Libyan International Medical University
Third Year Medical Student

The Prevalence of Diabetic Nephropathy In Benghazi Diabetic Patients at Benghazi Diabetic Center

Submitted by: Aya Ragab B. Roaeid.

Supervisor: Dr. Nawar.

Date of submission: 30\6\2018.

Student No.: 1211.

- **Abastract:**

Aim:

The object of this study is to report on the prevalence of proteinuria in diabetic patients at BDC.

Material and method:

Included in this study 123 diabetic patients (75 “61%” males and 48 “39%” females).

All patients were subjected to through history including age, duration of diabetes, presence of hypertension, type of treatment, urea, creatinine, fasting blood glucose, and HBA1C.

Date is presented as mean and as percentage of total.

Results:

Off 123 diabetic patients, 75 are males and 48 are females.

Mean age of the whole group is 9.6 (1-33 Y)

Mean duration of diabetes of the whole group is 6.5 (5.6-11.6 Y)

Mean HbA1c is 89.4mg

Off all patients, 45 were hypertensive and 78 were not

Off all patients, 47 had microalbuminuria and 5 had macroalbuminuria

Off all patients, 73 patients were on oral treatment, 3 patients were on insulin, and 46 patients were on combined.

- **Introduction:**

A. Diabetes Mellitus

It is a group of metabolic disease characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both[1].

Classification:

- Type 1 diabetes (due to autoimmune B-cell destruction, usually leading to absolute insulin deficiency).[1,2]
- Type 2 diabetes (due to a progressive loss of B-cell insulin secretion frequently on the background of insulin resistance).[1,2]
- Gestational diabetes mellitus (GDM) (diabetes diagnosed in the second or third trimester of pregnancy that was not clearly overt diabetes prior to gestation).[1,2]
- Specific types of diabetes due to other causes, e.g., monogenic diabetes syndromes (such as neonatal diabetes and maturity-onset diabetes of the young [MODY]), diseases of the exocrine pancreas (such as cystic fibrosis), and drug- or chemical induced diabetes (such as with glucocorticoid use, in the treatment of HIV/AIDS, or after organ transplantation).[1,2]

Complications of DM can be classified into:

- **Acute:**

1- Diabetic Ketoacidodsis, is a dangerous complication faced by people with diabetes which happens when the body starts running out of insulin.

DKA is most commonly associated with type 1 diabetes, however, people with type 2 diabetes that produce very little of their own insulin may also be affected.[3]

2- Hyperosmolar Nonketotic Hyperglycemia, is a dangerous condition brought on by very high blood glucose levels in type 2 diabetes (above 33 mmol/L).[3]

- **Chronic:**

1- Macrovasular complications involve atherosclerosis of large vessels, which can lead to: CAD, PVD, and Stroke.[3]

2- Microvascular complications underlie 3 common and devastating manifestations of diabetes mellitus:

Retinopathy:

Is the most common cause of adult blindness in the development countries.[3]

Neuropathy:

Is the result of nerve ischemia caused by direct effects of hyperglycemia on neurons, and intracellular metabolic changes that impair nerve function.[3]

B. Nephropathy:

Also known as diabetic kidney disease is a syndrome characterized by the presence of pathological quantities of urine albumin excretion, diabetic glomerular lesions, and loss of glomerular filtration rate (GFR) in diabetics.[4,5]

It has been categorized into stages based on the values of urinary albumin excretion (UAE): microalbuminuria and macroalbuminuria.[4,5]

- Incipient nephropathy is the initial presence of low but abnormal amounts of urine albumin, referred to as microalbuminuria (persistent albuminuria at level 30–299 mg/24 hours).[4,5]
- Overt nephropathy or macroalbuminuria (persistent albuminuria at level ≥300 mg/24 hours) develops after many years in type 1 diabetes but may be present at the time of diagnosis of type 2 diabetes.[4,5]

- **Pathophysiology:**

1- Endothelial Changes:

Endothelial dysfunction precedes altered vascular permeability and albuminuria. And this dysfunction causes an increase in oxidative stress which is the basis of activation of different cellular pathways leading to an increase in inflammation, diffuse inflammatory cell infiltrates, increased extracellular matrix deposition, altered angiogenesis and progressive tissue damage.[6]

2- Changes in Other Components of the Glomerular Filtration Barrier:

Podocyte detachment has been positively correlated with urinary albumin excretion and increasing podocyte detachment is associated with decreased permselectivity of the glomerulus and progressive albuminuria.[6]

- **Discussion:**

Off all diabetic patients (123) 52 patients (42.3%) had proteinuria; 47 patients had microalbuminuria (90.4%) and 5 patients had macroalbuminuria (9.6%).

