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The incidence of Diabetic Cystopathy among Iraqi Diabetic Patients with lower Urinary Tract Symptoms

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Abstract

Background: Diabetic cystopathy disease is one of the most important problems facing diabetics. Determining the prevalence rate is one of the basics to know the effect of hyperglycemia on bladder patients to provide them with the best treatment services. And reduce the percentage of damage that occurs to the functioning of the bladder over a duration of disease.

Aim of study: identify the prevalence of diabetic cystopathy among diabetic patients.

Patients and methods: A cross sectional study were conducted from the first of Jun 2019 to end of December 2020. We selected convenient sample includes all Diabetic patients presenting with voiding dysfunction attending to private clinic of Dr. Saif al-haideri for urodynamic study and and who that meeting the eligibility criteria, data collection by A structured questionnaire is developed to collect information from the participation after physical examination and Urodynamic evaluation was done.

Result: The total study sample were 550 diabetic patients, out of them 112 (20.4%) were diabetic cystopathy. (56% male and 44% female) with mean age was 56.50±15.50 years. The mean duration of diabetic diagnosis was (13.7±8.25) years with 75% were more than 10 years, while (742.70±158.29 ml) the mean volume of bladder capacity and (87.35±81.82 ml/cm H_2O) mean of compliance and without any statically significant association (p=0.120 and 0.989 respectively).

Conclusion: 20.4% of Iraqi diabetic patients have diabetic cystopathy, and without any statically significant association between urodynamic finding and duration of diabetic disease.

Keyword: Diabetic cystopathy; prevalence; diabetic duration; compliance.

Introduction

Diabetes mellitus is a progressive, systemic metabolic disease that is increasingly becoming a public health problem. Diabetes has been linked to an early onset and greater incidence of urologic disorders, which can lead to debilitating urologic complications. This urologic disorder, which include bladder

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dysfunction, have a significant impact on the quality of life of diabetic patients. Bladder disease affects more than half of all diabetic men and women.[1,2] Bladder instability or hypersensitivity was the most common finding in a series of clinical trials involving men and women with diabetes, ranging from 39 to 61 percent of participants.[2,3]

Diabetes cystopathy, a common urological problem, is historically described as a combination of reduced bladder sensation, rise bladder volume, and insufficient bladder emptying. Frimodt Moller identified it for the first time in 1976.[4] Even so, people with diabetes have a major trouble from overactive bladder as well as an extensively developed lower urinary tract condition is becoming increasingly evident in the recent definition of diabetic cystopathy (LUTS).[5] Lee et al. reported the prevalence of diabetic cystopathy with urodynamic diagnosis in 2004 to extend from 25 to 90%.[6] A new 2011 clinical study estimated that 22.5% of diabetics had excessive bladder, 48.0% of whom had urinary incontinence.[7]

The difference in the LUTS prevalence and incidence is because the identification of diabetic cystopathy and identified relation to patients is not validated and standardized.[8] Up to now little literature to direct the medical practice has been done about Diabetic uropathy that showed diabetic bladder dysfunction (DBD), which is more inclusive of diabetic cystopathy than the previously in vogue, DBD has become known in recent years as a series of symptoms, with a rise in frequency, urgency and sometimes even pressing incontinence described in early phases.[9] These modifications are typical for overactive bladder-related irritative signs (OAB).[6] As diabetes increases, recurrent DBD lead to insensate, decompensated bladder that results in high incontinence and post-residual volumes.[10] Hyperglycemia overcomes the capacity of kidney glucose uptake, leading to glucosuria and osmotic polyuria in initial phases of diabetes. At first and, the bladder compensates and the urinary frequency increases. Hyperglycemia simultaneously enhances oxidative phosphorylation in the bladder like in other insulin-independent sites, causing major oxidative stress. Inverse correlation of reactive (free) radical and antioxidant protection oxidation activity resulting in the reaction of surplus radicals that destroy all cell structures, even proteins.Caused by an imbalance. [11]Many diseases, such as heart disease, cancer and especially dangerous diabetes and DBD, are caused by elevated oxidative stress. Thus, oxidative stress in many target tissues leads to an inflammatory reaction. Over years inflammatory has been shown to play a key role in the production of various diabetic complications.[12]

