https://doi.org/10.29309/TPMJ/2022.29.07.6861

The Professional Medical Journal
www.theprofesional.com
2022, Volume, 29 Issue, 07

ORIGINAL ARTICLE

Diabetic retinopathy in diabetic patients versus diabetic with co-morbid hypertensive patients.

Mohammad Alam[1]

Article Citation: Alam M. Diabetic retinopathy in diabetic patients versus diabetic with co-morbid hypertensive patients. Professional Med J 2022; 29(7):1041-1044. https://doi.org/10.29309/TPMJ/2022.29.07.6861

ABSTRACT… Objectives: To find out severity of diabetic retinopathy in diabetic versus diabetic with co-morbid hypertensive patients in type II diabetes mellitus. **Study Design:** Comparative study. **Setting:** KDA Teaching Hospital Kohat. **Period:** March 2017 to December 2020. **Material & Methods:** This comparative study focused on severity of diabetic retinopathy was conducted on only type II diabetic patients versus type II diabetic with co-morbid hypertensive patients. Two groups A for diabetic and B for diabetic with co-morbid hypertension patients were made. Proper proforma of diabetic age and severity of diabetic retinopathy was designed for record. First 200 patients with only diabetes mellitus comprising of 123(61.5%) male and 77(38.5%) female were registered in group A and first 200 diabetic patients with co-morbid hypertension comprising of 97(48.5%) male and 103(51.5%) female were registered in group B. Proper informed consents obtained from all patients. Both A and B groups were subdivided into A 1 with diabetic age upto 10 years had 105(52.5%) patients, A 2 with diabetic age 11-20 years had 60(30%) patients, A 3 with diabetic age > 20 years had 35(17.5%) patients and B 1 with diabetic age upto 10 years had 117(58.5%) patients, B2 with diabetic age 11-20 years had 55(27.5%) patients and B3 with diabetic age >20 years had 28(14%) patients. **Results:** Group A. A 1 had 9(8.57%) patients with non-proliferative diabetic retinopathy. A 2 had 13(21.66%) with non-proliferative and 4(6.66) % with proliferative diabetic retinopathy patients. A 3 had 15 (42.85%) non-proliferative and 16(45.71%) proliferative diabetic retinopathy patients. Group B. B 1 had 14(11.96%) patients with non-proliferative diabetic retinopathy. B 2 had 16(29.09%) with non-proliferative and 10(18.18%) with proliferative diabetic retinopathy patients. B 3 had 12(42.85%) non-proliferative and 14(50)% proliferative diabetic retinopathy patients. **Conclusion:** Diabetic retinopathy is adversely affected by co-morbid hypertension.

Kew words: Diabetes Mellitus (DM), Diabetic Retinopathy (DR), Non-proliferative Diabetic Retinopathy (NPDR), Proliferative Diabetic Retinopathy (PDR).

INTRODUCTION

Diabetes Mellitus is a systemic disease characterized by high glucose level is very emerging globally. It is estimated that by year 2014, about 10.4% adult population will be affected with this disorder.[1] DM has enormous health threats in various forms like cardiovascular and small vessels complications.[2] DM causes diabetic retinopathy, nephropathy, neuropathy, myopathy and cardiomyopathy. DR is micro vascular complications affecting about one third of all diabetic patients.[3] DR may be in stage of NPDR and PDR. Early NPDR may be asymptomatic but with increase in diabetic age becomes symptomatic in various stages even leads to PDR with vision threatening complications.[4] DR depends upon diabetic age, glycemic control and co-morbid hypertension and other factors which affect the severity of DR.[5] Hypertension is very important risk factor for worsening DR.[6] Guidelines 2017 for the prevention, detection, evaluation and management of hypertension in diabetic adult patients recommend that Blood Pressure < 130/80 mmHg in adults should be maintained to prevent worsening and further complications of DR.[7] Multiple population based studies have reported strong association of severity of DR with co-morbid hypertension.[8,9]

