Original Article

# Incidence of Angiographic Patterns of Diabetic Maculopathy

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**ABSTRACT**

**Objective:** The present study was carried out to observe the incidence of different types of diabetic maculopathy on fluorescein angiography to offer the appropriate treatment modality to the patients.

**Study Design:** In this interventional study the patients with diabetic retinopathy were selected by simple random technique.

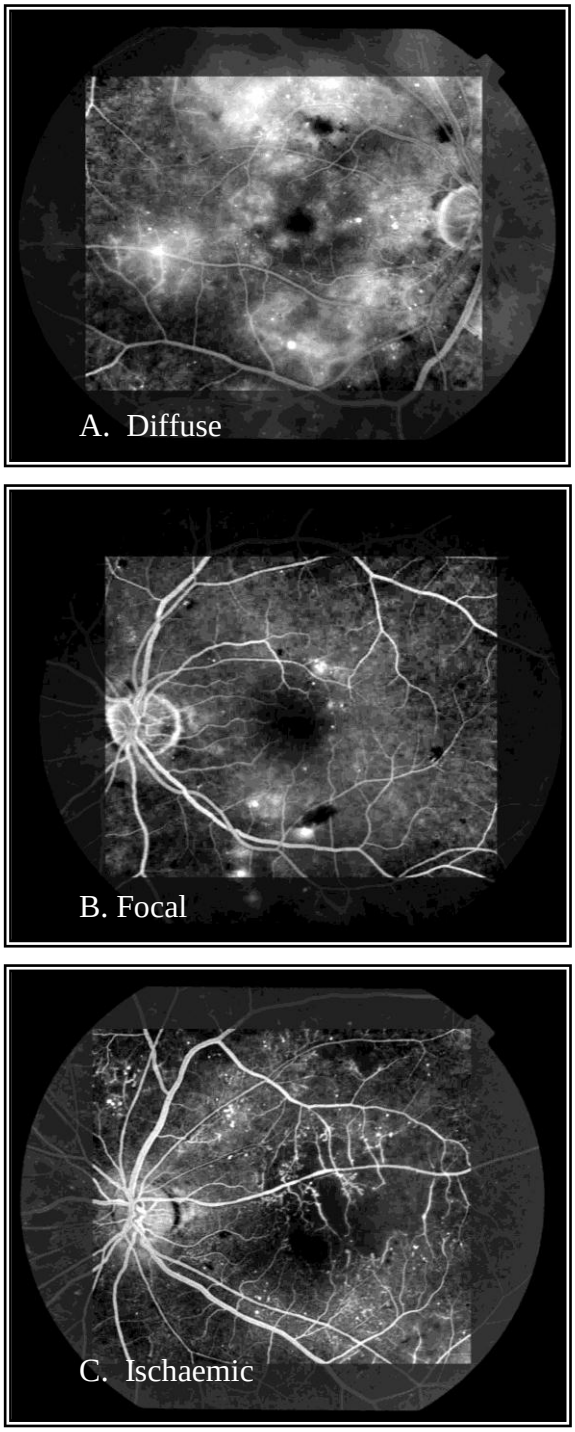
**Period:** From August to December 2009. **Subjects and Settings:** In present study 130 eyes of 65 patients were included; 30 males and 35 females with age ranging from 43 to 59 years. These patients were examined in out patient department and were diagnosed as cases of diabetic retinopathy with maculopathy. They were advised Fundus Fluorescein Angiography (FFA) which was performed in Diagnostic & Research Centre, Department of Ophthalmology, Allied Hospital, Faisalabad. The angiographic patterns of different types of diabetic maculopathy were observed.

**Results:** Out of 130 eyes, different angiographic patterns of diabetic maculopathy were seen in 115 eyes; Diffuse maculopathy in 77 eyes, Focal type in 23 eyes and Ischaemic type in 15 eyes. No maculopathy was seen in 14 eyes while in 1 eye premacular haemorrhage obscured the view.

**Key Words:** Diabetic Maculopathy, Focal, Diffuse, Ischaemic, Fundus Fluorescein Angiography (FFA).

## INTRODUCTION

Diabetic retinopathy is genetically determined and depends on the level of hyperglycaemia and duration of diabetes.[1,2] Diabetic retinopathy is the leading cause of blindness all over the world. The loss of vision is either because of proliferative retinopathy and its complications or diabetic maculopathy.[3] The proliferative retinopathy results into vitreous haemorrhage and tractional retinal detachment.[4] Diabetic maculopathy may be focal, diffuse or ischaemic type. The focal type is caused by leakage from a single or a few microaneurysms causing localized oedema. The diffuse type is caused by leakage from multiple microaneurysms and increased vascular permeability due to widespread microvascular pathology leading to generalized macular oedema. The ischaemic type is caused by the capillary occlusion resulting into decrease in the macular perfusion leading to disturbance of macular function.[5] Although the maculopathy is subdivided into three clinical types, depending upon the predominant clinical features, there is often an overlap between these. The types of diabetic maculopathy can only be differentiated more precisely by FFA. The key to the treatment of diabetic maculopathy is laser photocoagulation. Different modes of laser photocoagulation are offered to the patients having different types of maculopathy. For focal type, localized confluent laser burns are applied to the lesions. For diffuse maculopathy, macular grid photocoagulation is applied. The most important point is that in the ischaemic type, the laser photocoagulation must be avoided to the area of capillary occlusion. The other cause of loss of vision in maculopathy is traction at macula caused by epiretinal membranes due to partial posterior vitreous detachment. The laser photocoagulation is also not recommended in cases of macular traction, rather surgical mode of treatment may be offered.[6] The Optical Coherence Tomography (OCT) can be helpful to diagnose traction at the macula and to quantify the macular oedema.[7, 8]




