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PATHOPHYSIOLOGICAL CORRELATES OF SUBJECTIVE MEASURES OF SYMPTOM SEVERITY FOR STRESS URINARY INCONTINENCE

Hypothesis / aims of study

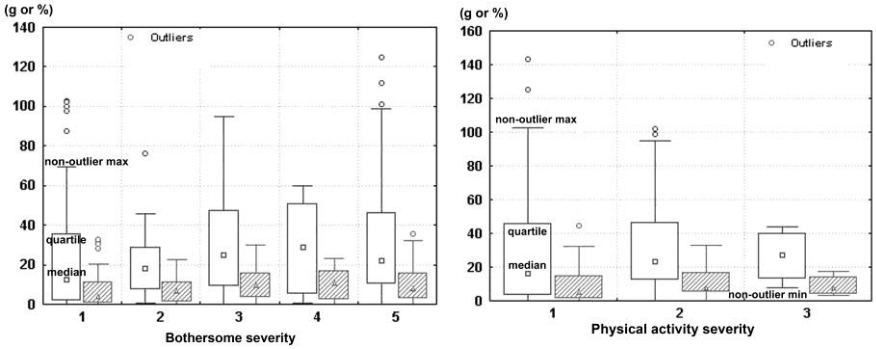
To explore the associations of subjective measures of symptom severity for SUI with the risk factors and objective features relating to female SUI pathophysiology. Our hypothesis is that subjective measures of symptom severity for stress urinary incontinence (SUI) may bear no relations with the relevant risk factors and pathogenesis as a consequence of lifestyle adaptation.

Study design, materials and methods

We retrospectively reviewed our urodynamic database and identified 707 women with documented urodynamic stress incontinence. Clinical data included demographic information, symptom questionnaires, pelvic examination, 1-hour pad test, urodynamic study, and ultrasound cystourethrography. The symptom questionnaires consisted of questions regarding lower urinary tract symptoms and their severity and affect on physical activity (physical activity severity and bothersome severity) and also a self-completed quality of life questionnaire, including short forms of the Urogenital Distress Inventory (UDI-6) and Incontinence Impact Questionnaire (IIQ-7). The subjective assessment of severity was compared with risk factors as well as morphological and functional objective measures of SUI.

Results

Figure 1 displays the distributions of absolute and percentage weight gain on 1-hour pad test according to physical activity severity and bothersome severity.



I. Associations among subjective severity measures and 1-hour pad tests.

Table 2. Agreement among subjective and semi-quantitative measures of severity of stress urinary incontinence (n = 707)

Variables	Physical activity severity	Bothersome severity	UDI-6 sum score#	IIQ-7 sum score†	1-hour pad test weight gain amount	1-hour pad test weight gain percentage
Physical activity severity	-	r = 0.28**	r = 0.35*	r = 0.40**	r = 0.12	r = 0.13
Bothersome severity	r = 0.28**	-	r = 0.62**	r = 0.49**	r = 0.15*	r = 0.16*
UDI-6 sum score	r = 0.35*	r = 0.62**	-	r = 0.78**	r = 0.23*	r = 0.25**
IIQ-7 sum score	r = 0.40**	r = 0.49**	r = 0.78**	-	r = 0.24*	r = 0.25*
1-hour pad test weight gain amount	r = 0.12	r = 0.15*	r = 0.23*	r = 0.24*	-	r = 0.95**
1-hourr pad test weight gain percentage	r = 0.13	r = 0.16*	r = 0.25**	r = 0.25*	r = 0.95**	-

#Possible score 0 to 18 with higher scores indicating worse perception of quality of life
†Possible score 0 to 21 with higher scores indicating worse perception of quality of life
*, $P < 0.05$; **, $P < 0.01$

II. Associations with relevant risk factors and functional and morphologic features relating to stress urinary incontinence.

Table 3. Associations of subjective and semi-quantitative measures wit risk factors for and pathophysiological features of stress urinary incontinence

Variables	Physical activity severity	Bothersome severity	UDI-6 sum score*	IIQ-7 sum score†	1-hour pad test weight gain amount	1-hour pad test weight gain percentage
I. Risk factor						
Age	r 0.17*	r -0.01	r -0.10	r -0.05	r 0.02	r 0.05
Parity	r 0.22**	r -0.01	r -0.05	r -0.00	r 0.04	r 0.05
Body mass index	r 0.21**	r 0.07	r -0.02	r -0.02	r 0.06	r 0.08
Menopause	r 0.07	r -0.01	r -0.22	r -0.16	r -0.02	r 0.00
II. Morphological objective measure						
A. Pelvic examination by POP-Q system						
Aa point	r -0.12	r -0.09	r -0.14	r -0.10	r -0.07	r -0.08
Ba point	r -0.14	r -0.08	r -0.14	r -0.11	r -0.07	r -0.07
ICS prolapse stage	r 0.10	r -0.01	r -0.18	r -0.17	r -0.10**	r -0.04
B. Ultrasound cystourethrography						
Resting bladder neck angle	r -0.02	r -0.10	r -0.10	r -0.05	r 0.04	r 0.04
Straining bladder neck angle	r 0.03	r -0.02	r -0.05	r 0.01	r 0.08*	r 0.09*
Rotational angle of bladder neck	r 0.07	r 0.01	r 0.01	r 0.08	r 0.08*	r 0.09*
Vector of bladder neck motion	r -0.01	r 0.05	r 0.06	r 0.10	r 0.00	r 0.00
Funneling of bladder neck	r 0.16*	r 0.14*	r 0.00	r -0.06	r 0.19**	r 0.22**
III. Functional objective measure						
Maximum urethral closure pressure	r -0.28**	r -0.15*	r 0.07	r 0.01	r -0.17**	r -0.18**
VLPP grading (n 374)	r -0.05	r -0.07	r -0.10	r -0.04	r -0.17**	r -0.16**

