ABSTRACT #377
IMPACT OF OBESITY ON URINARY INCONTINENCE IN PREDIABETIC AND DIABETIC WOMEN: A RETROSPECTIVE COHORT STUDY

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Introduction

Urinary incontinence (UI) is a common condition with significant impact on quality of life in the female population. Age, parity, menopause, obesity, and diabetes are the most reported risk factors. The global increase in the prevalence of obesity and diabetes has become a major public health concern, as diabetes is a chronic disease with significant systemic complications.

Compared to other well-known diabetes-related microvascular complications such as retinopathy (7.5%), microalbuminuria (2.2%), and neuropathy (1.5%), UI (27%) has been reported to be much more frequent (1). In order to prevent diabetic complications, identification of pre-diabetic individuals has a crucial importance. Recently, it was reported that pre-diabetes, an intermediate stage between normal glycaemia and diabetes, is quite common among older age groups and especially in obese people (2). In comparison to definitions based on serum fasting glucose levels, the use of hemoglobin A1c (A1C) provides a number of benefits. A1C reflects chronic hyperglycemia and is strongly linked to the unfavorable end-organ results. In a recent study, the urinary complaints of women defined as pre-diabetes and diabetes were investigated thoroughly, but without any emphasis on their status of obesity. As abnormal blood glucose levels and obesity are the most reported co-morbidities, their co-effect on urinary incontinence in women cannot be ignored. However, the impact of obesity on urinary incontinence in women with and without carbohydrate metabolism disorders is still a controversial issue.

Thus, in this study, it was aimed to evaluate the impact of body mass index (BMI) on urinary incontinence in women with abnormal A1C levels.

Methods and Materials

In this retrospective cohort study, data of 1600 women with urinary incontinence who were admitted to the urogynecology unit of a university hospital between January 2011 and December 2022 were reviewed. Records of women who had been screened as part of the routine evaluation protocol by fasting blood glucose and/or serum A1C levels due to a diagnosis of diabetes, or being on medication for impaired glucose tolerance, or having risk factors for diabetes, were retrieved (n = 276). Data of women whose A1C results were within 2 weeks after admission and who had no documented urinary tract infection, were further analyzed retrospectively (n = 192). Women were grouped according to their A1C levels as pre-diabetic (5.7%≤A1C≤6.4%), and diabetic (A1C≥6.5%) respectively (3). Subsequently, pre-diabetic and diabetic groups were both further classified as non-obese and obese subgroups according to their BMI (BMI<30=non-obese, BMI≥30=obese). Baseline characteristics, scores of symptom and quality of life questionnaires (short forms of the urogenital distress inventory (UDI-6) and the incontinence impact questionnaire (IIQ-7), 8-item overactive bladder questionnaire (OAB-v8) and Sandvik incontinence severity index) and clinical findings (3-day voiding diary, cough stress test, and Q-tip test) were compared among non-obese and obese subgroups of pre-diabetic and diabetic women with UI. Student's t-test and Chi-square test were used, where appropriate; p ≤ 0.05 was considered statistically significant.

Table 1. Comparison of women with UI categorized according to A1C levels

	Prediabetic (n=63)	Diabetic (n=129)	*p*
Baseline characteristics			
Age (years)	59 ± 11.2	60.2 ± 9.9	0.451 [a]
BMI (kg/m^2)	32.4 ± 5.8	32.6 ± 5.4	0.756 [a]
Postmenopausal status *n (%)*	50 (79.3)	105 (81.3)	0.817 [b]
Parity	3.1 ± 1.9	3.5 ± 2	0.132 [a]
Previous vaginal birth *n (%)*	44 (69.8)	92 (71.3)	0.315 [b]
Maximum birth weight (g)	3731.8 ± 746.8	3764.7 ± 820.8	0.783 [a]
Level of A1C *(%)*	5.8 ± 0.4	8.1 ± 1.7	***<0.001*** [a]
Questionnaires			
UDI-6 total score (0-100)	29.2 ± 22.8	25.1 ± 18.9	0.194 [a]
UDI-6 irritative	66.6 ± 33.9	69.2 ± 30.9	0.604 [a]
UDI-6 stress	53.7 ± 35.1	53.3 ± 33.6	0.929 [a]
UDI-6 obstructive	34.4 ± 33.8	33.6 ± 34.7	0.822 [a]
OAB-V8 score	23.3 ± 10.5	20.5 ± 10	0.154 [a]
IIQ-7 score	9.6 ± 6.7	9.6 ± 6.5	0.722 [a]
Sandvik severity index	7.2 ± 4.5	8.2 ± 4	0.252 [a]
3-day bladder diary			
24-hour urinary frequency	9.7 ± 3.9	8.7 ± 4.3	0.131 [a]
Number of incontinence episodes	3.6 ± 4	2.6 ± 4.2	0.176 [a]
Clinical findings			
Positive cough stress test n (%)	34 (54)	68 (53)	0.91 [b]
Q-tip test>30° n (%)	36 (57)	81 (63)	0.433 [b]

Data was given as mean ± SD
[a]: Student's-t test, [b]: Chi-Square, p<0.05 statistically significant.
Abbreviations: UI: Urinary incontinence, BMI: Body mass index, A1C: Hemoglobin A1c, UDI-6: Short form of the Urogenital Distress Inventory, OAB-V8: 8-item overactive bladder questionnaire, IIQ-7: Incontinence impact questionnaire-7.

