Comparative Analysis of Parameters to Evaluate the Severity of Urinary Incontinence: a Prospective Study

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Introduction

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- Appropriate evaluation is necessary to broaden understanding of the relationship of parameters of stress urinary incontinence including 1-hour pad test, Q-tip test, questionnaires and urodynamic results.

Purpose

- The aim of this study is to investigate correlation of stress urinary incontinence with evaluation tools of 1-hour pad test, Q-tip test, urodynamics and questionnaires in a prospective, observational study.

Subjects and Methods

- A total of 113 female patients with stress urinary incontinence were interviewed with questionnaires of International Consultation on Incontinence Questionnaire – Urinary Incontinence, (ICIQ-UI), Patient Perception of Bladder Condition (PPBC) and King's Health Questionnaire (KHQ).
- They underwent urodynamic tests with 1-hour pad and Q-tip tests to evaluate urethral, bladder and sphincter function.
- Database was prospectively collected.

Results

- A total of 113 female patients were included. The mean age was 57.7 ± 10.2 years. Urinary incontinence showed stress-related type (26 cases) and mixed type (80 cases).
- The questionnaires showed strong degree of correlation between ICIQ-UI and PPBC (r = 0.580, p <0.001), ICIQ-UI and KHQ (0.185 < r < 0.473, p < 0.001) and KHQ and PPBC (0.304 < r < 0.656, p < 0.001).
- Q-tip test showed no significant correlation with the questionnaires, the pad test and urodynamic results.
- The correlation between each parameter was shown in Figure.

(1) The pad test showed significant correlation of role limitations (r = 0.306, p = 0.004), physical limitations (r = 0.219, p = 0.044), social limitations (r = 0.302, p = 0.004), emotions (r = 0.336, p = 0.001), sleep/energy (r = 0.430, p < 0.001) and severity measures (r = 0.291, p = 0.005) in the KHQ. Personal relationships showed no significant correlation with the pad test.

(2) The pad test showed negative correlation with valsalva-related leak pressure point (VLPP, r = -0.254, p = 0.021) and cough-related leak pressure point (CLPP, r = -0.266, p = 0.012).

(3) PPBC showed moderate-to-strong correlation with the pad test (r =0.305, p = 0.003), VLPP (r = -0.241, p = 0.025) and CLPP (r = -0.206, p = 0.046).

(4) Urodynamic results showed that maximum urethral closure pressure showed negative correlation with sleep/energy (r = -0.202, P = 0.039) and severity measures (r = -0.252, P = 0.010) in the KHQ. Maximal cystometric capacity showed negative correlation with role limitations (r = -0.201, p = 0.044), sleep/energy (r = -0.265, p = 0.006) and severity measures (r = -0.227, p = 0.021) in the KHQ. Bladder compliance showed negative correlation with role limitations (r = -0.258, p = 0.010) and severity measures (r = -0.205, p = 0.040) in the KHQ. PdetQmax showed negative correlation with social limitations (r = -0.313, p = 0.044) and severity measures (r = -0.332, p = 0.024) in the KHQ. Closing pressure showed no significant correlation with all KHQ factors. VLPP showed moderate-to-strong degree of negative correlation with all KHQ factors. CLPP showed moderate-to-strong degree of negative correlation with social limitations (r = -0.270, p = 0.010), emotions (r = -0.229, p = 0.031), sleep/energy (r = -0.237, p = 0.022) and severity measures (r = -0.334, p = 0.001) in the KHQ.

(5) ICIQ-UI showed no significant correlation with the pad test.

(6) ICIQ-UI showed strong degree of negative correlation VLPP (r = -0.324, p = 0.003).

(7) Maximal urethral closing pressure (MUCP) was strongly positively correlated with VLPP (r = 0.326, p = 0.002) and CLPP (r = 0.337, p = 0.001).

Interpretation of results

- Stress urinary incontinence negatively affect various aspects of daily lives.
- The questionnaires, pad test, and urodynamic tests can show significant correlations of stress urinary incontinence.

Conclusions

- The pad test and urodynamic results of patients with stress urinary incontinence showed significant correlation with the questionnaires.
- Q-tip test showed no role to evaluate the status of stress urinary incontinence.

