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Serum lipids in correlation to Diabetic Retinopathy

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Keywords: Diabetic retinopathy - blood sugar - serum lipid

Aim

To evaluate the association of elevated serum lipids with retinal complications in diabetic patients which lead to loss of vision in type 2 DM.

Introduction

Lipids are an important component of living cells. Together with carbohydrates and proteins, lipids are the main constituents of plant and animal cells. Cholesterol and triglycerides are lipids. Lipids are easily stored in the body. They serve as a source of fuel and are an important constituent of the structure of cells.

Lipids include fatty acids, neutral fats, waxes and steroids (like cortisone). Compound lipids (lipids complexed with another type of chemical compound) comprise the lipoproteins, glycolipids and phospholipids.

There are several reasons why a patient may present in Primary Care with high serum lipids. One of the main genetic causes is Familial Hypercholesterolemia (FH). So that diabetic retinopathy is a leading cause of irreversible blindness.

Totally 196 patients were included of which 98/196 had diabetic retinopathy of any grade.

Ophthalmoscopically visible signs of retinopathy grading may not accurately reflect functionally sever disease since maculopathy with sever visual loss may occur in the presence of moderate ophthalmoscopic signs.

Systemic screening program was helpful in reflection of vision threatening risk of diabetic retinopathy and its relation to hypercholestremia and lipid profile control.

Elevated serum lipids showed a significant association with vitreous hemorrhage and development of retinopathy.

Were the ophthalmoscopically visible signs of retinopathy grading may not accurately reflex functionally sever disease since maculopathy with sever visual loss may occur in the presence of moderate ophthalmoscopic signs [3-6] .Systemic screening program was helpful in reflection of vision threatening risk of diabetic retinopathy and its relation to hypercholestremia and lipid profile control inclusion criteria were as follows.

1- had fitness to undergo dilated fundus examination .
2- Best corrected visual acuity by Snllen chart.
3- Color examination.
4- Pupillary reflexes .
5- IOP by prism tonometer.
6- Detailed funduscopy was done with direct ophthalmoscope.
7- Slitlamp biomicroscopy with 78.90 V/L
For purpose of the study grading the severity of retinopathy as follow

Diabetic retinopathy Grading of DR depending of overall severity of ophthalmoscopic signs

1- Non proliferative Background
2- Proliferative.
3- Maculopathy.
4- Advance diabetic eye diseases.

Materials and Methods

Materials

Type 2 diabetic patients seeking ocular evaluation for diabetic retinopathy were included in our study they were assessed for the presence and severity of diabetic retinopathy.

Retinal finding were correlated to frequent serum lipid with in the year of our study.

Methods

Our trial study includes 196 patients with follow up and estimation their result according to our lab. Test in our center

Fasting S. Glucose	3.6-5.5 (manual)
HbA1C	4.0-5.6% (Cuvate)
STG	< 2 mm/l
S.Cholesterol	< 5 mm/l
S.HDL	1-1.5 mm/l
S.LDL	1.8-4.3mm/l (biolyser 300)

Totally 196 patients were included in our study all have DM more than 10 Yrs. Of both gender , age group 42 – 74 yrs.

All have DM more than 10 yrs. Of both gender, age group 42-74 yrs.

The trial was done in between May 2016 – May 2017
This 196 Iraqi patients were divided in 2 groups

G1(No.73) clinically healthy control subject

G1a (No.73) clinically having hyperglycemia and dyslipidemia

G2 (No. 25) clinically having elevated STG SCH.level .HbA1C around seven.

Results and Discussion

Table (1) an abbreviated version is set out in table 1 with descriptive categories

Background	Micro aneurysms dot and blot HG
Preproliferative Indicates progressive retinal ischemia	Cotton wool spots Venous changes IRMA Deep retinal hemorrhages
Proliferative diabetic retinopathy	Neovascularization disc NVE
Maculopathy	Presence of retinopathy in the macula but commonly reserved for significant changes particularly vision threatening edema and ischemia
Advanced diabetic eye diseases	Tractional retinal detachment Significant persistent vitreous hemorrhage Nevascular glaucoma

From table (1) seems that

1. Elevated S CH. were not significantly associated with retinopathy of different grades.
2. Other results did not find any correlation between elevated serum cholesterol and vitreous hemorrhage.
3. There is a highly significant result in patients with different grades of DR heaving hypertriglyceridemia compared with healthy control group.
4. Patients with hyperglycemia but normal serum lipid level showed highly significant values with retinopathy of different grades.
5. Our trial however showed a relationship with occurence vitreous hemorrhage in patients with elevated STG while HbA1C around 7.