Patients who have DM associated with

1. FCPS, Associate Professor Ophthalmology, KMU-IMS Kohat.

Correspondence Address:
Dr. Mohammad Alam
Department of Ophthalmology
KMU-IMS Kohat.
malamktk@gmail.com

Article received on: 21/10/2021
Accepted for publication: 28/12/2021

concomitant hypertension have increased risk of DR. There are multiple reports that DR increases 1.7 times more with hypertension and 1.19 times more risk of vision threatening complications with every 10 mmHg increase in blood pressure.[10,11] So to prevent DR, there should be good glycemic control along with control of hypertension. This study aim is to compare DR in type II diabetic patients versus type II diabetic with co-morbid hypertensive patients.

MATERIAL & METHODS

This comparative study focused on severity of diabetic retinopathy was conducted on only type II diabetic patients and type II diabetic with co-morbidity hypertensive diabetic patients from March 2017 to December 2020. Two groups A for diabetic and B for diabetic with hypertension patients were made. Proper proforma of diabetic age and severity of diabetic retinopathy was designed for record. First 200 patients with only diabetes mellitus comprising of 123(61.5%) male and 77(38.5%) female were registered in group A and first 200 diabetic patients with co-morbid hypertension comprising of 97(48.5%) male and 103(51.5%) female were registered in group B (Table-I). Proper informed consents were obtained from all patients. History of diabetic age, types of diabetes and hypertension was taken. The pupils of all patients were dilated with tropicamide eye drops. Fundi were examined with indirect ophthalmoscope and slit lamp indirect bimicroscopy. The severity of retinopathy was recorded in proforma according to diabetic age. Both A and B groups were subdivided into A 1 with diabetic age upto 10 years had 105(52.5%) patients, A 2 with diabetic age 11-20 years had 60(30%) patients, A 3 with diabetic age > 20 years had 35(17.5%) patients (Table-II) and B 1 with diabetic age upto 10 years 117(58.5%) patients, B2 with diabetic age 11-20 years had 55(27.5%) patients , B3 with diabetic age >20 years had 28(14%) patients (Table-III).

RESULTS

Group A. A 1 had 96(91.42%) patients with normal fundi 9(8.57%) patients with NPDR and no patient had PDR. A 2 had 43 (71.66%) with normal fundi 13(21.66%) with NPDR and 4 (6.66%) with PDR patients. A 3 had 4(11.42%) patients with normal fundi 15(42.85%) patients with NPDR and 16(45.71%) PDR patients (Table-IV).

Group B. B 1 had 103 (88.03%) with normal fundi 14(11.96%) patients with NPDR. B 2 had 29 (52.72%) patients with normal fundi, 16(29.09%) with NPDR and 10(18.18%) with PDR patients. B3 had 2(7.14%) patients with normal fundi, 12(42.85%) with NPDR and 14 (50%) PDR patients (Table-V).

Groups	Male	Female
A	123(61.5%)	77 (38.5%)
B	97(48.5%)	103(51.5)

Table-I. Gender in groups. Each group has 200 patients.

Diabetic Age	Number of Patients	Percentage
A1. Upto 10 years	105	52.5
A2. 11-20 years	60	30
A3. >20years	35	17.5

Table-II. Diabetic age Group A

Diabetic Age	Number of Patients	Percentage
B1. Upto 10 years	117	58.5
B2. 11-20 years	55	27.5
B3. >20years	28	14

Table-III. Diabetic age Group B

Groups	Normal Fundi	NPDR	PDR	Total Patients
A 1	96 (91.42%)	9 (8.57%)	0 (0%)	105
A 2	43 (71.66%)	13 (21.66%)	4 (6.66%)	60
A 3	4 (11.42%)	15(42.85%)	16 (45.71%)	35

Table-IV. Diabetic retinopathy Group A.

