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UROFLOWMETRY QUALITY EVALUATION IN SEVEN URODYNAMIC DEPARTMENTS: FAR FROM THE EXCELLENCE?

Hypothesis / aims of study
Valuable and reliable information is obtained from uroflowmetry studies only if curve and data quality can be ensured. ICS reports on Good Urodynamic Practice have been published to improve excellence in measurement, quality control and documentation of urodynamic investigations, including uroflowmetry. Despite ICS recommendations, it is very common to find artefacted traces, inadequate micturition volumes and incomplete information that makes difficult to obtain a high quality interpretation.The aim of this study was to evaluate the quality of uroflowmetry studies in seven urodynamic departments using the Uroflowmetry Quality Score (UQS), based on Good Urodynamic Practice recommendations.

Study design, materials and methods
Retrospective, diagnostic and multicenter study to asses uroflowmetry quality in seven urodynamic departments in Valencia (Spain).   Uroflowmetry Quality Score (UQS) tool was developed to evaluate the quality of the uroflowmetry curves and informs. Following the ICS Good Urodynamic Practice report [1], 14 ítems were included (table 1). Every item scores 1 point, except item 2 regarding presence of trace artefacts (3 points), with a maximum UQS of 16 points and a minimum of 0 points. 140 consecutive uroflowmetries were evaluated, 20 from each department. Traces and informs were examined by two independent investigators, who score studies without knowing the results from the other one. When a score discrepancy was detected, the study was jointly assessed and a final consensus score was assigned. Hospital, uroflowmetry indication, gender, age, score per item and final UQS were obtained from each uroflowmetry. Percentage of items correctly fulfilled were calculated for each Urodynamic Department. UQS were calculated for each center, and compared using ANOVA (post hoc Tukey's test).

Table 1: Uroflowmetry Quality Score

		Score
#1	Uroflowmetry indication included in application form	1
#2	Trace without artifacts	3
#3	Patient gender included in application form	1
#4	Scale adapted to patient's gender	1
#5	Volume voided is acceptable	1
#6	Post void residual volume has been calculated	1
#7	Time from micturition to postvoid volume measurement registered	1
#8	Trace labeled as a regular (habitual) micturition	1
#9	Trace has been reviewed and "smoothed"	1
#10	Qmax calculated with smoothed trace	1
#11	If trace has not been smoothed, Qmax labeled as Qmaxraw	1
#12	Qmax, voided and residual volume values have been rounded	1
#13	Results shown as ICS standard "Qmax/Volume voided/Post void residual volume"	1
#14	Presence of a validated nomogram	1

Results
Items correctly fulfilled percentage and total UQS are shown by urodynamic department with significant differences among centers (Table 2). Best rated items were #2, #3 and #5, with a global fulfilment of 91.4%, 87.1% and 76.4% respectively. Two items were not completed in any of the centers: #7 and #11. Another four items were rarely completed: #10, #8, #9 and #12, all of them with a global fulfilment bellow 7%. Only two centers follow the ICS recommendation of showing results as the standard "Qmax/Vol voided/PVR vol".

Table 2: Uroflowmetry Quality Score for each Urodynamic Department, and global score.

	UD1	UD2	UD3	UD4	UD5	UD6	UD7	Global
# 1	0	0	0	87.5	0	100	95.8	40.7
# 2	85.7	89.5	90	93.8	95	100	87.5	91.4
# 3	38.1	84.2	0	87.5	100	100	100	87.1
# 4	0	21.1	0	37.5	5	40	100	30.7
# 5	52.4	73.7	90	68.8	80	80	87.5	76.4
# 6	47.6	100	0	100	95	85	100	75
# 7	0	0	0	0	0	0	0	0
# 8	0	0	0	0	0	15	4.2	2.9
# 9	0	0	0	0	0	0	33.3	5.7
# 10	0	0	0	0	5	0	0	0.7
# 11	0	0	0	0	0	0	0	0
# 12	0	0	0	0	35	5	0	6.4
# 13	0	0	0	0	95	0	87.5	28.6
# 14	47.6	10,5	85	0	0	45	0	27.1
UQS	4.43±1.3	5.74±1.0	5.65±0.9	6.19±0.8	7.10±1.1	7.80±0.6	8.67±1.2	6.57±1.7

	9	4	8	3	1	9	3	5

Percentage of items correctly fulfilled for each department. UQS shown as mean value and standard deviation. Significative differences observed between centres (ANOVA with Tukey's post hoc test)

Interpretation of results
Some items show a very good accomplishment in the seven urodynamic departments evaluated, specially those regarding to curve quality and adequate volume voided. Some ICS recommendations have not been implemented in our centers, specially those regarding smoothing curve and Qmax calculated, labelling Qmax raw, time from micturition to residual volume calculation and round values.
In general, the curve quality is good, without artifacts (91.4%), and with a proper volume voided (76.4%), notwithstanding that global UQS is only 6.57 ± 1.75 (over a maximum score of 16 points).
Indication information (three centres) and ICS standard formula (two centres) are data that make the difference in urodynamist quality. Other differences, like the use of nomograms, is device dependent or adapted by software (like gender scale).
Some ICS recommendations (Items #2, 5, 6, 7, 8 and 9) are very important to improve the quality of uroflowmetry, thus supporting a more precise diagnosis of patient vesicourethral dysfunction. Probably, investigators have considered other ICS recommendations less important for an appropriate uroflowmetry evaluation (items #1, 3, 4, 11, 12, 13), and have not been implemented in the daily practice. Some parameters are device-dependent, and very difficult to change, which is an additional limitation. The use of Qmaxraw nomenclature is device dependent. If the device does not allow the change of nomenclature, the technician should change this every time and is impractical. To round the figures of Qmax, voided and residual volumes is not usual in our ambient. It is debatable that a loss of precision improve the quality of reporting.
However, it is clear that there are some items that need to be improved in the daily practice: labelling the trace as habitual micturition, reviewing and smoothing the curve, adapting scale to gender and the use of a validated nomogram are easy implementing measures that improve uroflowmetry quality.

Concluding message
Uroflowmetry quality evaluation in seven urodynamic departments using the Uroflowmetry Quality Score (UQS), a specially designed tool based on ICS recommendations of good urodynamic practice, showed a low global score of 6.57 (over a maximum of 16 points). However, uroflowmetry traces were of high quality (without artifacts) in the majority of centers. Some ICS recommendations need to be implemented in the urodynamic daily practice to improve the quality of the results.

References
1. Schäfer et al, Neurourology and Urodynamics 21:261-274,2002

Disclosures