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Original Research Article

Microangiopathic and Cardiovascular Complications of Diabetes Mellitus

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Abstract

A study of Microangiopathic and cardiovascular complications in 106 diabetic patients admitted to the department of medicine of Diwaniyah Teaching Hospital showed 39 patients had diabetic retinopathy and 20 patients had ad/or nephropathy, 59 patients had absent ankle jerk, 15 patients had postural hypotension, 6 patients had absent vibration sense, 7 patients had abnormal pin prick sensation, 11 patients had abnormal ECG.

Keywords: Microangiopathic Diabetes Mellitus.

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INTRODUCTION

In recent years new knowledge on the pathogenesis of diabetes and its chronic complications has led to better understanding of this heterogenous disease and its impact on the community.

Diabetes as a metabolic disorder is no longer a disease of poor immediate prognosis with education of diabetes as well as health care personnel the expectation of life has improved; thanks to better self-care and early detection of complication.

Diabetes is now classified into two major types

- IDDM (Insulin dependent diabetes mellitus) which usually associated with HLA DR3, DR4 and ICA (Islet Cell antibody)
- NIDDM (Non-Insulin dependent diabetes mellitus) either obese or non-obese.

Proteinuria, in the absence of any evidence of renal disease was considered an indication of the onset of nephropathy cardiovascular disease was diagnosed in the presence of clear history of angina and\or unequivocal ECG changes.

Neuropathy was considered present when the patient has absent sensory modalities and\or tendon jerks. IDDN was diagnosed in the presence of characteristic feature such as normal or decreased weight at presentation, insulin dependency or ketosis processes when doubt existed glucagon stimulated C-peptide assay were performed.

MATERIAL AND METHOD

106 patients admitted to the department of medicine of Al-Diwaniyah teaching hospital were studied in the period from November 2017 to August 2018. Full history was taken and detailed examination was performed.

Urine analysis was done routinely together with blood sugar profile, blood urea, creatinine, uric acid, complete blood picture and ESR, together with ECG and chest x ray.

Fundoscopy was performed with pupils fully dilated and finding was double-checked by consultant physician or ophthalmologist or both.

Retinopathy was classified as follows

A) Background (B D R)

- Microaneurysms with or without associated small blot hemorrhage.
- Hard exudates.
- Minor venous abnormalities characterized by irregularity in the width of the vein.
- Arteriolar narrowing.
- Arteriolar venular nicking.
- Retinal edema.

B) Preproliferative diabetic retinopathy (PPDR)

- Cotton wool spots (soft exudate)

- Venous abnormalities characterized by beading and duplication.
- Intraretinal microvascular abnormalities.
- Areas of non-perfusion or capillary closure.
- Macular changes.

C) Proliferative diabetic retinopathy (PDR)

- Vasoproliferation:
- New vessels on the disc (NVD)
- New vessels elsewhere (NVEW)
- Fibrous tissue membrane associated with the new vessels.
- Fibrous growth stage with contraction.
- Retinal hemorrhage.
- Vitreous hemorrhage.
- Traction retinal detachment.

RESULTS

Mean ages in Type I patients was 29.7 (range 10-59 years).
Mean age in Type II patients was 46.9 (range 13-70 years).
Mean duration of D.M type I patients was 7.19 years (range 1 week – 22 years).
Mean duration of D.M type II patients was 7.01 years (range 1 week – 22 years).
Mean duration of Diabetes in both types was 7.12 years (range 1 week – 22 years).
Mean duration of Diabetes in females was 6.03 years (range 1 week – 22 years).
Mean duration of Diabetic males was 8.18 years (range 1 week – 22 years).

Table 1 shows in type I patients the majority of diabetic retinopathy is between 10-19 years duration of D.M is 85.7%.

Table II shows in type II patients the majority of diabetic retinopathy is more than 20 years duration of D.M is 85.7%.

Table III shows in both types of diabetic patients the majority of diabetic retinopathy is between 10-19 years and also in more than 20 years duration of D.M is 80%.

