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HOW SHOULD CONTINENCE AND INCONTINENCE AFTER RADICAL PROSTATECTOMY BE EVALUATED?
A PROSPECTIVE STUDY OF PATIENT-RATINGS AND CHANGES OVER TIME.

Hypothesis / aims of study
There is no international consensus regarding the optimal way to define, assess, and grade PPI, which partially explains the wide range of prevalence rates reported.
The aims of this study were to examine the prevalence rates and changes of continence and incontinence before and after radical prostatectomy (RP) for prostate cancer (PCa), comparing different definitions, and to study baseline predictors of PPI at 12 months.

Study design, materials and methods
This national prospective study included 844 patients treated with RP between 2005 and 2009. Adverse effects, including urinary dysfunction and bother, were patient-reported by validated questionnaires (EPIC-50, UCLA-PCI) at baseline (preoperatively) and 12-month follow-up by 735 patients (88%) (1).
From the questionnaires a common urinary incontinence domain (UID) with four items was extracted, and the item responses were converted to a 0-100 scale, with higher scores representing less PPI. Ellison et al.'s stratification of PPI is based on the UID score, and they classify the score range of 0-49 as severe, 50-69 as moderate and 70-100 as mild/no PPI (2). Based on the *urinary control* and *use of pads* items the sample was divided into three categories commonly used for continence status according to Herschorn et al. for ICS (3):
1) total control and no use of pads (perfect continence); 2) occasional dribbling without use of pads; and 3) using pads daily.
The different definitions of continence and incontinence at baseline and at 12 months were studied. Linear regression analyses examined baseline predictors and degree of PPI at 12-month follow-up. Collinearity statistics showed no collinearity between age, work status, comorbidity, sexual dysfunction, and incontinence.

Results
At baseline 70% reported total urinary control, 29% had occasional dribbling without using pads, and 1% used pads daily. Based on Ellison et al.'s stratification 95% had no/mild, 4% had moderate, and 1% had severe incontinence at baseline (Table 1). Moderate or big problem with urinary leakage was reported by 14 patients (2%), of whom six used pads.
At 12 months follow-up 26% reported total urinary control; while 34% had occasional dribbling without using pads, and 40% used pads daily. According to Ellison et al. 58% had no/mild, 16% moderate, and 25% had severe PPI at 12 months (Table 1). Frequent dribbling or no urinary control whatsoever was reported by 8% 12 months after RP. Moderate/big problem with urinary leakage was reported by 18% and among them 93% used pads. The changes from baseline to 12 months after RP are shown in Table 1. Significant baseline predictors of PPI at 12 months were age ≥65 years, not working, sexual dysfunction and incontinence, and the latter two remained the significant predictors in multivariable analysis. PCa related variables like T stage, D'Amico risk groups, surgical approach and nerve sparing technique were not significantly associated with PPI.

Interpretation of results
The prevalence of PPI varied considerably according to the definition applied. When defined as *any pad use* it was 40%, while defined as *any leakage* it was 74% in our sample at 12 months follow-up. Severe PPI, when defined as *total incontinence/no urinary control whatsoever*, was reported by 3%, but according to Ellison et al. 25% had severe PPI in our sample. Of the patients with preoperative incontinence 14% improved postoperatively, probably related to relief of obstruction following RP.
Higher age and preoperative urinary incontinence can be considered established predictors of PPI. Surprisingly, not working at baseline was associated with PPI, also when adjusted for age, which is a new finding. However, neither higher age nor not working was significant in multivariable analysis where only incontinence and sexual dysfunction remained significant.

Concluding message
The chosen definition of PPI plays a major role for prevalence rates reported. In our opinion, incontinence should be reported as any leakage, not only pad use, and grading done on a symptom scale. Further effort should be made to reach international consensus on a severity grading of PPI. Baseline sexual dysfunction and urinary incontinence were the strongest predictors of PPI at 12-month follow-up.

Table 1. Prevalence of continence and incontinence before and after radical prostatectomy (N=735).

Continence categories described by Herschorn et al. [a]				
Baseline:	**12 months:**			
N (%)	**Total control**	**Dribbling, no pads**	**Use of ≥1 pad/day**	**Total**
Total urinary Control	166 (32)	162 (32)	185 (36)	513 (100)
Dribbling, no pads	28 (13)	84 (40)	100 (47)	212 (100)
Use of ≥1 pad/day	1 (10)	3 (30)	6 (60)	10 (100)
Total	195 (27)	249 (34)	291 (40)	735 (100)

Incontinence stratification according to Ellison et al. [b]				
Baseline:	**12 months:**			
N (%)	**No/mild incontinence**	**Moderate incontinence**	**Severe incontinence**	**Total**
No/mild incontinence	415 (60)	113 (16)	168 (24)	696 (100)
Moderate incontinence	10 (33)	7 (23)	13 (43)	30 (100)
Severe incontinence	3 (33)	0 (0)	6 (67)	9 (100)
Total	428 (58)	120 (16)	187 (25)	735 (100)

[a] Continence categories described by Herschorn et al. based on the two items of the UID; *urinary control* and *pad use* (3). [b] Incontinence stratification based on Ellison et al. (2)
Color codes: Green: Improved continence. Red: Worsened. Blue: Stable or little change. Blue/white shaded: Stable or worsened (using more pads).

References
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