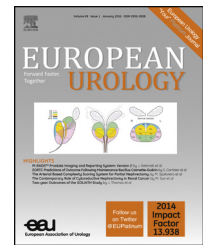


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Platinum Priority – Review – Prostate Cancer

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Preoperative Membranous Urethral Length Measurement and Continence Recovery Following Radical Prostatectomy: A Systematic Review and Meta-analysis

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Abstract

Context: Membranous urethral length (MUL) measured prior to radical prostatectomy (RP) has been identified as a factor that is associated with the recovery of continence following surgery.

Objective: To undertake a systematic review and meta-analysis of all studies reporting the effect of MUL on the recovery of continence following RP.

Evidence acquisition: A comprehensive search of PubMed, EMBASE, and Scopus databases up to September 2015 was performed. Thirteen studies comprising one randomized controlled trial and 12 cohort studies were selected for inclusion.

Evidence synthesis: Four studies (1738 patients) that reported hazard ratio results. Every extra millimeter (mm) of MUL was associated with a faster return to continence (hazard ratio: 1.05; 95% confidence interval [CI]: 1.02–1.08, $p < 0.001$). Eleven studies (6993 patients) reported the OR (OR) for the return to continence at one or more postoperative time points. MUL had a significant positive effect on continence recovery at 3 mo (OR: 1.08, 95% CI: 1.03–1.14, $p = 0.004$), 6 mo (OR: 1.12, 95% CI: 1.09–1.15, $p < 0.0001$), and 12 mo (OR: 1.12, 95% CI: 1.03–1.22, $p = 0.006$) following surgery. After adjusting for repeated measurements over time and studies with overlapping data, all OR data combined indicated that every extra millimeter of MUL was associated with significantly greater odds for return to continence (OR: 1.09, 95% CI: 1.05–1.15, $p < 0.001$).

Conclusions: A greater preoperative MUL is significantly and positively associated with a return to continence in men following RP. Magnetic resonance imaging measurement of MUL is recommended prior to RP.

Patient summary: We examined the effect that the length of a section of the urethra (called the membranous urethra) had on the recovery of continence after radical prostatectomy surgery. Our results indicate that measuring the length of the membranous urethra via magnetic resonance imaging before surgery may be useful to predict a longer period of urinary incontinence after surgery, or to explain a delay in achieving continence after surgery.

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1. Introduction

Radical prostatectomy (RP) is the mainstay surgical treatment for localized prostate cancer. The aim of such surgery is to achieve oncologic control while preserving urinary continence and erectile function [1]. In the majority of patients, urinary incontinence (UI) following RP is a predictable consequence. Despite improvements in surgical techniques, the incidence of UI remains high, especially during the early postoperative period and the time to achieve continence (continence recovery) after RP, is variable. The variability in the rates of UI following RP remains one of the most significant functional complications with the potential for a negative impact on quality of life [2–4].

The prevalence of postprostatectomy UI varies according to the definition applied [5]. Encouragingly, despite the lack of a common and consistent working definition of continence, postoperative UI typically resolves gradually with time, with reports of significant improvement occurring up to 2 yr following RP [2,6,7]. The mechanism for the time dependent recovery of UI is not clearly understood.

Various preoperative prognostic patient-related risk factors that affect continence recovery have been reported. The preoperative length of the membranous urethra (MUL) which is measured via T2-weighted magnetic resonance imaging (MRI) images (Fig. 1), is one patient-related anatomical factor that has been reported to affect continence recovery following RP. A comprehensive understanding of MUL is potentially of value to clinicians when counselling patients in clinical practice prior to surgery and when explaining a delay in continence recovery following surgery. Also, given the recent technical advances that have led to the wider application of MRI technologies for the diagnosis and staging of prostate cancer [8], clinicians also have increased accessibility to obtain measurements of MUL prior to RP.

2. Evidence acquisition

2.1. Objective

Our aim was to systematically review and meta-analyze studies reporting the prognostic value MUL measurements prior to RP for the recovery of continence.

2.2. Search strategy

We adopted the Preferred Reporting Items for Systematic Reviews and Meta-analysis [PRISMA] guidelines for our systematic review [9]. The PubMed, EMBASE, and Scopus databases were searched for relevant articles from the inception of each database until September 22, 2015. The systematic searches were formulated and conducted with the guidance of two health sciences librarians from the University of New England, Australia. The PubMed search strategy included a free-text protocol using the combined terms “prostatectomy OR radical prostatectomy AND urinary incontinence AND urethral length OR urethral volume OR membranous urethra” across the title and abstract fields of the records.

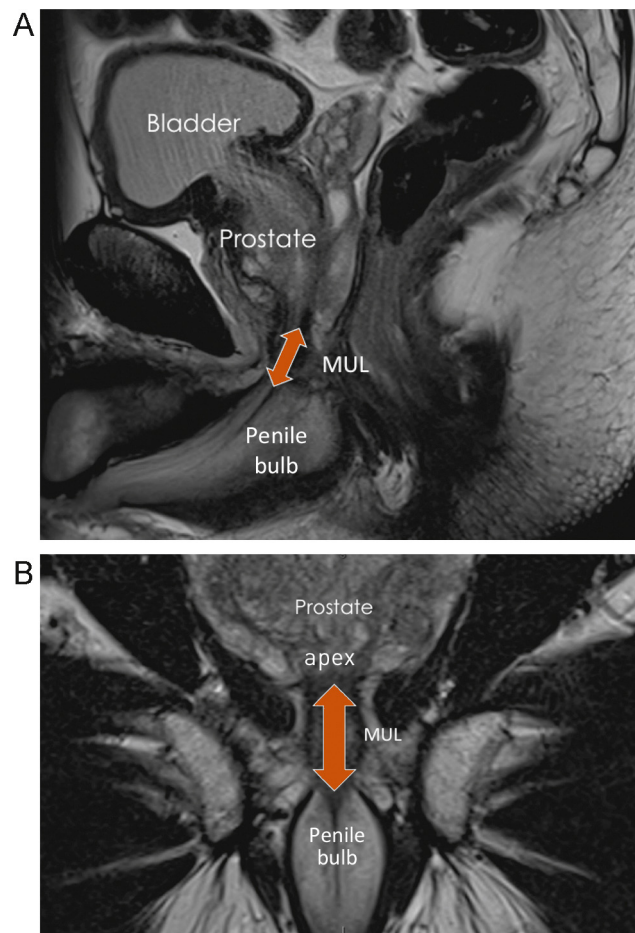


Fig. 1 – T2-weighted (A) sagittal and (B) coronal magnetic resonance images^a for the measurement of membranous urethral length (MUL). ^a The image was not taken from the studies included in this systematic review and meta-analysis.

2.3. Study selection

After the removal of duplicates, two authors (SM and MP) screened all titles and abstracts independently to identify potentially relevant articles for eligibility. Full-text articles were obtained where there was insufficient information in the title or the abstract to determine eligibility. Reference lists were also manually searched to identify relevant articles not captured by the search strategies. Studies were included and excluded according to the criteria presented in Table 1. In all cases disagreements on eligibility were resolved by consensus.

2.4. Quality assessment

The methodological quality of each study was rated using the full version Downs and Black evaluation tool [10]. The tool consists of 27 questions across five sections: study quality (ten items), external validity (three items), internal validity bias (seven items), confounding selection bias (six items), and power of the study (one item) with an overall score out of a possible 30 points. The studies were

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