Table IV shows in type I patients the majority of nephropathy when duration of diabetes more than 20 years is 75%.

Table V shows in type II patients the majority of nephropathy is 10-19 years and more than 20 years duration of D.M which is 33.3.

Table VI shows in both types of diabetic patients the majority of nephropathy is more than 20 years duration of D.M which is 50%.

Table VII shows in type I patients the majority of absent ankle jerk is 10-19 years duration of D.M., while majority of pin prick abnormality is also 10-19 years duration of D.M.
Absent vibration sense is majority more than 20 years duration of D.M (50%).
Postural hypotension majority more than 20 year's duration of D.M (50%).

Table VIII shows in type II patients the majority of absent ankle jerk is more than 20 years duration of D.M (83.3%).

Majority of pin prick abnormality is more than 20 years duration of D.M (50%).
Absent vibration sense majority is more than 20 years duration of D.M (50%).
Postural hypotension majority is more than 20 years duration of D.M (50%).
Table IX shows both type patient's majority of absent ankle jerk is 10-19 years duration of D.M. Pin prick abnormality majority is more than 20 years duration of D.M.
Absent vibration sense majority is more than 20 years duration of D.M.
Postural hypotension majority is more than 20 years duration of D.M.

Table X shows in type I patients majority of patients with ECG changes is 10-20 years duration of D.M.

Table XI shows in type II patients majority of patients with ECG changes is 10-20 years duration of D.M.

Table XII shows in both types of diabetic patients majority of ECG abnormality is 10-20 years duration of D.M.

Table XIII shows diabetic male with ischemic heart disease 10.6%, while diabetic female with ischemic heart disease 10.1%.

Table-1: Distribution of retinopathy in 60 patients with D.M. with Basal C-peptide less than 0.6 nmol/l according to duration of DM

Duration of D.M. (years)	Total No. of patients	Patients D.R.		B.R.		P.P.R. + Maculopathy		Proliferative D.R.	
		No.	%	No.	%	No.	%	No.	%
Less than 5	29	1	3.4	1	3.4	-	-	-	-
5-9	14	5	35.7	3	21.4	2	14.2		
10-19	14	12	85.7	3	21.4	7	50	2	14.2
More than 20	3	2	66.6	-	-	2	66.6	-	-
Total	60	20	33.3	7	11.6	11	18.33	2	3.33

Table-2: Distribution of retinopathy in 46 diabetic patients with C-peptide more than 0.6 nmol/l (Basal) according to duration of D.M

Duration of D.M. (years)	Total No. of patients	Patients D.R.		B.R.		P.P.R. + Maculopathy		Proliferative D.R.	
		No.	%	No.	%	No.	%	No.	%
Less than 5	19	3	15.7	1	5.26	1	5.26	1	5.26
5-9	10	2	20	1	20	1	20	-	-
10-19	10	8	80	2	20	4	40	2	20
More than 20	7	6	85.7	-	-	6	85.7	-	-
Total	46	19	41.3	4	8.6	12	26.08	3	6.52

Table-3: Distribution of retinopathy in 106 diabetic patients according to duration of D.M

Duration of D.M. (years)	Total No. of patients	Patients D.R.		B.R.		P.P.R. + Maculopathy		Proliferative D.R.	
		No.	%	No.	%	No.	%	No.	%
Less than 5	48	4	8.3	2	4.1	1	2.8	1	2.88
5-9	24	7	29.1	4	16.6	3	12.5	-	-
10-19	24	20	80	5	20.8	11	45.8	4	16.6
More than 20	10	8	80	-	-	8	80	-	-
Total	106	39	36.7	2	10.3	23	21.69	5	4.71

D.R: Diabetic Retinopathy
B.R: Background Retinopathy
P.P.R: Preproliferative Retinopathy

Table-4: distribution of nephropathy in insulin dependent D.M. according to duration of D.M in 64 patients

Duration of D.M	Total No. of patients	proteinuria	
		No.	%
Less than 5 years	28	-	-
5-9 years	17	4	23.52
10-19 years	15	6	40
More than 20 years	4	3	75
Total	64	13	20.3

