

A STUDY OF RELATIONSHIPS BETWEEN ALBUMINURIA AND FUNDUS FINDINGS OF TYPE II DIABETES MELLITUS PATIENTS

Ophthalmology

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ABSTRACT

Diabetic retinopathy is a leading cause of blindness in adults and is unique in displaying a uniform epidemiological profile worldwide. Early detection and identification of the risk for the development of diabetic complications are important strategies to minimize the human suffering and costs incurred from the disease.

The objective of the study is to determine the strength of association between urinary albumin excretion and the severity of Diabetic retinopathy.

KEYWORDS

Diabetic, Retinopathy, Epidemiology, Albuminuria, Fundus Finding.

INTRODUCTION:

Diabetes Mellitus can affect the eye in many ways. Diabetic retinopathy is the most common and perhaps the most serious of all ocular complication¹. It is considered the hallmark of generalized micro angiopathy occurring in the diabetic patient. While there are multiple risk factors which have been associated with the development and progression of retinopathy, the duration of the disease and the age of the patient are said to be the strongest predictors. Other risk factors like hypertension, pregnancy, blood glucose level control and presence of nephropathy are shown to have a strong association. Micro albuminuria, Dyslipidemia, BMI and smoking are some of the factors whose role as predictors of diabetic retinopathy is not well established. Increased permeability of retinal vasculature is described as one of the mechanisms in the pathology of diabetic retinopathy. Various studies have been conducted to ascertain this pathological increase in permeability with inconclusive and ambiguous results. Studies have been conducted to correlate diabetic retinopathy and urine albumin excretion, regarding them as two entities representing retinal and renal vasculature respectively. However it is not absolutely certain that whether the increased permeability is limited to retinal vessels or part of generalized micro angiopathy affecting all the vessels of the body. Around 246 million people in the world have diabetes². Apart from its vision threatening effects, the presence of Diabetic retinopathy increases risk of life threatening systemic vascular complications. Early diagnosis and intervention remains the key for preventing development and progression of Diabetic retinopathy and other systemic complications. The prevalence of Diabetic retinopathy in Chennai Urban Rural Epidemiology Eye Study (CURES) in South India was 17.6%, significantly lower than age matched western counterparts³. There is a growing concern for Asia being the region for diabetic epidemic. Despite this the epidemiological data for diabetic retinopathy is scarce^{4,5}. The present study is undertaken to ascertain the correlation and to quantitatively assess the urine albumin excretion with the grade/severity of Diabetic retinopathy.

AIMS AND OBJECTIVES:

To study the relationships between albuminuria and fundus findings of type ii diabetes mellitus patients.

MATERIALS AND METHODS:

This cross-sectional study titled 'One year cross sectional study of relationship between albuminuria and fundus findings of type II Diabetes Mellitus patients' was conducted in department of Ophthalmology, Kanachur Institute of Medical Sciences, Mangalore between December 2017 and December 2018.

SOURCE OF DATA

Patients who presented to our outpatient department and inpatients referred from other departments were evaluated as per the inclusion and exclusion criteria. A total 250 patients were selected during the study period.

INCLUSION CRITERIA

- NIDDM cases, established / recently diagnosed [defined by American Diabetes Association 2007]

- Age > 40 years

EXCLUSION CRITERIA

- Age < 40 years
- Media opacities precluding fundus examination corneal / lenticular / vitreous opacities.
- Patients who have received LASER / Intravitreal treatment for DR.
- Established Renal diseases – Renal Failure / UTI.

PROCEDURE

An informed written consent was obtained in every case. A detailed ocular history and medical history was taken. A detailed general physical examination was performed. Pupils were dilated with 1% tropicamide with 5% Phenylephrine drops. Plain 1% tropicamide was used in hypertensives.

Detailed funduscopy was done by direct ophthalmoscopy, indirect ophthalmoscopy – slit lamp biomicroscope using 78 D Volk lens, and Fundus Camera Kowa V_x-10.

All cases were categorised depending on the presence and absence of diabetic retinopathy. Cases with diabetic retinopathy were graded into 5 classes on the basis of ETDRS classification. Patients with advanced diabetic retinopathy, those with high risk fundus features requiring immediate vitreoretinal intervention [in the form of LASER/intravitreal anti-VEGF/surgical] were referred to vitreoretinal surgeon for further management.

Sample collection and Storage

Urine samples were collected in autoclaved, dry corked glass bottles. Not less than 10ml of random, mid stream urine samples were collected from patients after 1 hour of rest prior to collection. The samples were immediately stored in the freezer.

Laboratory investigations

No urine sample was kept for a period of more than 2 weeks in the freezer. The samples were brought down to room temperature and centrifuged. Assessment of urine albumin levels was done by immunoturbidometric assay using a fully automated analyser.

