of the midurethral sling made the procedure less invasive and accessible for more caregivers. Luckily there are many options available and the field is developing quickly. In recent years many new medical devices have been developed, that increase the number of treatment options available and make it possible to find a suitable solution for the individual patient based on subjective and objective results and the chances of complications. This manuscript provides an introduction to the therapeutical options that are available nowadays for female stress urinary incontinence.

1. Introduction

Q3 Stress urinary incontinence (SUI) is defined as "the involuntary loss of urine on effort or physical exertion or on sneezing or coughing" [1]. It is a common medical condition with a severe impact on quality of life. Symptoms of urinary incontinence are prevalent in 25% of the female population above 20 years [2], 50% of which are stress incontinence symptoms. The main risk factors for development of SUI are higher age, parity and obesity [3]. In white, non-Hispanic women SUI is more common than in other ethnic groups [4]. Other (chronic) comorbidities like physical inactivity [5], diabetes, asthma and angina pectoris are also known to negatively influence incontinence [3].

* Corresponding author. Radboud university medical centre, Geert Grooteplein 10, Urology – Experimental Urology (route 267), Q2 P.O. Box 9101, 6500 HB Nijmegen, The Netherlands.
E-mail address: allert.devries@radboudumc.nl (A.M. de Vries).
Peer review under responsibility of Second Military Medical University.

http://dx.doi.org/10.1016/j.ajur.2017.09.001

Please cite this article in press as: de Vries AM, Heesakkers JPFA, Contemporary diagnostics and treatment options for female stress urinary incontinence, Asian Journal of Urology (2017), http://dx.doi.org/10.1016/j.ajur.2017.09.001

In this article an overview of the current therapeutical options of this bothersome medical condition is given. Information is presented in a historical context, with personal experience from the authors. The data are supported by recent literature found in Pubmed, Cochrane and Embase databases and the European Association of Urology (EAU) [6] and International Consultation on Incontinence (ICI) [7] guidelines on incontinence.

2. Diagnostics

When initiating treatment for female SUI, assessment of the type of incontinence, either stress-, urge-(UUI), or mixed urinary incontinence (MUI), is necessary first. Investigations to distinguish between these types include patient history, physical examination, voiding diaries, imaging techniques, pad weight testing and urodynamic investigation.

2.1. Medical history taking

In medical history taking one should ask when incontinence occurs. SUI occurs at moments of increased abdominal pressure, during coughing, sneezing and/or straining. If incontinence occurs after a feeling of urgency, without abdominal pressure rise, urge-incontinence can be assumed. By thoroughly asking for the symptoms, medical history taking can for a large part distinguish between the various forms of incontinence. In 20%—36% of patients MUI is present, which consists of both forms of incontinence [8]. Because high-quality evidence is not available about the ideal treatment of MUI, in these patients conservative treatment of the most prominent form of incontinence is recommended [8].

2.2. Physical examination

To support medical history taking, thorough physical examination is essential. During inspection of the female genitals it is important to look at signs of vaginal atrophy, pelvic organ prolapse and whether urethral hypermobility is present or not.

Vaginal atrophy is a found in post-menopausal women after lowering of estrogen levels. Local or systemic estrogen suppletion can help improve continence, as it will increase the thickness of the urethral and vaginal mucosal tissue, which in turn will lead to a better closing mechanism. Treatment with estrogens might furthermore help to improve the quality of the tissue. Although improved quality and thickness of the vaginal wall suggests a more easy procedure during pelvic surgery, no strong evidence exists yet for advantages of pre-operative hormone replacement therapy [9].

Assessment of pelvic organ prolapse is also an important part of physical examination. It can be classified according to several quantification-systems, for example the Pelvic Organ Prolapse Qualification (POP-Q) score. The POP-Q score assesses the position of the anterior and posterior vaginal wall and the uterus compared to the hymenal ring and quantifies this. A vaginal prolapse, especially from the anterior wall, almost always leads to a decreased urethral support, which in turn might lead to (stress) incontinence. By supporting the urethra/anterior vaginal wall during physical examination and performing a cough test simultaneously, one can mimic the effect after (surgical) correction of this situation. Sometimes this effect can also been seen after placing a pessary and these devices can be used as a treatment for SUI in this way. Contradictory, incontinence can develop after surgical correction of a prolapse, because urethral kinking is made undone. The straightened urethra is more vulnerable for developing SUI, because the physiological mechanism of urethral closure is impaired. Although prolapse and incontinence are closely related to one another, we will not further discuss the treatment of prolapse in this article.

In determining the type of stress urinary incontinence, it can be useful to assess the degree of urethral mobility and to diagnose intrinsic sphincter deficiency (ISD). Originally these conditions, which both play a role in the pathogenesis of SUI, were described as "type 1" and "type 3" incontinence respectively. Based on John DeLancey's hammock theory [10], midurethral hypermobility causes SUI because of a lack of support of the urethral sphincter. The urethral sphincter is not capable to close the urethra during moments of high intra-abdominal pressure resulting in urinary loss. This can be compared to a garden hose, that can easily be compressed against a solid underground, but is hardly compressible in loose sand. Intrinsic sphincter deficiency is, as the name suggests, a failure of the sphincter mechanism of the urethra itself. In these patients stress incontinence can occur without the presence of urethral hypermobility. Stress incontinence based on ISD is more severe and more difficult to treat [11].

The clinical significance of distinguishing between these different forms of SUI is subject of debate. In general, one can state that in case of urethral hypermobility (with or without ISD) treatment with a tension-free vaginal tape is recommended. In case of ISD, one should consider reinforcing the urethral sphincter as well. This can be done with a more compressive sling, an artificial sphincter or — in case the patient is not fit or does not opt for surgery — bulking agents.

Urethral hypermobility is mostly assessed by eyeball observation. Classically it can also be diagnosed by performing a Q-tip test, in which a cotton swab is placed in the urethra. The patient is asked to strain, if the angle of the cotton swab changes more than 30° from the original position, hypermobility is present. In clinical practice, it is not commonly used.

Although the clinical significance of urodynamics in individual cases is disputable, urodynamic investigation can give useful information about the type of incontinence. First it can differentiate between SUI and UUI. Second, it can diagnose ISD if urethral pressure profilometry (UPP) is performed as part of the complete investigation. Generally, an ISD is concluded if the maximal urethral closing pressure (MUCP) is below 20 cm H_2O (1.96 kPa), but the ranges are wide. There is no consensus about whether the cut-off point of the MUCP is a predictor for success of a possible subsequent surgical procedure [12,13]. Several imaging techniques are available to diagnose incontinence. The most important are X-ray, ultrasound and magnetic resonance imaging (MRI). All can be used to assess bladder neck

Please cite this article in press as: de Vries AM, Heesakkers JPFA, Contemporary diagnostics and treatment options for female stress urinary incontinence, Asian Journal of Urology (2017), http://dx.doi.org/10.1016/j.ajur.2017.09.001