Table-5: Distribution of nephropathy in NIDDM type 2 in 42 patients

Duration of D.M	Total No. of patients	proteinuria	
		No.	%
Less than 5 years	19	1	5.26
5-9 years	8	1	12.5
10-19 years	9	3	33.33
More than 20 years	6	2	33.33
Total	42	7	16.66

Table-6: Distribution of nephropathy according to duration of D.M. in 106 diabetic patients

Duration of D.M	Total No. of patients	proteinuria	
		No.	%
Less than 5 years	47	1	2.12
5-9 years	25	5	20
10-19 years	24	9	37.5
More than 20 years	10	5	50
Total	106	20	18.86

Table-7: Assessment of neurological deficit in 64 type 1 patients according to duration of D.M

Duration of D.M	Total No. of patient	Abnormal pin prick		Absent vibration sense		Postural hypotension		Absent ankle jerk	
		No.	%	No.	%	No.	%	No	%
Less than 5 years	19	-	-	-	-	-	-	8	42.1
5-9 years	8	1	12.5	1	12.5	1	12.5	4	50
10-19 years	9	1	11.1	-	-	3	33.3	7	77.7
More than 20 years	6	3	50	3	50	3	50	5	83.3
Total	42	5	11.9	4	9.52	7	16.66	24	57.14

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Table-8: Assessment of neurological deficit in 42 type 2 patients according to duration of D.M.

Duration of D.M	Total No. of patient	Abnormal pin prick		Absent vibration sense		Postural hypotension		Absent ankle jerk	
		No.	%	No.	%	No.	%	No.	%
Less than 5 years	28	-	-	-	-	-	-	6	21.42
5-9 years	17	-	-	-	-	1	5.88	12	70.5
10-19 years	15	2	13.3	-	-	5	33.3	15	100
More than 20 years	4	-	-	2	50	2	50	2	50
Total	64	2	3.12	2	3.12	8	12.5	35	54.6

Table-9: Assessment of neurological deficit in 106 diabetic patients according to duration of D.M

Duration of D.M	Total No. of patient	Abnormal pin prick		Absent ankle jerk		Absent of vibration sense		Postural hypotension	
		No.	%	No.	%	No.	%	No	%
Less than 5 years	47	-	-	14	29.7	-	-	-	-
5-9 years	25	1	4	16	64	1	4	2	8
10-19 years	24	3	12.5	22	91.6	-	-	8	33.3
More than 20 years	10	3	30	7	70	5	50	5	50
Total	106	7	6.6	59	55.6	6	5.6	15	14.15

Postural hypotension: difference between supine and erect systolic blood pressure more than 20 mm/Hg

Table-10: ECG changes in 64 type 1 diabetic patients in relation to duration of D.M.

Duration of diabetic mellitus (years)	Total No. of patients	Patients with abnormal ECG	
		No.	%
Less than 10 years	48	-	-
10-20 years	16	4	25
21-25 years	-	-	-
Total	64	4	6.25

Table-11: ECG changes in 42 type 2 diabetic patients in relation to duration of D.M

Duration of diabetic mellitus (years)	Total No. of patients	Patients with abnormal ECG	
		No.	%
Less than 10 years	30	5	16.66
10-20 years	10	2	20
21-25 years	2	-	-
Total	42	7	16.66

Table-12: ECG changes in 106 diabetic patients according to duration of D.M

Duration of D.M (years)	Total No. of patients	Patient with abn. ECG	% of patients with abn. ECG
Less than 10 years	78	5	6.41
10-20 years	26	6	23.07
21-25 years	2	-	-
total	106	11	10.37

ECG abnormality means ST elevation in more than one lead.
ST depression in more than one lead
Left bundle branch block.
T wave inversion in more than one lead

Table-13: ECG abnormality in 106 diabetic patients according to sex

Sex	Total No. of patients	I.H.D	
		No.	%
Male	47	5	10.6
Female	59	6	10.1
Total	106	11	10.37

CONCLUSIONS

Studies on the prevalence of long-term complications of diabetes vary from one country to another and from one group in the same country to another. In general, the long-term complications constitute the major threat to the lives of all diabetics.