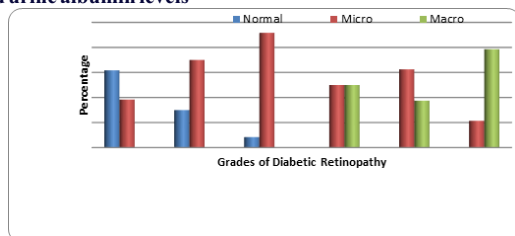
RESULTS:

Table – 1 : Distribution of severity/grade of diabetic retinopathy and urine albumin levels

Grade of Diabetic Retinopathy		Urine albumin Level			Total
		Normal	Micro	Macro	
No Retinopathy	No	111	69	0	180
	%	61.7%	38.3%	.0%	100.0%
Mild NPDR	No	6	14	0	20
	%	30.0%	70.0%	.0%	100.0%
Moderate NPDR	No	2	22	0	24
	%	8.3%	91.7%	.0%	100.0%

Severe NPDR	No	0	2	2	4
	%	.0%	50.0%	50.0%	100.0%
Very severe NPDR	No	0	5	3	8
	%	.0%	62.5%	37.5%	100.0%
PDR	No	0	3	11	14
	%	.0%	21.4%	78.6%	100.0%
Total	No	119	115	16	250
	%	47.6%	46.0%	6.4%	100.0%

Figure 1: Distribution of severity/grade of diabetic retinopathy and urine albumin levels



DISCUSSION:

In the Study, among the 180 patients with no retinopathy 61.7% had normoalbuminuria and 38.3% had microalbuminuria. Among the 20 mild NPDR patients, 30% had normoalbuminuria and 70% had microalbuminuria. In 24 patients with moderate NPDR 8.3% had normoalbuminuria and 91.7% had microalbuminuria. In the 4 severe NPDR patients 50% had microalbuminuria while the other 50% had microalbuminuria. In the very severe NPDR, 62.5% had microalbuminuria and 37.5% had microalbuminuria. In 14 PDR patients, 21.4% had microalbuminuria and 78.6% had macroalbuminuria.

Estacio et al demonstrated that the prevalence of retinopathy was higher with each increasing stage of urine albumin excretion ($p < 0.001$)⁶.

The percentage of patient with diabetic retinopathy for each category was 51% (normoalbuminuria), 62% (microalbuminuria) and 75% (overt albuminuria). Server et al demonstrated that overnight albumin excretion rate showed the best correlation to diabetic retinopathy. Jan Holm et al reported that the prevalence of retinopathy was more with macroalbuminuria (58%)⁷.

Parvanova et al demonstrated that relative to patients without retinopathy, those with proliferative diabetic retinopathy had significant association with albuminuria ($p < 0.05$).

Erasmus observed that among Nigerian diabetics with normoalbuminuria, 12% had retinopathy when compared to 18% in the microalbuminuria group⁸.

CONCLUSION

This study demonstrates that overt albuminuria was associated only with those patients who had either severe NPDR, Very severe NPDR and PDR. It also showed that none of these three grades of diabetic retinopathy had normal urine albumin excretion.

REFERENCES

1. Ning Cheung, Paul Mitchell, Tien Yin Wong. Diabetic Retinopathy. Lancet. 2010; 376: 124-136
2. International Diabetes federation. Diabetes atlas 2007. <http://www.eatlas.idf.org>
3. Chan J C, Malik V, Jia W, et al. Diabetes in Asia : epidemiology, risk factors and pathophysiology. JAMA 2009; 301: 2129 – 40.
4. Wong TY, Loon SC, Saw SM. The epidemiology of age related eye diseases in Asia. Br J Ophthalmol 2006; 90: 506-11
5. M. Rema, R. Pradeepa. Diabetic Retinopathy : An Indian Perspective. Indian J Med Res 125, March 2007, pp 297-310.
6. H.H. Parving, C.E. Mogensen, M.C. Thomas. 'Poor prognosis in proteinuric type 2 diabetic patients with retinopathy: Insight from RENAAL study'. Q J Med 2005; 98: 119-26.
7. Nielsen, Jan Holm, Lars Hemmingson. 'Diabetic retinopathy related to the degree of tubular proteinuria and albuminuria in IDDM'. Acta Ophthalmologica; 1990(68): 270-74.
8. Parvanova Aneliya, Iliev Ilian, Fillipino Marco. 'Insulin resistance and proliferative retinopathy: a cross sectional study of 115 patients'. Journal of clinical endocrinology & metabolism. Sept 2004; 89 (9): 4371-76.