

## THE CORRELATION OF CLINICAL AND URODYNAMIC FINDINGS AND THE IMPACT OF RADIATION IN POST-RADICAL PROSTATECTOMY INCONTINENCE

### Hypothesis / aims of study

Troublesome incontinence after radical prostatectomy (RP) for prostate cancer occurs in 3-10% of patients<sup>1</sup>. Prior to invasive treatment, urodynamic studies are recommended in order to establish a precise diagnosis<sup>2</sup>. The objective of our study is two-fold. First, we examined the relationship between patient complaints and urodynamic findings by retrospectively reviewing the clinical records of men who underwent video urodynamic studies (VUDS) for incontinence post-radical prostatectomy. Secondly, we also examined the potential impact of post-surgical (adjuvant or salvage) radiation therapy on urinary incontinence and the VUDS results.

### Study design, materials and methods

Data from 680 men who had undergone RP and VUDS were retrospectively reviewed. Clinical history with regards to urinary symptoms was obtained. Three groups were created based on clinical symptoms, stress urinary incontinence (SUI), urgency urinary incontinence (UUI) and mixed (stress and urgency) urinary incontinence (MUI). The groups were analyzed for differences in frequency, severity of incontinence (pads used per day) and VUDS findings.

Secondly, data were compared between patients who had received post-surgical radiation (either adjuvant or salvage) versus those who had not to see if there were any differences in perceived urinary symptoms and/or VUDS findings.

### Results

Of the 680 patients originally recruited, 670 had symptoms of SUI, UUI or MUI that were documented on history. SUI was the most common clinical type of incontinence (n=330, 49%). MUI was the second most common (n=286, 43%). Overall, there was a statistically significant difference in the mean number of pads used per day among all three groups (ANOVA, 13.225 (2, 667), p=0.0001). Overall, the UUI group had a significantly lower mean number of pads (1.52, SD=2.73) used daily than either the SUI (2.98, SD=2.64) or MUI (3.65, SD=3.23) group (p = 0.0002 and p = 0.0001 respectively) and the SUI group had a significantly lower mean number of pads used daily than the MUI group (p = 0.0048).

The results from the VUDS are found in Table 1. From these data and using the VUDS as the "gold standard", the sensitivity, specificity, positive predictive value and negative predictive values were calculated (Table 2). For our calculations, we used the following: the SUI group included the SUI alone and MUI groups. The UUI group included the UUI alone and MUI groups. For the VUDS, any VUDS finding indicative of SUI was considered a true positive (i.e. SUI alone and SUI and DO). The same criteria were followed for the UUI group (DO alone and SUI & DO).

Table 1: Patient symptoms and video-urodynamic findings

Symptoms	No. Pts	Video Urodynamic Findings			
		SUI alone	SUI & DO	DO alone	Normal
SUI only	330	168 (50.9%)	78 (23.6%)	0 (0%)	84 (25.5%)
MUI	286	120 (42.0%)	104 (36.3%)	0 (0%)	62 (21.7%)
UUI only	54	10 (18.5%)	12 (22.2%)	28 (59.1%)	4 (7.4%)

Table 2: Determining the sensitivity, specificity and positive predictive values of clinical complaints using VUDS as the gold standard

Clinical Complaint	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value
SUI	0.955	0.175	0.76	0.58
UUI	0.65	0.56	0.42	0.76

Finally, in the comparison of patients treated with and without radiation, the radiation treatment group had a significantly higher mean number of pads used per day (radiation= 3.69 pads/day, SD=2.80, no radiation=2.96 pads/day, SD=2.99, p=0.010). Furthermore, the radiation treatment group had a significantly higher voiding pressure (mean=36.46cmH<sub>2</sub>O, SD=34.43) compared to the non-radiation treatment group (mean=30.47cmH<sub>2</sub>O, SD=17.5, p=0.0125). Finally, the non-radiation treatment group had a significantly higher maximum flow rate (16.83ml/sec vs. 14.36 ml/sec, p=0.0104) and bladder capacity (393.29ml vs. 340.82ml, p = 0.0003).

### Interpretation of results

SUI was the most common complaint (330, 49%). MUI was the second most common (286, 43%). This finding is supported by other studies in the literature<sup>1</sup>. Our study found significant differences in the number of pads used daily in all three groups. These differences may be attributed to the causes of the incontinence symptoms and the dysfunctional aspects of the detrusor and sphincter associated with each condition.

Based on our findings, the diagnosis of stress urinary incontinence (either SUI alone or MUI) based on clinical history had a sensitivity of 0.955 (Table 1). Therefore, the absences of SUI symptoms on history make it unlikely that the patient has SUI. Furthermore, SUI clinical findings had a positive predictive value of 0.76. These results indicate that in the clinical diagnosis of SUI, the use of VUDS would likely add little to determining the treatment plan. The clinical diagnosis of UUI had a sensitivity of

0.65, and positive predictive value of 0.42. These results suggest that the clinical diagnosis of UUI may require the use of VUDS to guide treatment planning, as it may shed light on other components of incontinence such as SUI.

Furthermore, our results suggest that post-surgical radiation treatment has an effect on lower urinary tract function. Patients who had undergone radiation treatment used significantly more pads than those who had no radiation. Radiation treatment was also found to result in obstruction with higher voiding pressures and lower maximum flow rates. Finally, radiation post radical prostatectomy resulted in significantly decreased bladder capacity. These results could possibly be explained by the documented changes radiation is known to have on the bladder (musculature and innervations), urethral musculature and surrounding structures.<sup>3</sup>

#### Concluding message

A history of SUI symptoms alone can accurately be used to guide treatment planning and the use of VUDS would add little to further guide treatment. However, the clinical scenario of UUI may not be as clear, and may require the use of VUDS to further guide the treatment plan if initial treatment fails and to rule out components of SUI that may be present.

Furthermore, patients who have been treated with adjuvant or salvage radiation therapy are more likely to have worse incontinence, decreased bladder capacity, and a higher likelihood of obstruction than patients who have not had radiation.

#### References

1. Herschorn S, et al: Surgical treatment of stress incontinence in men. *Neurourology and Urodynamics* 2010 Jan: 29: pp 179-90.
2. Abrams P, et al: Fourth International Consultation on Incontinence Recommendations of the International Scientific Committee: Evaluation and treatment of urinary incontinence, pelvic organ prolapse, and fecal incontinence. *Neurourology and Urodynamics* 2010 Jan: 29: pp 213-40.
3. Anderson J, et al. Urinary side effects and complications after permanent prostate brachytherapy: The MD Anderson Cancer Center Experience. *Journal of Urology*. 2009; 74: pp 601-605.

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<b><i>Was this study approved by an ethics committee?</i></b>	<b>Yes</b>
<b><i>Specify Name of Ethics Committee</i></b>	<b>The University Health Network Hospital Ethics Board</b>
<b><i>Was the Declaration of Helsinki followed?</i></b>	<b>Yes</b>
<b><i>Was informed consent obtained from the patients?</i></b>	<b>Yes</b>