Groups	Normal Fundi	NPDR	PDR	Total Patients
B 1	103 (88.03%)	14 (11.96%)	0	117
B 2	29 (52.72%)	16 (29.09%)	10 (18.18%)	55
B 3	2 (7.14%)	12 (42.85%)	14 (50%)	28

Table-V. Diabetic retinopathy Group B

DISCUSSION

Severity of DR is directly proportional to diabetic age. Usually DR starts after 5-6 years of diabetic age. With good glycemic control DR process can be delayed. If the diabetic patients have co-morbid hypertension the retinopathy process is accelerated. This study reports that DR is more progressive and severe in patients who have hypertension as compared to simple diabetic patients. Looking at the results in Table-IV and Table-V, it is clear that there is exponential rise in diabetic retinopathy if diabetic patients have co-morbid hypertension.

The variations in results are subjected to many factors like no proper history of diabetic age, hypertension and compliance of treatment and follow up. Many national and international studies have been done on this aspect supporting our results. Memon S, Ahsan S, Riaz Q have reported that DR starts usually after 10 years of diabetic age and associated hypertension has increased its severity.[12] Rani PK, Rehman R, Chandrakantan A have reported that diabetic age is very important factor in inducing DR and DR occurs in most patients after 10 years of diabetic age.[13] Niazi MK, Akram A, Naz MA, Awan S have observed that diabetic age is strong independent risk factor and DR occurs after 10 years of diabetic age.[14] Bano S, Soni V, Dubey A have found out 17.86% NPDR, 28.60% PDR and 53.60% advanced DR in diabetic patients with associated hypertension, anemia, dyslipidemia and low socioeconomic status.[15]

Liu L, Quang ND, Banu R conducted study on DR associated with hypertension and reported strong association of vision threatening DR in diabetic patients with concomitant hypertension.[16] Li YT, Wang Y, Hu XJ, have found in their study that DR was more pronounced in diabetic patients associated with uncontrolled hypertension as compared to controlled hypertension giving correlation test $p < 0.001$.[17] Lee JH, Kim YA, Lee Y have reported vascular complication in the form of DR in interarm blood pressure difference in 28.77% patients.[18] Atchison E, Barkmeire A have noted found in their study increased severity of DR in patients associated with hypertension and the progression is decelerated if hypertension is well controlled.[19] Monique S, Roy MD have reported that DR had been directly related to diabetic age and associated hypertension increased three times more risk to PDR and according to another study simple diabetic patients have less severe DR which gets worse if associated with hypertension.[20] Ramanathan RS study also reveals that diabetic retinopathy gets worse with co-morbid hypertension.[21]

CONCLUSION

Diabetic retinopathy is serious ocular complication. Severity of DR depends upon diabetic age and glycemic control. Severity of DR gets worse if it is associated with co-morbid hypertension, hyperlipidemia and poor glycemic control. All diabetic patients after diabetic age of 6 years should be regularly for DR. If there is concurrent hypertension, it should be properly addressed and treated.

REFERENCES

1. Ogurtsova, K; da Rocha fernandes, J.D; Huang, Y; Linnenkamp, U;Guariguata, L; Cho, N.H.; Cavan, D.; Shaw, J.E.; Makaroff, L.E. **IDF diabetes Atlas Global estimates for the prevalence of diabetes for 2015 and 2040.** Diabetes Res. Clin Pract. 2017,128,40-50.

2. BecKman, J.A.; Creager, M.A. **Vascular complications of diabetes.** Circ Res. 2016, 118, 1771-1785.

3. Harding J.L, Pavkov M.E. Magliano D.J. Shaw J.E. Gregg E.W. **Global trends in diabetes complications: A review of current evidence.** Diabetologia 2019, 62,3-16.

4. Simo-Servat O. Hernandez C. Simo R. **Diabetic retinopathy in the context of patients with diabetes.** Ophthalmic Res. 2019, 62,211-217.

5. Ting D.S.W, Cheung G.C.M, Wong T.Y. **Diabetic retinopathy. Global prevalence, major risk factors, screening practices and public health challenges: A review.** Clin. Exp. Ophthalmol. 2016, 44,260-277.