Patients and Methods

A cross sectional study was conducted from the first of Jun 2019 to end of December 2020. We selected as a sample includes all Diabetic patients presenting with voiding dysfunction attending to private clinic of Dr. Saif al-haideri for urodynamic study that specialist of urology and who that meeting the eligibility criteria and accepted to participate in study were included and excluded any patients with 1. end stage renal disease, 2. Patients with medication known to interfere with function of the bladder or sphincter, 3. acute metabolic complication of DM, 4. supra-sacral lesions or any root lesion of the sacral and lumbar outflow tracts and diseases related to peripheral neuropathy other than DM; 5. prostate or bladder cancer and prostatic hyperplasia, 6. previous genitourinary surgery, pelvic organ prolapsed and 7. urolithiasis current.

We evaluated 550 diabetic patients examined in our clinic after a diabetic medical consultation, and data collection by A structured questionnaire is developed to collect information from the participation. Some information regarding clinical factors and certain other information were obtained from the medical records, (age, weight, height) while other information was obtained from the patients (duration and treatment for diabetes mellitus and the voiding symptoms). after that we do physical examination and Ultrasound of abdomen was done to assess the status of the upper tracts, any other lesions in bladder, prostate. Urine examine was done to rule out pyuria and UTI and Urodynamic evaluation consisted of multi-channel urodynamics measuring abdominal, vesical and detrusor pressures simultaneously. Data was translated into a computerized database structure. Statistical analyses were done using SPSS (Statistical Package for Social Sciences). Version 23 computer software for windows. Categorical variables were presented as frequency and percentage, Chi-square was used to test the significance of the association between categorical variables while continuous variables presented as median with interquartile range and compared using analysis of variance. With considered P. Value of ≤ 0.05 was statistically significant.

Result

The total study sample were 550 diabetic patients, 52.2% were female and 47.8% were male, with the mean patient's age of 60.78±13.45 years old. 27.8% of patients presented with over active bladder, 23.6% with bladder out let obstraction, 27.2% stress urinary incontinence and 20.4% diabetic cystopathy. all these were shown in Figure 1.

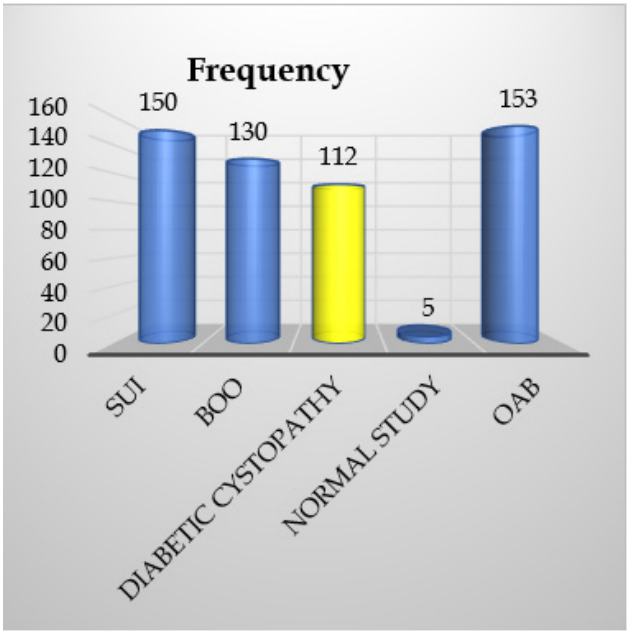

Figure 1: Distribution of study sample according to urodynamic finding. N=550

We selected all patient with diabetic cystopathy(112) for more evaluation, the result of current study showed (56% male and 44% female) with mean age of diabetic cystopathy patients was 56.50±15.50 years, and the most prevalence age was more than 60 years (45.5%). The mean duration of diabetic diagnosis was (13.7±8.25) years with 75% were more than 10 years, while (742.70±158.29 ml) the mean volume of bladder capacity with 76.8% highest part among >650ml and (87.35±81.82 ml/cm H_2O) mean of compliance.as shown in Table 1. and Figure 2. Regarding to correlation of demographic characteristic to duration of diabetic disease, the result of study found no statistical significant association between age category and duration (p=0.565), also no any statically difference between gender and duration of diabetic (p=0.582).as shown in Table 2.

