

MR-based assessment of membranous urethra as a predictor of urinary incontinence after radical prostatectomy

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Background and purpose

Radical prostatectomy provides curative therapy to patients with organ-confined prostate cancer. Urinary incontinence after radical prostatectomy is a frequent complication affecting up to 20% of patients [1]. Patient age and surgical technique are known predictors of postoperative urinary dysfunction [2]. We aimed to assess relation of functional length of membranous urethra (measured on endorectal MRI) to postoperative urinary incontinence in patients with prostate cancer treated by radical retropubic prostatectomy. Previous studies [3] demonstrated potential usefulness of this predictive approach.

Material and methods

Study sample included 20 patients with prostate cancer (80% with organ-confined disease, 20% with pT3a stage). Pre-operative BPH-associated urinary disorders were diagnosed in 35% of patients (without residual urine after voiding). Endorectal MRI (1,5 T) was used for functional urethra length assessment. The imaging protocol included standard sequences for prostate cancer detection and staging [4, 5]. Measurements of functional urethra length were performed on sagittal T2-weighted images obtained along the axis of urethra with endorectal coil. Prostate volume ranged from 20 to 95 cc. All the patients were operated by one surgeon in the same settings. Duration of operation ranged from 130 to 160 minutes. Neo-adjuvant hormonal therapy was prescribed to 40% of patients for 3 months prior to operation. Hormonal therapy had no influence on the operation. Intraoperative blood loss was 350-700 ml. Assessment of continence status was performed 3-4 weeks post-operatively. We tried to control for any other potential causes of urinary incontinence.

Results

Functional urethra length ranged from 5 to 20 mm (mean 12.4 mm). Six patients (30%) were continent 1-month after operation. Two patients (10%) had severe incontinence. Correlation between functional urethra length and continence status was significant ($r=0.55$, $p=0.01$, coefficient of determination 0.3). Correlation between prostate volume and continence status was non-significant ($p=0.2$), hence neo-adjuvant hormonal therapy for reduction of prostate volume did not seem to improve post-operative continence status.

Conclusion

MRI allows simple assessment of functional urethra length which can be used as a predictor of urinary incontinence after radical retropubic prostatectomy.

References

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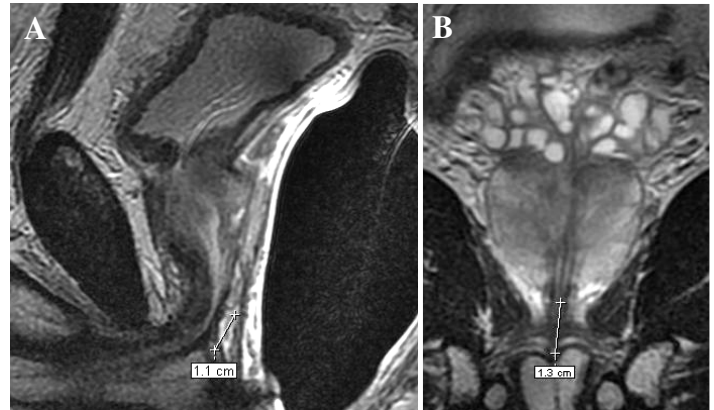


Figure 1. Sagittal and coronal T2-weighted images acquired with endorectal coil demonstrate measurements of membranous urethra length.

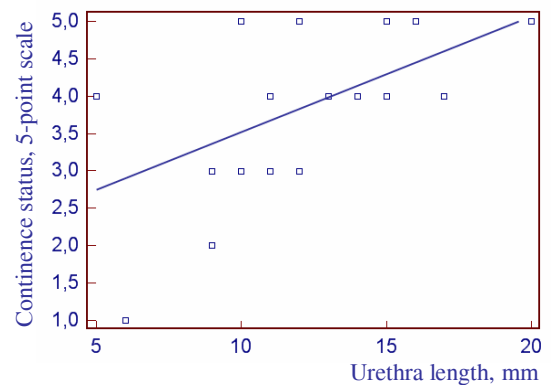


Figure 2. Scatter plot with regression line demonstrating association between functional urethra length and postoperative continence status ($r=0.55$, $p=0.01$).