6. **Tight blood pressure control and risk of macrovascular and microvacsular complications in type 2 diabaetes: UKPDS 38, UK Prospective diabetes study group.** BMJ, 1998; 317(7160):703-13 PMID: 9732337; PubMed Central PMCID: PMC28659.

7. Whelton PK, Carey RM, Aronow WS, Casey DE Jr, Collins KJ, Dennison Himmelfarb C, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA. **Guidelines for the Prevention, Detection, Evaluation and management of high blood pressure in adults; A report of the American college of cardiology/American Heart association task force on clinical practice Guidelines.** J Am Coll Cardiol. 2017. Epub2017/11/18.

8. Wong TY, Kleirn R, Islam FM, Cotch M F, Folsom AR, Klein BE, et al. **Diabetic retinopathy in a multi-ethnic cohort in the United States.** AM. J Ophthalmol. 2006; 141(3):446-55.

9. Klein R, Sharrett AR, Klein BE, Moss SE, Folsom AR, Wong TY, et al. **The association of atherosclerosis, vascular risk factors, and retinopathy in adults with diabetes: The atherosclerosis risk in communities study.** Ophthalmology, 2002; 109(7):1225-34.

10. Zheng Y, Lemoureux EL, Lavanya R, et al. **Prevalence and risk factors of diabetic retinopathy in migrant Indians in an urbanized society in Asia: The Singapore Indian eye study.** Ophalmology. 2012; 119(10):2119-24.

11. Walraven I, Mast MR, Hoekstra T, et al. **Real-world evidence o f suboptimal blood pressure control in patients with type 2 diabetes.** J Hypertens. 2015; 33:2091-8.

12. Memon S, Ahsan S Riaz Q, Basit A, Sheikh SA, Fawad A, Shera S. **Frequency, severity and risk indicators of retinopathy in patients with diabetes screened by fundus photographs: A study from primary health care.** Pak J Med Sci 2014; 30(2):366-372.

13. Rani PK, Raman R, Chandrakantan A, Pal SS, Perumal GM, Sharma T: **Risk factors for diabetic retinopathy in self reported rural population with diabetes.** J Postgrad Med 2009, 55:92-96.

14. Niazi MK, Akram A, Naz MA, Awan S. **Duration of diabetes as a significant factor for retinopathy.** Pak J Ophthalmol 2010, Vol 26 No 4.

15. Bano S, Som V, Dubey A, Kumar K. **Risk factors associated with diabetic retinopathy among patients with type 2 diabetes mellitus in central India.** Indian Journal of Clinical and Experimental Ophthalmology, July-September 2019; 5(3):335-338.

16. Liu L, Quang ND, Banu R, Kumar H, Tham YC, Cheng CY, Wong TY, Sabanayagam C. **Hypertension, blood pressure control and diabetic retinopathy in a large population-based study.** PLoS One. 2020 Mar 5; 15(3):e0229665.

17. Li YT, Wang Y, Hu XJ, Chen JH, Li YY, Zhong QA et al. **Association between systolic blood pressure and diabetic retinopathy in both hypertensive and normotensive patients with type 2 Diabetes: Risk factors and Health care implications.** Healthcare 2021, 9,580.

18. Lee JH, Kim YA, Lee Y Bang WD, Seo JH. **Association between interarm blood pressure differences and diabetic retinopathy in patients with type 2 diabetes.** Diabetes and Vaccular Disease Research. July-August 2020: 1-9.

19. Atchison E, Barkmeier A. **The role of systemic risk factors in diabetic retinopathy.** Cirr Ophthalmol Rep (2016) 4: 84-89.

20. Roy MS. **Diabetic retinopathy in African Americans with type 1 diabetes: The New Jersey 725: I. Methodology, population, frequency of retinopathy, and visual impairment.** Archives of ophthalmology. 2000 Jan 1; 118(1):97-104.

21. Ramanathan RS. **Correlation of duration, hypertension and glycemic control with microvascular complications of diabetes mellitus at a tertiary care hospital.** Integr Mol Med 2017 Vol 4(1): 1-4.

AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Mohammad Alam	Principal author