The prevalence of symptomatic neuropathy depends on the diagnostic methods used. It is estimated that 80% of diabetics have impaired electrophysiological test [1, 2].

In the unselected series of 1175 patients found 21% with clinical signs of neuropathy only 6% had symptoms [3].This contrasts with the experience of other who recorded a higher frequency of symptoms and lower rate of signs [4-7].

In our study the prevalence of neuropathy as determined by objective signs was comparable. It is noted that the more common abnormality is the absence of the ankle jerk which had prevalence of 54.6%.

Diabetic nephropathy is a major cause of death in IDDM patients [8]. As estimated 25-30% of diabetics diagnosed before they are 30 years of age probably die from diabetic nephropathy [9].

Proteinuria in excess of 0.5 gram/24 hour in an insulin dependent diabetic is the hall mark of clinical diabetic nephropathy; it heralds a progressive decline of renal function [5].

Clinical nephropathy developed in about 35% of insulin dependent patient after duration of diabetes ranging between 16-20 years. Non-insulin dependent patients have prevalence of clinical nephropathy which varies in different ethnic groups [6]. In our group of patients, the prevalence of nephropathy 18.86% (in type 1=20.3%, in type 2= 16.66%).

Cardiac complications of diabetes represent the major problem of morbidity and mortality. Recent epidemiological data establish that cardiovascular risk is similarly increased in both male and female diabetic contrary to what is expected in non-diabetic [6].

In our patients 10.37% prevalence of ischemic heart disease in male 10.6%, in female 10.1%. Diabetic retinopathy is a leading cause of blindness in United States [7]. Diabetic retinopathy affects all races and the ages and the duration of diabetes appears to be important factors.

Visual prognosis depends on type of retinopathy and the patients' age and is much worse if new vessel is present in our patient. The overall prevalence of retinopathy was 36.7% and 33.3% in type 1, 41.3% in type 2.

Preproliferative and maculopathy constitute the majority 21.69% of all. IDDM 18.33% of all. NIDDM 26.08%. While the less common form i. e. Proliferative was 4.7% (in type 1 it is 3.33% in type 2 it is 6.52%).

REFERENCES

1. Krall, L. P. (1988). World book of diabetes in practice. Elsevier.
2. Joslin, E. P., & Kahn, C. R. (2005). Joslin's Diabetes Mellitus: Edited by C. *Ronald Kahn*.
3. Pirart, J. (1985). Diabetic neuropathy: a metabolic or a vascular disease?. Diabetes, *14*(1), 1-9.
4. Viberti, G., & Keen, H. (1984). The patterns of proteinuria in diabetes mellitus: relevance to pathogenesis and prevention of diabetic nephropathy. Diabetes, 33(7), 686-692.
5. World Health Organization (WHO. (1985). Multinational study of vascular disease in diabetics: prevalence of small vessel and large vessel disease in diabetics patients from 14 countries. *Diabetologia*, *28*, 615-640.
6. Kasper, D., Fauci, A., Hauser, S., Longo, D., Jameson, J., & Loscalzo, J. (2018). *Harrison's principles of internal medicine*. McGraw-Hill Professional Publishing.
7. Cryer, P. E., Davis, S. N., & Shamoon, H. (2003). Hypoglycemia in diabetes. Diabetes care, *26*(6), 1902-1912.
8. Melmed, S., Polonsky, K. S., Larsen, P. R., & Kronenberg, H. M. (2015). *Williams's textbook of endocrinology*. Elsevier Health Sciences.
9. McPhee, S. J., & Papadakis, M. A. (2007). *Current Consult: Medicine 2007*. McGraw-Hill.
10. Goldman, L., & Ausiello, D. A. (Eds.). (2008). Cecil medicine 1212-1216. Philadelphia: Saunders Elsevier.