

# Retinopathy Changes in a Patient with Anaemia & Type 2 Diabetes Mellitus

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**Abstract:** *Background:* Anaemia, a common complication, is more prevalent in persons with diabetes than in persons without diabetes. [1] Anaemia also develops earlier and is more severe in patients with diabetes than in patients with renal impairment from other causes. Anemia can hasten the progression of micro as well as macro-vascular complications of DM. *Method:* A 42 year old patient presented with sudden diminution of vision in both eyes & generalized weakness. Ophthalmological examination showed reduced visual acuity (CF at 2mt. in both eyes), conjunctival pallor & retinopathy changes in both eye on fundoscopy. Physician opinion sought & Patient was diagnosed as a case of type 2 diabetes mellitus (RBS 187 m/dl, HbA1c 7.5%) and anaemia (Hb 2.3gm/dl). *Result:* Patient was treated for anaemia & type 2 DM & followed up frequently. With treatment his visual acuity improved to 6/6 by end of 3 months & retinal lesions also resolved over time. *Conclusion:* Early diagnosis & timely intervention of anaemia would make a significant impact in managing the micro-vascular complications of DM such as diabetic retinopathy.

**Keywords:** Diabetes mellitus, anaemia, microvascular complications, retinopathy.

## 1. Introduction

Anaemia, a common complication, is more prevalent in persons with diabetes than in persons without diabetes. [1] Anaemia also develops earlier and is more severe in patients with diabetes than in patients with renal impairment from other causes. [2] Anaemia has been associated with the development and progression of both microvascular and macrovascular complications of diabetes. [1]

Anaemia can lead to falsely low HbA1c levels, which may result in under treatment of hyperglycemia, which in turn will contribute to the progression of both microvascular and macrovascular diabetic complications. [3]

Retinopathy is the major cause of morbidity in patients with diabetes and is increasing globally with the total number of people with DM. [4,5] Meanwhile, improvements of healthcare and specific treatments have increased the life expectancy and survival rate of the diabetic patients. Increased life expectancy is associated with higher prevalence of DM complications and lower life quality of the patients. One of the most important DM complications is diabetic retinopathy (DR). Various factors are associated with the development and severity of DR including high blood pressure, proteinuria, duration of DM, administration of insulin and renal disease. [6] High glycosylated haemoglobin, diabetic neuropathy, low serum albumin, younger age and also low hematocrit has been reported as risk factors for the development of more severe form of DR (high risk proliferative DR) and visual loss.

Anaemia is suggested as another long term complication of DM and defined as hemoglobin level less than 13 g/dl in men and 12g/dl in women. [7,8] the prevalence of anaemia in DM patients is reported as 14-48%. [9]

## 2. Materials & methods

A 42 year old patient presented to Ophthalmology outpatient department with complains of generalized weakness since 1 month & sudden diminution of vision in both eyes since 2

weeks. Patient gave the history of generalized weakness & easy fatigueness while working since 1 month which was insidious in onset, progressive in nature & used to get relieve on taking rest. Patient also gave the history of sudden diminution & blurring of vision in both eyes since 2 month. It was sudden in onset, non-progressive, no aggravating or relieving factor.

No h/o redness of eyes/watering/foreign body sensation/ eye pain/ floaters/ flashes/metamorphopsia.  
No h/o any similar episodes in the past.

### On examination

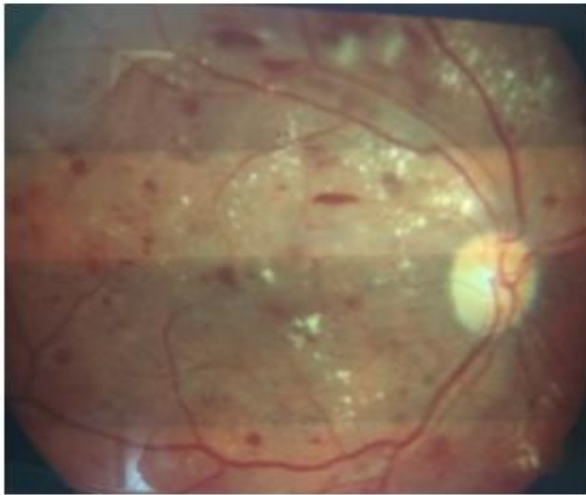
Patient was afebrile  
PR= 70/min, BP=126/80mmhg, RR=16/min