Figure 2: distribution of study sample according to gender.

Table 1: Distribution of study sample according to demographic and clinical characteristic. N=112

Age	**Frequency**	**Percent**
<40 years	17	15.2
40-60 years	44	39.3
>60 year	51	45.5
Total	112	100.0
Gender	**Frequency**	**Percent**
Female	49	43.8
Male	63	56.3
Total	112	100
Capacity volume	**Frequency**	**Percent**
350-650ml	26	23.2
>650ml	86	76.8
Total	112	100
Duration	**Frequency**	**Percent**
≤10 years	28	25.0
>10 years	84	75.0
Total	112	100.0
Compliance	**Frequency**	**Percent**
< 30ml	61	54.5
30-120 ml	21	18.8
>120ml	30	26.8
Total	112	100

Table 2: Relation duration of diabetic diagnosis to demographic characteristic.

Variables	Duration of diabetic diagnosis			P value
Age	≤10 year	>10 year	Total	
18-39 years	6	11	17	
	5.4%	9.8%	15.2%	
40-60years	10	34	44	
	8.9%	30.4%	39.3%	
>60year	12	39	51	0.565
	10.7%	34.8%	45.5%	
Total	28	84	112	
	25.0%	75.0%	100.0%	
Pearson Chi-Square= 1.141a df=2 statically significant *				
Gender	**≤10 year**	**>10 year**	**Total**	**P value**
Female	11	38	49	
	9.8%	33.9%	43.8%	
Male	17	46	63	
	15.2%	41.1%	56.3%	0.582
	28	84	112	
	25.0%	75.0%	100.0%	
Pearson Chi-Square=0.302a df=1 statically significant *				

Regarding the effect of the duration of diabetes on the volume of capacity, the results of the study showed that the number of patients with a capacity greater than 650 ml was the highest among patients affected for more than 10 years but without statically differences (p = 0.120), as the result showed all patients who had History of diabetes more than 10 years not statistically significant association with compliance over 120, (p = 0.989).

Table 3: Relation duration of diabetic diagnosis to clinical characteristic

Variables	Duration of diabetic diagnosis			P value
Capacity volume	≤ 10 year	>10 year	Total	
350-650ml	15	31	46	
	13.4%	27.7%	41.1%	
>650 ml	13	53	66	0.120
	11.6%	47.3%	58.9%	
Total	28	84	112	
	25.0%	75.0%	100.0%	
Pearson Chi-Square =2.410 df= 1 statically significant *				
Compliance	≤ 10 year	> 10 year	Total	P value

Contd... Table 3: Relation duration of diabetic diagnosis to clinical characteristic				
< 30 ml/ cm H_2O	12	35	47	0.989
	10.7%	31.3%	42.0%	
30-120 ml/ cm H_2O	11	33	44	
	9.8%	29.5%	39.3%	
>120 ml/ cm H_2O	5	16	21	
	4.5%	14.3%	18.8%	
Total	28	84	112	
	25.0%	75.0%	100.0%	
Pearson Chi-Square 0.235a df= 2 statically significant *				