Figure. Correlation diagram

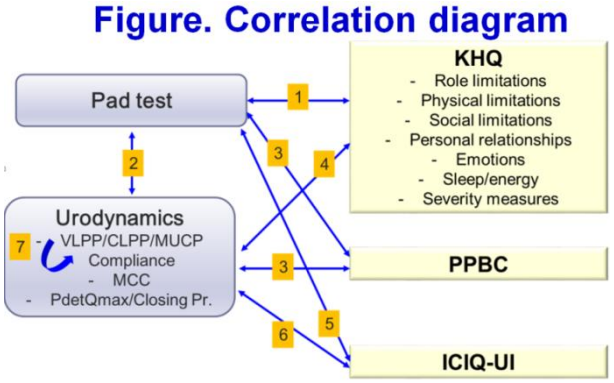

Table. Pearson correlation coefficient and p-value

		ICIQ-UI	PPBC	KHQ Role limitations	KHQ Physical limitations	KHQ Social limitations	KHQ Personal relationships	KHQ Emotions	KHQ Sleep/energy	KHQ Severity measures	MUCP	MCC	Bladder compliance	PdetQmax	Closing pressure	VLPP	CLPP	Trabeculation	Pad test	Q-tip test
ICIQ-UI	correlation coefficient	1	.578**	.466**	.307**	.413**	.179	.462**	.418**	.585**	-.152	-.067	.022	-.263	-.207	.324**	-.194	.125	.169	-.082
	p-value		.000	.000	.003	.000	.081	.000	.000	.000	.122	.497	.828	.081	.218	.003	.067	.205	.105	.439
PPBC	correlation coefficient	.578**	1	.654**	.486**	.582**	.307**	.629**	.434**	.486**	-.083	-.065	-.131	-.234	-.132	-.241*	-.207*	.156	.295**	-.186
	p-value	.000		.000	.000	.000	.001	.000	.000	.000	.391	.503	.182	.110	.417	.025	.044	.107	.004	.072
KHQ Role limitations	correlation coefficient	.466**	.654**	1	.759**	.736**	.422**	.676**	.547**	.551**	-.138	-.199*	.259**	-.164	-.085	-.231*	-.086	.119	.299**	-.088
	p-value	.000	.000		.000	.000	.000	.000	.000	.000	.165	.044	.009	.293	.625	.038	.421	.231	.004	.410
KHQ Physical limitations	correlation coefficient	.307**	.486**	.759**	1	.775**	.359**	.581**	.416**	.489**	-.144	-.156	-.191	-.269	-.260	-.233*	-.194	.107	.179	.079
	p-value	.003	.000	.000		.000	.000	.000	.000	.000	.158	.128	.064	.108	.165	.043	.075	.298	.097	.472
KHQ Social limitations	correlation coefficient	.413**	.582**	.736**	.775**	1	.652**	.706**	.520**	.584**	-.182	-.120	-.154	-.310*	-.178	.393**	-.266*	.183	.268*	-.096
	p-value	.000	.000	.000	.000		.000	.000	.000	.000	.066	.228	.124	.043	.293	.000	.011	.065	.010	.369
KHQ Personal relationships	correlation coefficient	.179	.307**	.422**	.359**	.652**	1	.452**	.245*	.330**	.100	-.147	-.125	.000	-.069	.289**	-.182	.035	.118	.065
	p-value	.081	.001	.000	.000	.000		.000	.012	.001	.308	.133	.206	.360	.677	.008	.081	.718	.259	.533
KHQ Emotions	correlation coefficient	.462**	.629**	.676**	.581**	.706**	.452**	1	.605**	.614**	-.167	-.163	-.156	-.281	-.110	.308**	-.226*	.120	.295**	-.247*
	p-value	.000	.000	.000	.000	.000	.000		.000	.000	.091	.100	.118	.059	.501	.005	.032	.226	.005	.019
KHQ Sleep/energy	correlation coefficient	.418**	.434**	.547**	.416**	.520**	.245*	.605**	1	.505**	-.214*	-.283**	-.169	-.151	.065	-.267*	-.220*	.027	.393**	-.172
	p-value	.000	.000	.000	.000	.000	.012	.000		.000	.027	.003	.084	.306	.692	.014	.033	.785	.000	.097
KHQ Severity measures	correlation coefficient	.585**	.486**	.551**	.489**	.584**	.330**	.614**	.505**	1	-.242*	-.204*	-.184	-.331*	-.168	.453**	-.340**	.119	.267*	-.155
	p-value	.000	.000	.000	.000	.000	.001	.000	.000		.013	.037	.062	.023	.301	.000	.001	.226	.010	.140