Results

In the final study population of women with UI (n = 192), 32.8% were found to be pre-diabetic (n = 63) and 67.2% were found to be diabetic (n = 129) according to the levels of A1C. Age, BMI, postmenopausal status, parity, history of vaginal delivery, and maximum birth weight of the newborns did not differ significantly between pre-diabetic and diabetic women (Table 1). Total and subscale scores of all questionnaires and clinical findings were also similar between these groups.

The pre-diabetic and diabetic groups classified as non-obese and obese were further analyzed to show the impact of obesity on UI. In these subgroup analyses, all baseline characteristics were similar among non-obese and obese pre- or diabetic women, except for parity (Table 2). In pre-diabetic women with obesity, OAB-v8 scores were found to be significantly higher (16.7 ± 8.9 vs. 28.5 ± 8.7, p < 0.001), while in diabetic women with obesity, higher stress subscale scores of UDI-6 were observed (40.2 ± 34.3 vs. 60.9 ± 31, p = 0.005). Additionally, diabetic women with obesity showed higher cough stress positivity (61.2% vs. 36.4%, p < 0.019) in accordance with their higher stress subscale scores.

Table 2. Comparison of subgroups categorized according to BMI values

	Prediabetic (n=63)			Diabetic (n=129)		
	Non-obese (n=29)	Obese (n=34)	*p*	Non-obese (n=44)	Obese (n=85)	*p*
Baseline characteristics						
Age (years)	59.8 ± 13.1	61.7 ±11.2	0.536 [a]	61.1 ± 9.8	59.7 ± 10	0.43 [a]
BMI (kg/m^2)	27 ± 2.2	35.9 ± 5.6	***<0.001*** [a]	27.1 ± 1.9	35.5 ± 4.3	***<0.001*** [a]
Postmenopausal status n (%)	22 (75.8)	28 (82.3)	0.708 [b]	37 (84.1)	69 (81.1)	0.723 [b]
Parity	3.4 ± 2.1	3.4 ± 2.1	0.96 [a]	2.9 ± 1.8	3.8 ± 2.1	0.032 [a]
Previous vaginal birth n (%)	21 (72.4)	23 (67.6)	0.812 [b]	32 (72.7)	60 (70.5)	0.615 [b]
Maximum birth weight (g)	3826.1 ± 721.3	3603.7 ± 579.7	0.264 [a]	3572.6 ± 695.9	3863.7 ± 866.6	0.093 [a]
Level of A1C (%)	6 ± 0.2	6 ± 0.2	0.658 [a]	7.9 ± 1.6	8.2 ± 1.7	0.271 [a]
Questionnaires						
UDI-6 total score (0-100)	29.5 ± 22.9	27.3 ± 22.4	0.846 [a]	23.5 ± 15.9	25.8 ± 20.3	0.1 [a]
UDI-6 irritative	60.9 ± 33.1	73.1 ± 31.5	0.709 [a]	67.9 ± 29.6	70 ± 31.8	0.769 [a]
UDI-6 stress	42.9 ± 28.1	59.7 ± 32.9	0.532 [a]	40.2 ± 34.3	60.9 ± 31	***0.005*** [a]
UDI-6 obstructive	44.5 ± 35.3	50.4 ± 35.2	0.871 [a]	29.6 ± 33.4	35.9 ± 35.6	0.424 [a]
OAB-V8 score	16.7 ± 8.9	28.5 ± 8.7	***<0.001*** [a]	21.4 ± 9	20.1 ± 1.5	0.579 [a]
IIQ-7 score	7.3 ± 7	9.6 ± 6.1	0.127 [a]	11.1 ± 6.4	8.9 ± 6.6	0.095 [a]
Sandvik severity index	5.7 ±4.4	8.1 ± 4.4	0.107 [a]	7.3 ± 3.7	8.6 ± 4.1	0.181 [a]
3-day bladder diary						
24-hour frequency	9.8 ± 4.3	9.7 ± 3.7	0.952 [a]	9.6 ± 4.8	8.2 ± 3.9	0.164 [a]
Number of incontinence episodes	3.2 ± 4	4.9 ± 4.5	0.24 [a]	3.5 ± 6.8	2.2 ± 2.1	0.193 [a]
Clinical findings						
Positive cough stress test n (%)	13 (44.8)	23 (67.6)	0.209 [b]	16 (36.4)	52 (61.2)	***0.019*** [b]
Q-tip test>30° n (%)	19 (65.5)	17 (50)	0.239 [b]	31 (70.5)	50 (58.8)	0.328 [b]

Data was given as mean ± SD.
[a]: Student's-t test, [b]: Chi-Square, p<0.05 statistically significant.
Abbreviations: BMI: Body mass index, A1C: Hemoglobin A1c, UDI-6: Short form of the Urogenital Distress Inventory, OAB-8: 8-item overactive bladder questionnaire, IIQ-7: Incontinence impact questionnaire-7.

Discussion

In this study, although there was no significant difference in baseline characteristics, symptom severity, quality of life, and clinical findings of women with pre-diabetes and diabetes, obese patients in both groups showed significantly higher urinary symptom bother.

In the whole study population, cough stress test positivity was found in more than 50% of the women, but no significant difference was observed among the pre-diabetic and diabetic groups. However, in diabetic women, obesity seems to have an impact on the positive cough stress test rate.

Conclusions

The impact of BMI levels on urinary incontinence in women with pre-diabetes and diabetes seems to be more important than hemoglobin A1C levels, which should be clarified by prospective large cohort studies.

References

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