### Ocular Examination:

Visual acuity = CF@ 2mts. in Both eyes, no improvement with pin hole.  
Ocular motility – normal ocular movement of BE.  
Adnexa- normal in both eyes  
Conjunctiva- Pallor (+) in both eyes.  
Cornea, was clear  
AC was normal in depth and contents.  
Pupils were brisk and reactive.  
Lens was clear in both eyes

### Fundus examination

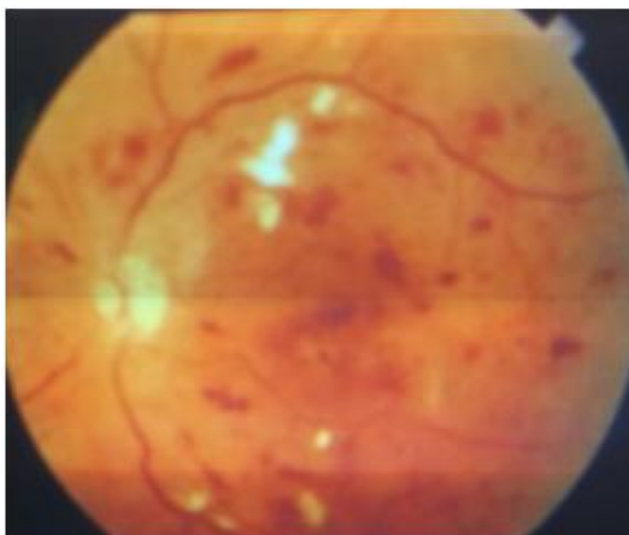
**RE-** Multiple retinal hemorrhages with hard exudates & few soft exudates. (figure 1)  
**LE-** Multiple retinal hemorrhages involving macula, soft exudates all quadrants (figure 2)



**Figure 1: RE-**Multiple retinal hemorrhages with hard exudates & few soft exudates



**Figure 3: RE-** resolving haemorrhages



**Figure 2: LE-** Multiple retinal hemorrhages involving macula, soft exudates (+)



**Figure 4:** Retinal haemorrhage present at macula

**On 2nd follow up-**  
After 2 months- Hb-10.6gm%, FBS-100mg/dl, RBS-137mg/dl.  
VA: RE- 6/6, LE-6/24  
Fundus: RE- clear fundus  
LE- resolving blood clot at macula.

Patient was referred to medicine Opd to rule out any systemic illness. On routine investigations patient Hb was 2.3gm%, His FBS =132mg/dl. HbA1c value was 7.5%. Based on clinical findings & above mentioned investigations patient was diagnosed as a case of type 2 DM with associated anemia. Patient was treated with blood transfusion at monthly intervals for 3 months, oral haematinics (iron, B12, & folate) & oral hypoglycemics. Patient was advised regular follow ups.

### 3. Results

Patient showed significant improvement with treatment on subsequent follow-ups.

#### On first follow up

After 1 month- Hb 6.7gm%, FBS 102mg/dl, RBS 149mg/dl.  
VA: RE: 6/36, LE: - 6/36.  
Fundus: Resolving retinal hemorrhages BE with hemorrhage over macula in LE.



**Figure 5: RE-** clear fundus



Figure 6: LE- resolving blood clot at macula

#### 4. Discussion

Anemia has been associated with development & progression of both micro-vascular & macro-vascular complications of DM.<sup>[10-12]</sup>

Davis et al & Garcia-Ramirez et al found that low hemoglobin level is associated with two times increased risk of development of DR. Our case report shows that anemia hastens the progression of diabetic retinopathy & timely correction of anemia will help in preventing the occurrence of severe complications of DM & resolution of existing lesions as well.

Detection of anaemia and its treatment is important in the management of diabetic retinopathy. In those patients who had both anemia (Hb-10g/dl) and diabetes mellitus, Friedman and associates reported that treatment with erythropoietin was correlated with substantial resolution of macular hard exudates.<sup>[13]</sup> The improved haemoglobin concentration with therapy of anaemia improves tissue oxygenation and may result in reduced VEGF production, which improves the hyperpermeability and reduces the stimulus for neovascularization.<sup>[13]</sup>

Duration of diabetes is another risk factor for occurrence of anaemia. Studies have shown the patient having diabetes for more than 5 years are more prone for developing anaemia. Anaemia increases development of both micro as well as macro-vascular complications of diabetes.

#### 5. Conclusion

There is an association of low Hb & severity of Diabetic retinopathy thus anaemia evaluation should be considered in the routine management of persons with diabetes and should be treated to minimize the risk of microvascular complications such as nephropathy and retinopathy. Early diagnosis & timely intervention of anemia would make a significant impact in managing the micro-vascular complications of DM such as diabetic retinopathy.

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