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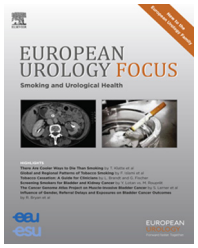

Review – Incontinence

Surgical Treatment of Male Postprostatectomy Incontinence: Current Concepts

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Abstract

Context: Radical prostatectomy is the most common reason for male stress urinary incontinence. There is still insecurity about its therapeutic management.
Objective: To evaluate current evidence regarding therapy of postprostatectomy incontinence (PPI).
Evidence acquisition: In October 2017, a nonsystematic review of the literature published within the last 2 yr was performed using the PubMed/Medline database. In total, 58 articles were included in the current analysis.
Evidence synthesis: Regarding invasive management of moderate-to-severe PPI, artificial urinary sphincter (AUS) is still the treatment of choice. Recent studies focused on efficacy, but also a plethora of potential predictive features for treatment success has been investigated. Owing to inconsistent results, there still is no consensus about valid risk factors of AUS treatment success to date. There are increasing efficacy data about the use of adjustable slings, and long-term follow-up results are now available for the AdVanceXP male sling. Evidence addressing the use of the quadratic Virtue male sling needs further evaluation. To date, there is no randomized controlled trial investigating the outcome of one specific surgical treatment or comparing the outcome of different surgical treatment options. Limitations include the nonsystematic approach.
Conclusions: Level of evidence addressing the surgical management of PPI is increasing but still unsatisfying.
Patient summary: In this review article, we look at current research regarding surgical management of stress urinary incontinence following radical prostatectomy. Many studies focus on how to predict treatment failure and outcomes after artificial urinary sphincter implantation. In addition, more information on the long-term results after male sling implantation is now available.

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1. Introduction

To date, radical prostatectomy (RP) is by far the most important cause of stress urinary incontinence (SUI) in male patients. Naturally, postprostatectomy incontinence (PPI) has a major impact on patients' quality of life (QOL) and may affect various daily activities [1]. In a recent analysis of functional outcomes in a very high-volume center, Pompe et al [2] reported incontinence rates of 11.0% 3 yr after RP. In other series, PPI rates of up to 69% have been reported [3]. These differences in PPI incidences are most likely due to inconsistent definitions of continence [4], and/or

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significant differences regarding the methods of data acquisition [5]. It has been shown that the extent of preoperative patient information about anticipated functional outcome has a significant effect on postoperative patient satisfaction rates, especially if these patients are eligible for active surveillance [6].

The pathophysiology of PPI is not fully understood, but many authors mention intrinsic sphincter deficiency and underactivity, neural impairment/injury [7], urethral support defects [8], and decreased membranous urethral length and venous sealing effect [3,4]. Findings led to adjustments in surgical techniques, most notably the nerve-sparing technique that has recently been evaluated by Michl et al [9] in a large European patient collective.

Recently, we have performed a systematic review of conservative as well as surgical treatment options of PPI and provided an expert opinion-based algorithm of how to treat which patient [10]. In the current narrative review article, we provide an update on current literature regarding the surgical management of PPI.

2. Evidence acquisition

In order to critically summarize current areas of research in the field and highlight unmet needs regarding the evidence of surgical therapy of PPI, a nonsystematic literature search was conducted in October 2017 in the PubMed/Medline database. The following keywords were used: post-prostatectomy incontinence (Medical Subject Headings [MeSH]) OR postprostatectomy incontinence ([MeSH). Following previous evidence acquisition, an additional PubMed/Medline database search was conducted using the keywords urinary incontinence (MeSH) AND male (MeSH) AND artificial urinary sphincter/male sling/male adjustable sling/AMS 800/ZSI 375/AdVance/AdVanceXP/Virtue male sling/Argus male sling/Reemex male sling/ATOMS/ProACT (MeSH) [10].

In order to provide an overview of the current research on PPI, our search was limited to studies that were published since our last literature research has been performed in October 2015 [10]. Prospective and retrospective original research, systematic reviews, and meta-analyses were included. Meeting abstracts, editorials, and commentaries were excluded. Original articles were ineligible for further analysis, if they were not published in English, focused on patients with neurogenic urinary incontinence, non-PPI only, or preclinical devices. Reference lists of included articles were also screened for relevant articles. Initially, articles were screened and selected based on their abstracts and then studied in detail. Included articles were selected by the consensus of all authors.

In total, >100 articles were screened and consequently 58 articles were reviewed for evidence (Fig. 1).

3. Evidence synthesis

3.1. Artificial urinary sphincter

Current European Association of Urology guidelines recommend surgical treatment if initial conservative treatment strategies failed [4]. To date, the AMS 800 (Boston Scientific) artificial urinary sphincter (AUS) is still the device with the longest follow-up and the greatest level of evidence, and has thus been seen as the gold standard treatment of PPI for many years [11]. However, based on current expert opinions, male slings can be considered as a favorable treatment option in selected patients [10]. In a recent national database study of 1246 patients who received surgery due to SUI, it has been shown that 34.9% of the analyzed patients received an AUS, 36.4% underwent male sling implantation, and 28.7% were treated with a bulking agent [12]. In line, MacDonald et al [13] analyzed implantation patterns in 32 416 patients using the National Inpatient Survey database and found a significant decline in AUS implantations ($p < 0.01$), while male sling implantations were on the rise ($p < 0.01$). In spite of the rises of male slings in treatment strategies of PPI, the vast majority of recently published studies focused on outcomes and features of AUS implantation. In a systematic review by van der Aa et al [11], high cure rates but also significant peri- and postoperative morbidity rates were found. After a median follow-up of 4.1 yr, Linder et al [14] found a revision rate of 31.5% in a large single-center study including >1000 patients. Consequently, an increasing number of research groups focus not only on the efficacy outcomes, but also on complication rates as well as strategies on how to predict treatment success and failure after AUS implantation. Hereby, it is crucial to distinguish between real complications and what can be called "maintenance" of the AUS. It has been shown that AUS have a limited lifespan per se and reoperations are common in the long-term period [11]. However, those long-term reinterventions should not classify as complications (if it is not due to device infection or urethral erosion) but should be regarded as a process that is inherent to every AUS implantation. Thus, while analyzing the outcome after AUS, revisions do not equal complications in every case.

In the current narrative review, we present evidence regarding the AMS 800 and ZSI 375 (Zephyr Surgical Implants) devices. In addition, the Victo (formerly FlowSecure; Promedon, Argentina) AUS has been launched, and literature regarding its efficacy is still pending.

3.1.1. Functional outcomes after AUS implantation

In a recent meta-analysis, a significant reduction in daily pad usage after AUS implantation has been found (−3.75, 95% confidence interval [CI] = −4.56 to −2.93, $p < 0.001$), and cure rates of 56% (95% CI = 0.44–0.68, $p = 0.342$) were described [15]. However, it has to be stated that levels of variances and heterogeneity in the included studies were high. In addition, Leon et al [16] reported a continence rate of 77.3% in an intention-to-treat analysis after a median follow-up of more than 15 yr.

Recently, several studies focused on the functional outcomes after AMS 800 and were included in the current narrative review [17–22]. Notably, Viers et al [18] conducted a large retrospective single-center study, and analyzed functional outcomes of 278 patients after primary and secondary AMS 800 implantation. After a median

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