



## Diabetic Retinopathy Severity in patients with Diabetic Foot Syndrome

Authors

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### Abstract

**Background:** Diabetes is a common comorbidity in today's world with many complications. Diabetic retinopathy and diabetic foot ulcer are frequently encountered complications of diabetes and account for a large number of hospital visits.

**Objective:** The purpose of conducting this study is to assess the retinopathy status of patients with diabetic foot syndrome and to evaluate any relation between their severities.

**Methods:** Patients with diabetic foot syndrome visiting GMC Doda over a period of one and half month were subjected to ophthalmoscopic examination for documentation of their diabetic retinopathy severity.

**Results:** Twenty five patients were enrolled in the study, all of whom had type 2 DM of at least 5 years duration. All patients had some degree of diabetic neuropathy and associated diabetic foot syndrome. No correlation was found between the severity of diabetic retinopathy and that of diabetic foot syndrome (p value = .56).

**Conclusion:** Our study did not find any correlation between the severity of diabetic retinopathy and that of diabetic foot syndrome.

**Keywords:** Diabetic foot, Diabetic retinopathy, neuropathy.

### Introduction

The incidence of diabetes and its rising prevalence due to increased survival among diabetics make it one of the common comorbidities in today's world. A study conducted in September 2019 reported the global prevalence of diabetes in 2019 to be 463 million, that accounts for 9.3% of the world's population<sup>[1]</sup>. The number of diabetic patients in India is estimated to increase to around 80 million in India, by the year 2030<sup>[2]</sup>. This high prevalence of diabetes comes with high prevalence of diabetic complications. These include both microvascular and macrovascular complications.

The major macrovascular complications of diabetes are cardiovascular disease, stroke and peripheral vascular diseases. The microvascular complications include neuropathy, retinopathy and nephropathy. However, the disability-free life expectancy has decreased considerably<sup>[3]</sup>.

### Diabetic foot

Diabetic foot is a dreaded complication of diabetes which affects 15% of all diabetics in their lifetime<sup>[4]</sup> and accounts for 85% of all amputations<sup>[5]</sup>. The pathogenic mechanism accounting for diabetic foot is a triad consisting of neuropathy, ischaemia and infection. The prevention of this dreaded complication is in

meticulous blood sugar control and awareness among the patients, resulting in early consultation in case of a foot ulcer. Barefoot walking, ignorance, late presentation by patients are some of the factors which contribute to high incidence of this complication.

### Diabetic Retinopathy

Diabetic retinopathy is a microvascular complication of diabetes, which could range from being asymptomatic to causing severe vision loss. The prevalence of diabetic retinopathy among type 2 diabetics in India in the year 2018 was 21.7%<sup>[6]</sup>. Diabetic retinopathy is classified according to Modified Airlee House ETDRS Classification<sup>[7]</sup>.

### Material & Methods

This is a hospital based, cross sectional study carried out in a tertiary care hospital in Doda (Jammu and Kashmir, India). It comprised of 25 patients with various grades of diabetic foot who visited the Department of Medicine and the Department of Orthopaedics in GMC, Doda over a period of one and half month, i.e 15<sup>th</sup> July 2020 to 30<sup>th</sup> August 2020. An informed consent was taken from the patients enrolled in the study and the procedure explained. All the patients had some degree of diabetic foot at , the time of enrollment. The diabetic foot severity was graded according to the risk classification system of the International Working Group on the Diabetic Foot<sup>[8]</sup>, which is given as under:

Grade 0: Sensations intact

Grade 1: Diminution of protective sensations but without any deformity

Grade 2: Diminished sensation with foot deformities

Grade 3: Previous/ present ulcer or amputation

These patients were then subjected to dilated fundus examination and the retinopathy, if present was classified according to Modified Airlee House ETDRS classification<sup>[7]</sup>.

The demographic data of the patients including age, sex, duration of diabetes, treatment modality used was also collected and the presence or

absence of hypertension was also taken into account.

The statistical analysis was done using SPSS software and the association between DR and DF was studied.