Discussion

Diabetes is one of the world's most prevalent chronical disease which has spread over the past years in Iraq and is relatively easily diagnosed, but neurogenic bladder condition such as diabetic cystopathy has insidious development with signs and symptoms that do not occur until the disease is advanced. So, the incidence and prevalence of diabetic cystopathy not clearly detected in Iraq. In current study we found the prevalence of diabetic cystopathy was 20.4%, while another study reported 25-95% of patients with DM have cystopathy[13-15]. Since few studies have dealt with unselected patients, it is difficult to estimate the incidence of cystopathy in a diabetic population based on reports in the literature. One analysis[16] looked at 87 randomly chosen patients, while another[17] looked at 124 randomly chosen patients, and both observed cystopathy in 43 percent to 44 percent of the patients. In other documents, randomly selected patients have been selected within a restricted age (20 to 50 years). Cystopathy frequency varies between 34% and 63%.[18] Some urophysiological trials have occurred in patients that either use oral hypoglycemic agents, have a diet-controlled disorder or have been given hypoglycemic and dietary treatment of these patients, 66% had supposedly primary bladder outlet disorders and only 25% had symptoms of cystopathy.17 In iraq study conducted by Hasanain F.et al.[19]recorded 42% prevalence of Diabetic cystopathy. The possible explanation of these differences might be related to variations in study setting and sample constitutionandPart of this difference is that most experts agree that the specific criteria are different for diabetic cystopathylike reduced bladder sensation or increased bladder capacity.[20]

Only diabetic men have been examined in the early research on bladder disorders. However, numerous experiments have been conducted using both sexes over the last 20 to 30 years. In present study we found the frequency of cystopathy in males and females has been found to be practically identical: 56% in males and 44% in females, mean age of diabetic cystopathy patients was 56.50±15.50 years and without any statically association with duration of diabetics and age or sex. This result similar to Takahashi O. et al.(2021) a retrospective study, that showed no. of patients was 44:(61% of males and 39% of females). Average age 67.0 ± 12.7 years; The average duration of diabetes is 16.8 ± 13.1 years and without correlation. [21] another study by Martins U, et al.(2018) Of the 151 patients with diabetes assessed, 76 were female and 75 were male, with the average patient age being 54 years old with statically significant with age and feminine sex.[22] In Hasanain F. et al.[19] The study included 118 diabetic patients (71 female and 47 male) within the average age (62 ± 13) with mean duration of DM 11.3±3.7 in male ,12.2±4.1 0.2 in female with statically significant.It was found in our study, the a greater effect of prolonged diabetesduration on increased volume capacity and bladder compliance without any a statistically significant association (p=0.120 and 0.989 respectively). This result is agreed with study conducted by Somarendra K et al.[23] that found no correlation between duration of diabetes and increased maximum cystometric capacity in both males (P value-0.072) and females patients (P value-0.667). Govindarajan R et al.[24] reported large bladder capacity in 26% of patients and they also had no correlation with duration of diabetes mellitus.

In study conducted by Al-Shukri S. et al. showed the duration of the diabetes mellitus type II was

less than 10 years the bladder not significant. The duration of the disease was more than 10 years the predominantly bladder hypocontractility or hyposensitivity was significant while Sex and age had no significant influence on the urodynamic changes.[25] Several authors have shown, the longer the duration of diabetes the more likely to develop of cystopathy.[4,7] While occurs at rate of 25% in patients with diabetes of approximately 10 years' duration, the prevalence rate increases to more than 50% in patients who have had diabetes for more than 45 year.

Early studies of cystopathy showed that the frequency of cystopathy was similar between the sexes. However, a longer duration of diabetes was associated with an increased incidence of cystopathy. And its prevalence among females with diabetes for a period of more than 10 years.[26] another reported by Santhanakrishnan I. et al.[27] found the compliance was less in individuals with duration of diabetes > 4 years compared to those with duration < 4 years, but it was not statistically significant similar to the study conducted in Poland.[28]

Salem MA, et al. (2014) Studying the relationship between the diabetes duration and diabetic cystopathy, it was found that the duration of diabetes was not significantly related to any urodynamic finding indicating that disturbed bladder function may be independent of the duration of diabetes.[29] This is in concordance with the formerly mentioned study of Karavanaki et al.[30] which had findings suggesting that autonomic function can be impaired independent of diabetes duration.

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Conflict of Interest: Nil.

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