**Angiographic Patterns of Diabetic Maculopathy**

**METHODS AND SUBJECTS**

Total 130 eyes of 65 patients were included in this study. Out of these, 30 patients were male and 35 were female. Their age was from 43 to 59 years with an average of 53.17 years. All these patients were examined in out patient department after dilatation of pupils with 1% tropicamide eye drops every 10 minutes for three times. Detailed fundus examination was performed with the help of direct ophthalmoscope, Indirect ophthalmoscope, slit lamp biomicroscopy, with special emphasis to the presence of microaneurysms, cottonwool spots, hard exudates, dot and blot haemorrhages, macular oedema, presence of shunt vessels, neovascularization, subhyloid haemorrhages, fibrovascular proliferation and tractional retinal detachment. FFA was performed on all these patients in Diagnostic & Research Centre in Department of Ophthalmology, Allied Hospital, Faisalabad after taking the informed written consent. The pupils were dilated by instillation of 1% tropicamide eye drops in all cases and phenylephrine 10% eye drops in resistant, non hypertensive cases. 20G, I.V. canula was passed. Colour and red free fundus photographs were taken with latest Topcon fundus camera model TRC 50DX with incorporated, Image-net software. 3ml of 25% fluorescein sodium was injected intravenously and serial photographs were taken. All the measures, for adverse drug reactions and resuscitation, were observed by keeping emergency medicines at hand. In this study we did not encounter with any serious adverse reaction. Only some patients felt nausea and a few had vomiting. These fundus photographs were interpreted according to the internationally accepted parameters. Microaneurysms appeared as small discrete hyperfuorescent spots, some with leakage of the dye in the late photographs. Cottonwool spots appeared as areas of hypofluorescence with capillary dropout. Hard exudates appeared as autofluorescent areas with hyperfluorescence in those areas. Blot haemorrhages appeared as hypofluorescent areas because of masking the fluorescence. Macular oedema appeared as area of hyperfluorescence which increased with time. In cystoid macular oedema classical flower petals pattern of hyperfluorescence was seen. In shunt vessels there was no leakage of the dye. In new vessels and fibrovascular tissue there was profuse leakage of the dye.

**RESULTS**

There were total 65 patients; 35 females ( 53.85%) and 30 males (46.15%). All these patients had diabetic retinopathy. Out of 130 eyes, we noticed

non-proliferative diabetic retinopathy (NPDR) in 93 eyes (71.54%) and proliferative diabetic retinopathy (PDR) in 37 eyes (28.46%). The different angiographic patterns of diabetic maculopathy were seen. In 77 eyes there was diffuse maculopathy, in 23 eyes there was focal maculopathy while there were 15 eyes with ischaemic maculopathy. In 14 eyes no maculopathy was observed and in 1 eye macula could not be seen due to the presence of pre macular haemorrhage. Over all maculopathy was seen in 115 eyes (88.48 %) as shown in table 1.

**Table 1:**
**Distribution of Different types of Diabetic Maculopathy**

| Type of Maculopathy | No. of Patients | Percentage |
|---|---|---|
| Diffuse | 77 | 59.24 |
| Focal | 23 | 17.69 |
| Ischaemic | 15 | 11.55 |
| No maculopathy | 14 | 10.81 |
| Macula not visible | 01 | 0.71 |
| **Total** | **130** | **100.0** |

## DISCUSSION

The cause of deterioration of vision in diabetic patients is mainly the diabetic maculopathy or complications of proliferative diabetic retinopathy. The duration of diabetes is considered the most important predictor for development of diabetic retinopathy and hence maculopathy. Patz and Murphy (1985)[9] observed diabetic retinopathy in 50 % of patients with duration of diabetes of 10 years, in 70 % with duration of 15 years and in 95 % of the patients with duration of 25 years. The maculopathy presents in different clinical and angiographic forms in different patients. The patients with early diabetes remain symptom free at least for a few years before the development of maculopathy. It is now generally agreed that fundus changes in a diabetic patient are usually not clinically apparent before 5 years of systemic disease. The visual deterioration starts with the development of maculopathy in the form of microaneurysms, oedema, exudates, and haemorrhages in the macular areas. Generally the different types of diabetic maculopathy are described in three clinical and angiographic settings; Focal, Diffuse and Ischaemic, but practically often there is over lapping between these types. Our findings suggest that diabetic maculopathy appears in both types of retinopathy (NPDR, PDR). We observed the incidence of diabetic maculopathy was 88.48% in our study. Aiello et al[10] (1982) reported similar results in their study. Clark et al[11] (1994) reported an incidence of 72% of diabetic maculopathy in his series. In a series reported by Nizan Kowska et al[12] (1995) reported that incidence of diabetic maculopathy was 81.6%. The results of these studies are comparable with our results. Bodansky et al[13] found 43% of cases having maculopathy in their study. This is different from our results. The reason of this difference may be the delayed consultation of the patient to an ophthalmologist in our society.

## CONCLUSION

The treatment modalities of three types of diabetic maculopathy are different. For proper diagnosis and management only clinical examination can not be relied upon. FFA must be performed before deciding on the appropriate mode of treatment.

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