### Results

A total of 25 patients were included in the study of which 16 were males and 9 were females. The average age of the patients enrolled in the study was 62.5 years. All patients had type 2 DM from atleast 5 years and average duration among the patients was 10.16 years. The patients came from varying socioeconomic status and were taking varying types of treatment for control of their blood sugar.

7 patients were on insulin while the others were on oral euglycemic drugs. 14 out of 25 patients had hypertension also in addition to diabetes.

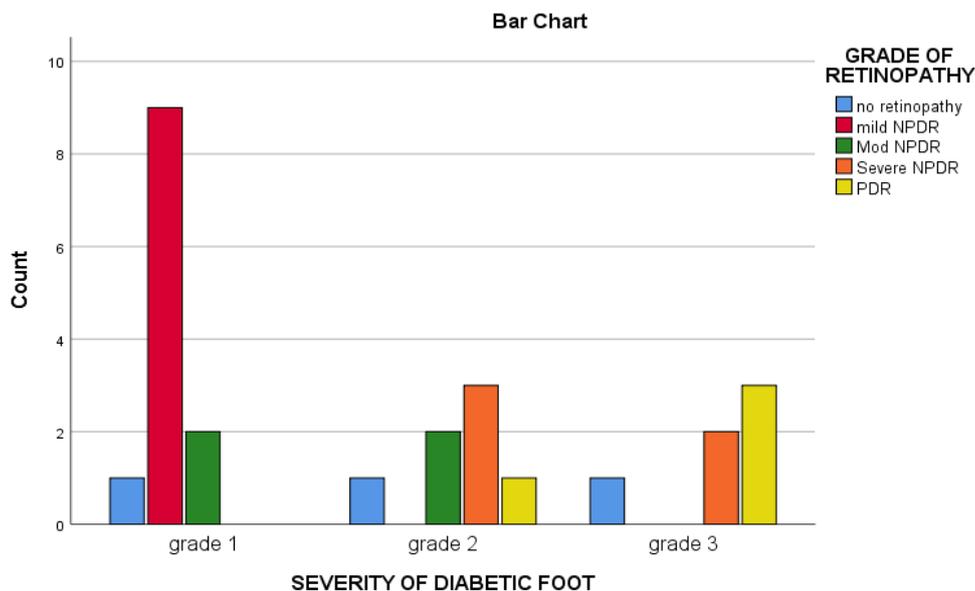
A strong association was found between the duration of diabetes and severity of retinopathy (p value <.01). The severity of diabetic retinopathy was more in patients with both hypertension and diabetes than in those with diabetes alone.

Diabetic foot syndrome also shows a strong correlation with the duration of diabetes (p value <.01).