And among these 52 patients, 29 patients (55.8%) had HbA1c ≥ 7 which means there is a big relation between nephropathy and HbA1c.

A study by Oman Medical Journal has approved that a poor glycemic control is a well-known risk factor for most diabetic complications, not only diabetic nephropathy.[7]

Also there is a relation between nephropathy and high blood pressure as of all 52 patient, 13 patients were hypertensive (25%). A study by Diabetic American Association has approved that patients who had a good control hypertension have a decreased risk to develop nephropathy.[8]

Another risk factor related to diabetic nephropathy is the duration of the diabetes.

27 of 52 patients (51.9%) had a duration of diabetes up to 5 years and 11 patients (21.15%) with a duration up to 10 years and 14 patients (26.9%) with a duration more than 10 years.

Another study showed that the prevalence of nephropathy multiplied with increase in age and diabetes duration. The lowest prevalence was in 25–44 and 45–64 years age groups, with diabetes duration <5 years represented by 3.7% and 3.3% respectively, while the highest was with duration ≥15 years in age groups 25–44, 45–64 and ≥65 years, amounting to 19.6%, 16.4% and 21.8%.[9]

- **Conclusion:**

- Nephropathy is a very common complication of Diabetes Mellitus according to my study and other Libyan and international studies.
- The cause of nephropathy is not well recognized but there are some factors that increase the risk of the development such as poor control, hypertension, dyslipidemia, and smoking.

- **Recommendations:**
- Diabetes mellitus must be controlled to decrease the incidence of its complications.
- If the patient is hypertensive, he/she must control his/her blood pressure and takes the antihypertensive drugs.
- **Observations**:

  CAD: coronary artery disease.

  PVD: peripheral vascular disease.

  BDC: Benghazi diabetic center.

- **References:**

1- American Diabetes Association. "Diagnosis and classification of diabetes mellitus." Diabetes care 33.Supplement 1 (2010): S62-S69.

2- American Diabetes Association. "Standards of medical care in diabetes— 2009." Diabetes care 32.Suppl 1 (2009): S13.

3- https://www.diabetes.co.uk/diabetes-complications/short-term-complications.html.

4- Lim, A. K. (2014). Diabetic nephropathy–complications and treatment. International journal of nephrology and renovascular disease.

5- Gross, J. L., De Azevedo, M. J., Silveiro, S. P., Canani, L. H., Caramori, M. L., & Zelmanovitz, T. (2005). Diabetic nephropathy: diagnosis, prevention, and treatment. Diabetes care, 28(1), 164-176. ISO 690.

6- https://www.msdmanuals.com/professional/endocrine-and-metabolic-disorders/diabetes-mellitus-and-disorders-of-carbohydrate-metabolism/complications-of-diabetes-mellitus#v29299235.
7- Alrawahi, A. H., Rizvi, S. G. A., Al-Riyami, D., & Al-Anqoodi, Z. (2012). Prevalence and risk factors of diabetic nephropathy in omani type 2 diabetics in Al-dakhiliyah region. Oman medical journal, 27(3), 212.
8- Wright JT Jr, Bakris G, Greene T, et al.; African American Study of Kidney Disease and Hypertension Study Group. Effect of blood pressure lowering and antihypertensive drug class on progression of hypertensive kidney disease: results from the AASK trial. JAMA 2002;288:2421–2431pmid:12435255.
9- Al-Rubeaan, K., Youssef, A. M., Subhani, S. N., Ahmad, N. A., Al-Sharqawi, A. H., Al-Mutlaq, H. M., ... & AlNaqeb, D. (2014). Diabetic nephropathy and its risk factors in a society with a type 2 diabetes epidemic: a Saudi National Diabetes Registry-based study. PloS one, 9(2), e88956.