#730 “Taking a stand”: The influence of posture on urodynamic studies in geriatric patients

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Hypothesis / aims of study

- Diagnosis of urinary incontinence (UI) often involves technical procedures like urodynamic studies (UDS).
- These procedures can be uncomfortable and time-consuming, especially for elderly individuals.
- Main objective: Identify disparities between outcomes of UDS in sitting vs. standing positions and evaluate their concordance
  - To streamline diagnostic workup for older adults with UI

Study design, materials and methods

- Study Name: “Think Dry: Optimalisation of Diagnostic Process of Urinary Incontinence in Older People” (NCT04094753)
  - Prospective observational cohort study
  - Aim: To create a short form of technical investigations to diagnose UI
  - Inclusion Criteria: Age 65+, all types of urinary incontinence
  - Exclusion Criteria: Indwelling urinary catheter, clean intermittent catheterization
- Secondary analysis
- Participants: 102 out of a total of 180 patients underwent both sitting and standing UDS
- UDS Parameters and Procedure
  - Adhered to International Continence Society (ICS) standards (1)
  - Each patient underwent two UDS, one in sitting position and one in standing position.
  - Voiding phase in seated position for both groups
  - Final diagnosis by referring urologist, based on both UDS, clinical exams, medical history, voiding diaries, and questionnaires
  - Experienced urologist reviewed UDS without knowledge of prior diagnosis.
- Concordance analysis using Cohen’s Kappa coefficient.
  - Statistical analysis with SPSS version 27

Results and interpretation

Table 1: Urodynamic parameters comparison

Urodynamic parameter, median (IQR)	Sitting vs. standing, general study population (n=102)	Sitting vs. standing, SUI (n=41)	Sitting vs. standing, UUI (n=31)	Sitting vs. standing, MUI (n=30)
First sensation of bladder filling, ml	185 (119.8-246.8) vs. 202.5 (122.8-280)	206 (122.5-288) vs. 209.5 (152.5-314.3)	134 (104-224) vs. 160 (58-280)	190 (135-255.5) vs. 210 (121-262)
Normal desire to void, ml	238 (188.8-327) vs. 238 (157.5 - 306)	240.5 (189.5-371.8) vs. 250 (181-342)	207.5 (147.5-280.5) vs. 202 (117.5-280.5)	247.5 (205-334.8) vs. 245 (154-208.5)
Strong desire to void, ml	340 (281.3-417.8) vs. 312 (270-407)	344 (297.8-427) vs. 340 (286.3-405.8)	270 (223.5-372.5) vs. 280 (214.5-428)	355 (300-428) vs. 300 (251.8-405.3)
Maximum flow, ml/s	14.7 (8.2-22.1) vs. 15.2 (10.3 -22.8)	17.7 (9.2-24.8) vs. 20.3 (13.5-24.6)	**11.7 (4.9-15.9) vs. 11.6 (7.3-21.2) p=0.048**	14.2 (9.3-21.9- vs. 12.1 (8.1-18.7)
Average flow rate, ml/s	3.8 (2.5-6.3) vs. 4.7 (2.7-6.5)	4.8 (2-7.6) vs. 5.6 (3.2-7.8)	2.9 (1.9-4.2) vs. 3.6 (2.3-5.9)	3.6 (2.7-6.3) vs. 3.6 (2.0-6.4)
Flow time, s	6.8 (4.9-11.2) vs. 6.3 (4.6-8.8)	7.4 (5.3-11.7) vs. 6.4 (5.3-8.6)	5.6 (4.4-11.6) vs. 4.8 (3.3-8.2)	7.4 (5.3-11.1) vs. 7.5 (4.3-9.9)
Time to maximum urinary flow rate, s	2.7 (1.6-7.5) vs. 2.0 (1.2-4.3)	3.6 (1.8-9.4) vs. 2.6 (1.7-4.5)	2.0 (1.3-11.2) vs. 1.5 (0.8-3.1)	2.7 (1.4-4.1) vs. 1.9 (1.1-5.5)
Voided volume, ml	279 (147.2-399.7) vs. 260 (183.7 - 371)	326.5 (230.1-431.5) vs. 309.1 (246.9-406.9)	191.4 (127.8-282.3) vs. 215.4 (124.1-292.5)	320.6 (143.3-440.7) vs. 250 (161.3-338.6)
Pressure at maximum flow, cmH2O	18.5 (8.8-31) vs. 16.7 (6.5-30.2)	18.3 (9.4-25.9) vs. 14.7 (4.0-34.8)	23.3 (17.4-33.3) vs. 18.1 (5.3-26.0)	11.7 (4.9-33) vs. 18.7 (8.7-26.1)
Peak pressure, cmH2O	32.8 (20.5-48.1) vs. 28.7 (16.6-47.5)	29.2 (17.4-43.1) vs. 27.5 (14.1-46.2)	42.3 (26.8-55.7) vs. 8.0 (17.6-52.7)	29.5 (18.7-47.7) vs. 31.4 (22.1-49.6)
Mean pressure, cmH2O	21 (10.1-34.8) vs. 15 (6.8-27.1)	17.1 (10.2-27.4) vs. 9.7 (4.3-24.6)	28.3 (20.4-45.3) vs. 18.9 (8.5-31.9)	17.1 (7.4-31.2) vs. 18.6 (7.3-26.4)
Post void residual volume, ml	**50 (0-180) vs. 40 (0-114) p=0.026**	31 (0-156) vs. 0 (0-80)	65.5 (0.5-159.8) vs. 40 (2.4-117.5)	52 (0-230) vs. 80 (0-130)
Compliance, ml/cmH20	40.5 (23.2-77.2) vs. 44.8 (21.6-121)	**47.7 (32.1-97.0) vs. 94.0 (39.4-240.5) p=0.026**	26.4 (18.4-71.3) vs. 27 (9.3-75.5)	37.7 (21.5-97.3) vs. 31.0 (18.4-73.0)