Aa and Ba, points of anterior vaginal wall compartment measured on POP-Q system
*Possible score 0 to 18 with higher scores indicating worse perception of quality of life
†Possible score 0 to 21 with higher scores indicating worse perception of quality of life

III. Effect of pelvic organ prolapse on morphologic and functional associations of subjective and semi-quantitative measures.

Table 4. Effect of pelvic organ prolapse on morphological and functional associations of subjective and semi-quantitative measures for stress urinary incontinence

Parameter	Physical activity severity	Bothersome severity	UDI-6 sum score*	IIQ-7 sum score†	1-hour pad test weight gain amount	1-hour pad test weight gain percentage
I. Stage I or II pelvic organ prolapse (n 669)						
A. Morphological objective measure						
Resting bladder neck angle	r 0.00	r - 0.09	r -0.06	r -0.02	r 0.05	r 0.05
Straining bladder neck angle	r 0.07	r 0.03	r -0.06	r 0.00	r 0.10*	r 0.11**
Rotational angle of bladder neck	r 0.10	r 0.07	r -0.00	r 0.06	r 0.08*	r 0.10*
Vector of bladder neck motion	r -0.03	r 0.05	r 0.05	r 0.06	r -0.00	r -0.01
Funneling of bladder neck	r 0.15	r 0.13	r 0.03	r -0.00	r 0.17**	r 0.21**
B. Functional objective measure						
Maximum urethral closure	r -0.29**	r -0.14*	r 0.04	r -0.04	r -0.20**	r -0.22**
VLPP grading	r -0.08	r -0.09	r -0.04	r 0.04	r -0.19**	r -0.18**
II. Stage III or IV pelvic organ prolapse (n 38)						
A. Morphological objective measure						
Resting bladder neck angle	r 0.02	r -0.02	r 0.08	r 0.14	r -0.07	r -0.09
Straining bladder neck angle	r -0.25	r -0.50*	r 0.63*	r 0.78*	r -0.11	r -0.13
Rotational angle of bladder neck	r -0.02	r -0.27	r 0.64*	r 0.78*	r 0.08	r 0.10
Vector of bladder neck motion	r 0.45	r 0.16	r -0.31	r 0.01	r 0.20	r 0.24
Funneling of bladder neck	r 0.29	r 0.30	r -0.54	r -0.64*	r 0.59**	r 0.58**
B. Functional objective measure						
Maximum urethral closure	r -0.22	r -0.18	r 0.09	r 0.41	r 0.04	r 0.07
VLPP grading	r 0.26	r 0.35	r -0.35	r -0.48	r 0.04	r 0.04

* Possible score 0 to 18 with higher scores indicating worse perception of quality of life
†Possible score 0 to 21 with higher scores indicating worse perception of quality of life

Interpretation of results

In a sample of women with the diagnosis of urodynamic stress incontinence, our study revealed the 1-hour pad tests were in significant association with morphological and functional features relating to female SUI pathogenesis. There were weak but significant associations of subjective measures of symptom severity with 1-hour pad tests except for physical activity severity. Physical activity severity and bothersome severity provided the morphological and functional information of urethral closure dysfunction. Physical activity severity also had a unique association with the risk factors for SUI. Interestingly, the UDI-6 and IIQ-7 scores bore no clear relationship to typical risk factors for or morphological and functional pathophysiology of SUI. Yet, advanced pelvic organ prolapse enhanced the associations of bothersome severity and UDI-6 and IIQ-7 scores with anterior vaginal wall relaxation. None of subjective severity measure was associated with VLPP grading.

Concluding message

Subjective measures of symptom severity for stress urinary incontinence may bear different relations to the risk factors for and relevant pathogenesis of female SUI. Because the pathogenesis of SUI is multifactorial and is not explainable by the conventional theory of anatomic incontinence and ISD only, understanding the inherited pathophysiology and implication inside of symptom questionnaires may help to reach a consensus on the definition of symptom severity.

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Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**Cathay General Hospital IRB and Mackay Memorial Hospital IRB**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**