MUCP	correlation coefficient	-.152	-.083	-.138	-.144	-.182	.100	-.167	-.214*	-.242*	1	.074	-.059	.123	.091	.326**	-.330**	-.106	-.149	.020
	p-value	.122	.391	.165	.158	.066	.308	.091	.027	.013		.431	.533	.398	.571	.002	.001	.257	.136	.839
MCC	correlation coefficient	-.067	-.065	-.199*	-.156	-.120	-.147	-.163	.283**	-.204*	.074	1	.362**	.173	.006	.182	.094	.169	-.153	.036
	p-value	.497	.503	.044	.128	.228	.133	.100	.003	.037	.431		.000	.233	.970	.084	.351	.071	.126	.724
Bladder compliance	correlation coefficient	.022	-.131	.259**	-.191	-.154	-.125	-.156	-.169	-.184	-.059	.362**	1	.189	.373*	.018	-.066	-.019	-.018	.088
	p-value	.828	.182	.009	.064	.124	.206	.118	.084	.062	.533	.000		.194	.016	.866	.520	.840	.859	.387
PdetQmax	correlation coefficient	-.263	-.234	-.164	-.269	-.310*	-.138	-.281	-.151	-.331*	.123	.173	.189	1	.615**	.563**	.499**	-.111	-.112	.172
	p-value	.081	.110	.293	.108	.043	.360	.059	.306	.023	.398	.233	.194		.000	.000	.001	.447	.478	.276
Closing pressure	correlation coefficient	-.207	-.132	-.085	-.260	-.178	-.069	-.110	.065	-.168	.091	.006	.373*	.615**	1	.319	.407*	-.082	-.115	.088
	p-value	.218	.417	.625	.165	.293	.677	.501	.692	.301	.571	.970	.016	.000		.054	.012	.612	.510	.616
VLPP	correlation coefficient	.324**	-.241*	-.231*	-.233*	.393**	.289**	.308**	-.267*	.453**	.326**	.182	.018	.563**	.319	1	.810**	-.178	-.254*	.144
	p-value	.003	.025	.038	.043	.000	.008	.005	.014	.000	.002	.084	.866	.000	.054		.000	.091	.021	.193
CLPP	correlation coefficient	-.194	-.207*	-.086	-.194	-.266*	-.182	-.228*	-.220*	.340**	.330**	.094	-.066	.499**	.407*	.810**	1	-.179	.271**	.078
	p-value	.067	.044	.421	.075	.011	.081	.032	.033	.001	.001	.351	.520	.001	.012	.000		.076	.010	.463
Trabeculation	correlation coefficient	.125	.156	.119	.107	.183	.035	.120	.027	.119	-.106	.169	-.019	-.111	-.082	-.178	-.179	1	.c	.c
	p-value	.205	.107	.231	.298	.065	.718	.226	.785	.226	.257	.071	.840	.447	.612	.091	.076		0.000	0.000
Pad test	correlation coefficient	.169	.295**	.299**	.179	.268*	.118	.295**	.393**	.267*	-.149	-.153	-.018	-.112	-.115	-.254*	.271**	.c	1	-.121
	p-value	.105	.004	.004	.097	.010	.259	.005	.000	.010	.136	.126	.859	.478	.510	.021	.010	0.000		.230
Q-tip test	correlation coefficient	-.082	-.186	-.088	.079	-.096	.065	-.247*	-.172	-.155	.020	.036	.088	.172	.088	.144	.078	.c	-.121	1
	p-value	.439	.072	.410	.472	.369	.533	.019	.097	.140	.839	.724	.387	.276	.616	.193	.463	0.000	.230	

**. The correlation coefficient is at 0.01 level (for double tail event).
*. The correlation coefficient is at 0.05 level (for double tail event).
c. One or more variables are constants and can not be calculated.