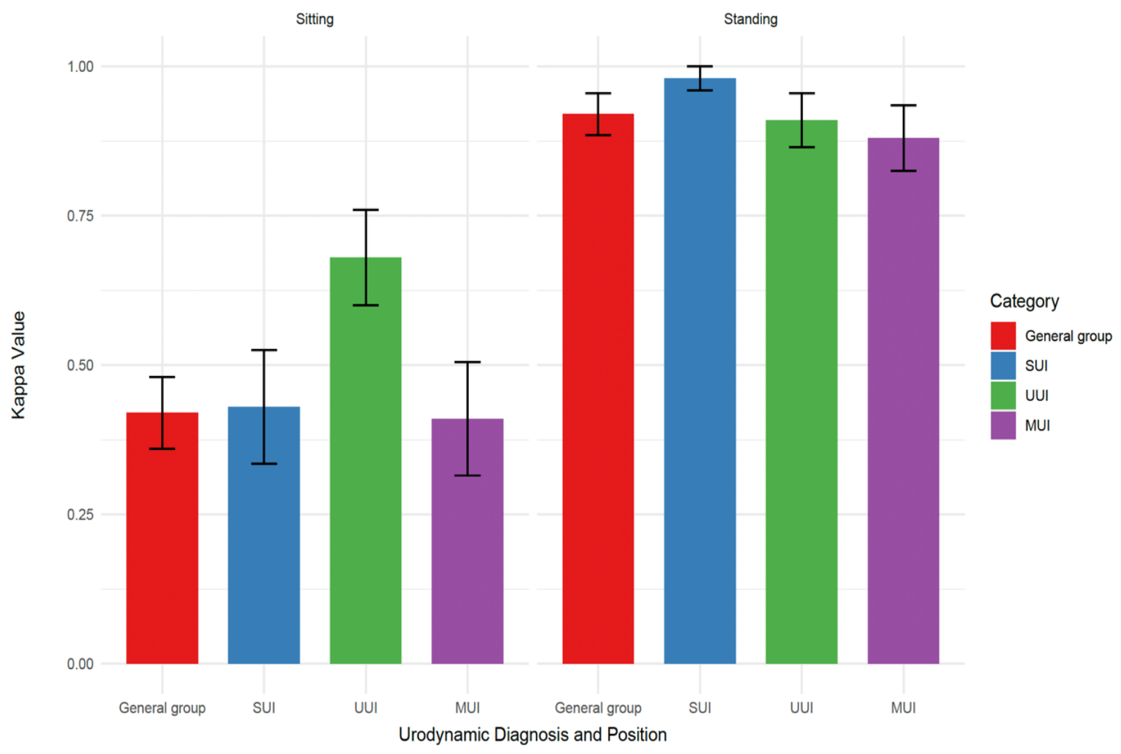
Significant: Bold, IQR: Interquartile range, SUI: Stress urinary incontinence, UUI: Urgency urinary incontinence, MUI: Mixed urinary incontinence, ml: milliliter, s: seconds, cm: centimeter

Results and interpretation

Results

- Patient Characteristics:
  - Median age: 74 years (IQR 70-78)
  - Females: 90.2%
  - Diagnosis distribution: Stress- (40.2%), Urge- (30.4%), Mixed- (29.4%) UI
- Urodynamic Parameters:
  - Significant difference in post-void residual in general population
  - Subgroup analysis results in **Table 1**
  - No differences in parameters when using age group cut-off (median, 74 years)
- Concordance Analysis, **Figure 1**:
  - General study population: Kappa-value of 0.42 (sitting UDS) vs. 0.92 (standing UDS)
  - Consistent outcomes across specific types of UI in subgroup analysis

Figure 1: Concordance analysis (Kappa Value and SE) comparing position and urodynamic diagnosis



SUI: Stress urinary incontinence, UUI: Urgency urinary incontinence, MUI: Mixed urinary incontinence, SE: Standard error

Interpretation

- Statistically significant differences in UDS parameters between positions, but without clinical importance
- Clinically significant difference in concordance analysis:
  - Comparing final diagnosis with those based solely on retrospectively reviewed sitting versus standing UDS
  - Moderate agreement in sitting position
  - **High agreement in standing position**
  - Consistent results in additional subgroup analyses

Conclusions

- UDS in elderly patients while standing provides a very high diagnostic concordance when compared to the final diagnosis.
- This potentially allows the omission of testing in the sitting position, resulting in reduced discomfort and increased efficiency.
- Future randomized testing sequence is recommended to confirm findings.

References

1. Rosier P.F.W.M., Schaefer W., Lose G., Goldman H.B., Guralnick M., Eustice S., Dickinson T., Hashim H., International continence society good urodynamic practices and terms 2016: Urodynamics, uroflowmetry, cystometry, and pressure-flow study, Neurourol. Urodyn., 36 (5) (2017), pp. 1243-1260, doi: 10.1002/nau.23124.