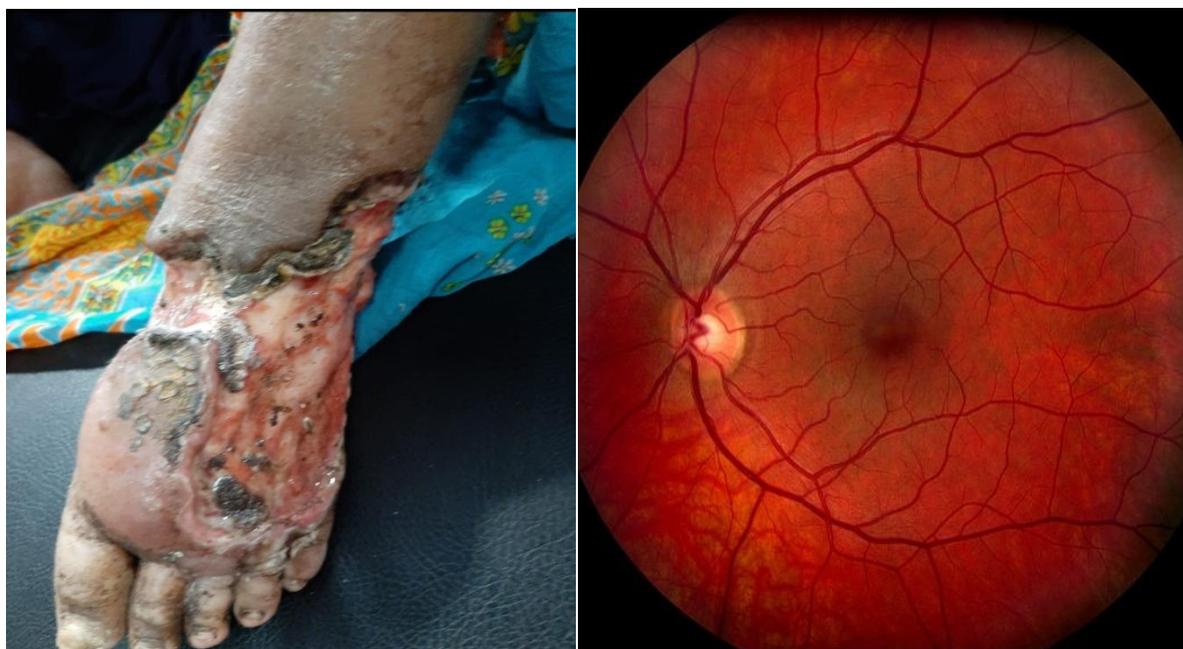
No correlation (p value=.56, by Kendall's tau b test) was found between the severity of diabetic foot and that of diabetic retinopathy as depicted in Table 1. 6 patients out of 25 had diabetic foot severity grade of 3, and 3 out of them had PDR, while 2 had severe NPDR. 1 patient didn't have any signs of diabetic retinopathy. 7 patients were having diabetic foot grade of 2, 1 of which had PDR while others had moderate to severe NPDR. 12 patients had diabetic foot severity grade of 1, and 9 of them had mild NPDR, 1 patient didn't have any sign of diabetic retinopathy and 2 patients had moderate NPDR.

**Table 1:** Association of Diabetic Retinopathy and Diabetic Foot

Diabetic retinopathy Grading	Diabetic foot Grading			Total
	Grade 1	Grade 2	Grade 3	
No DR	1	1	1	3
Mild NPDR	9	0	0	9
Moderate NPDR	2	2	0	4
Severe NPDR	0	3	2	5
PDR	0	1	3	4
Total	12	7	6	25



**Fig 1:** Severity of diabetic foot Vs Grade of retinopathy



**Fig 2:** Patient with grade 3 foot ulcer and no evidence of diabetic retinopathy

**Discussion**

Diabetes is a common comorbidity in today’s world. The complications of diabetes are also

rising with a rise in number of diabetics. Diabetic retinopathy and diabetic foot ulcer are frequently encountered complications of diabetes which

account to a major decline in the Physical Quality of Life Index of these patients.

In our study, we included patients between the age group of 50-80 years and the mean age of patients in our study was 62.5 years. The mean age of patients in the study conducted by Karam *et al*<sup>[9]</sup> was 59.28 years and that in the study conducted by Hwang *et al*<sup>[8]</sup> was 66.7 years.

Our study included 64% males, whereas, Karam *et al*<sup>[9]</sup> in their study had 75.27% males. The average duration of diabetes in the patients included in our study was 10.16 years, whereas the same in the study by Karam *et al*<sup>[9]</sup> was 12.9 years.

No correlation is found between the severity of diabetic retinopathy and that of diabetic foot syndrome in our study. This corresponds to the study conducted by Hwang *et al*<sup>[10]</sup> but doesn't correspond to the study by Karam *et al*<sup>[9]</sup> in their study showed a strong correlation between the severity of the two diabetic complications.

Hypertension was found to be a common association in patients with diabetic retinopathy and diabetic foot ulcer. This finding corresponds to the result of the studies done by the previous researchers.

### Conclusion

Diabetes mellitus is a chronic disease having no cure in the present day, the main aim being directed to its control. The number of diabetics in the world are rising at an alarming speed and so are its complications. The present study concludes that diabetic foot severity doesn't correlate with diabetic retinopathy severity. However, the presence of diabetic foot mandates urgent ophthalmological referral in all patients due to common risk factors of both the conditions, i.e. the duration of diabetes and the presence of hypertension.

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**Conflicts of Interest:** None declared

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