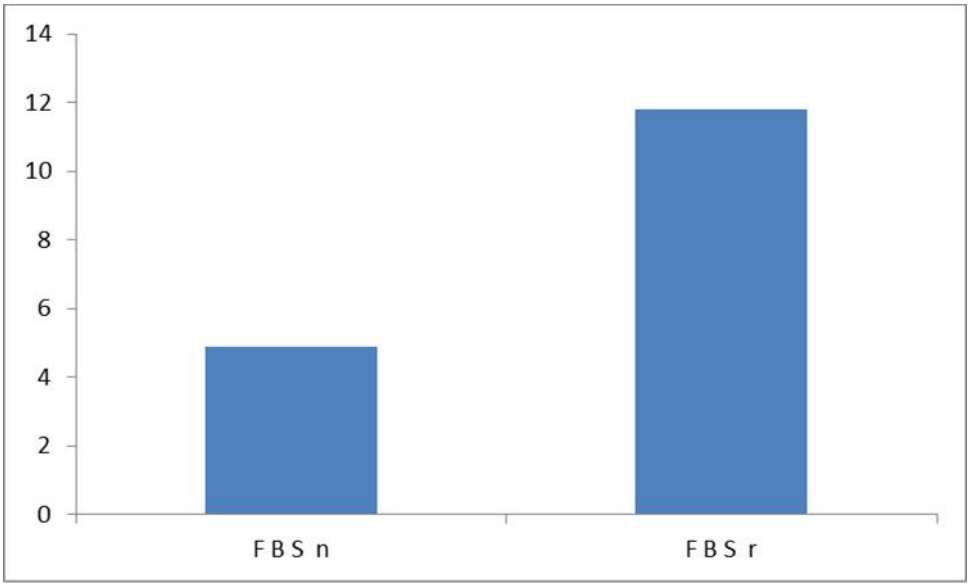

Figure (1) Mean value for fasting blood sugar in R patients and control group

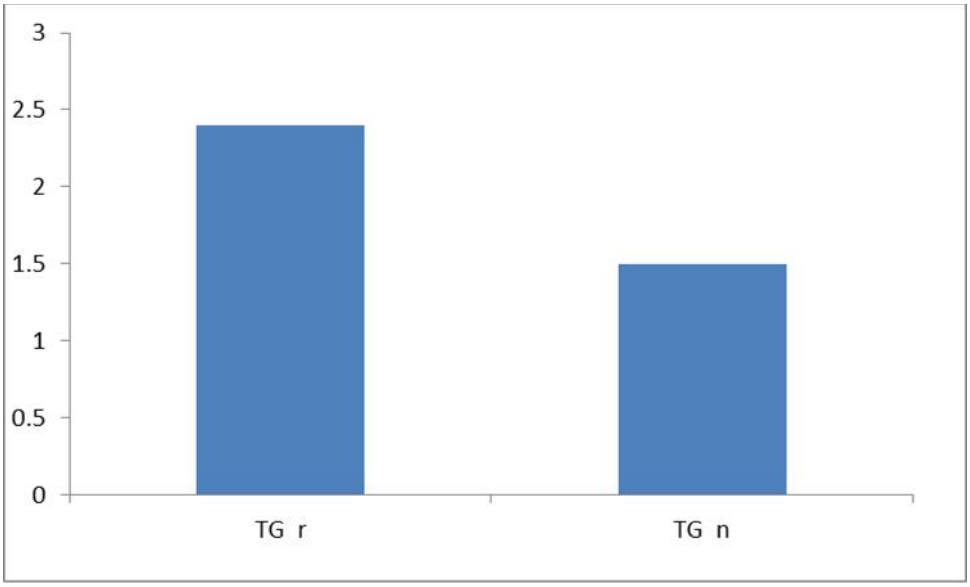

Figure (2) Mean value for Serum triglyceride in R patients and control group

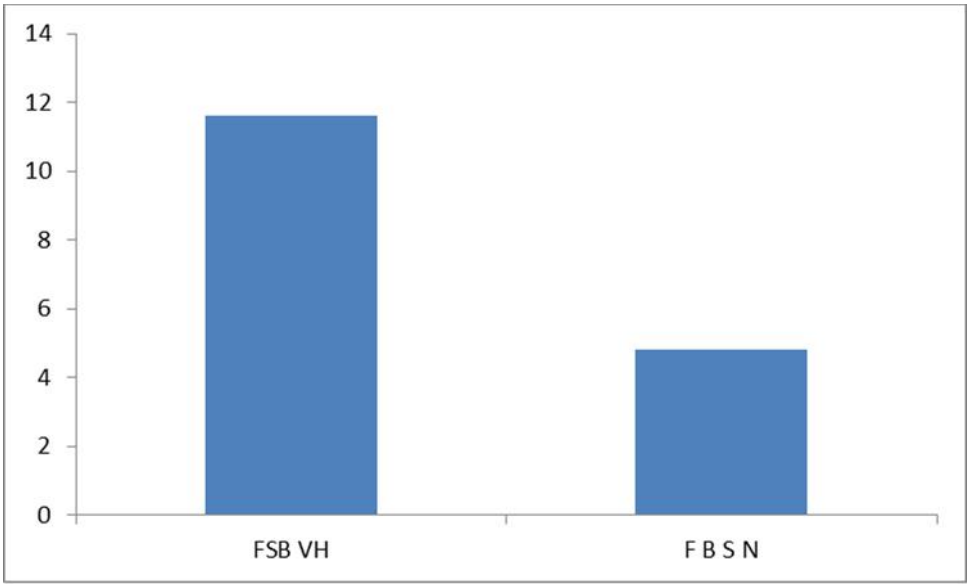

Figure (3) Mean value for fasting blood sugar in VH patients and control group

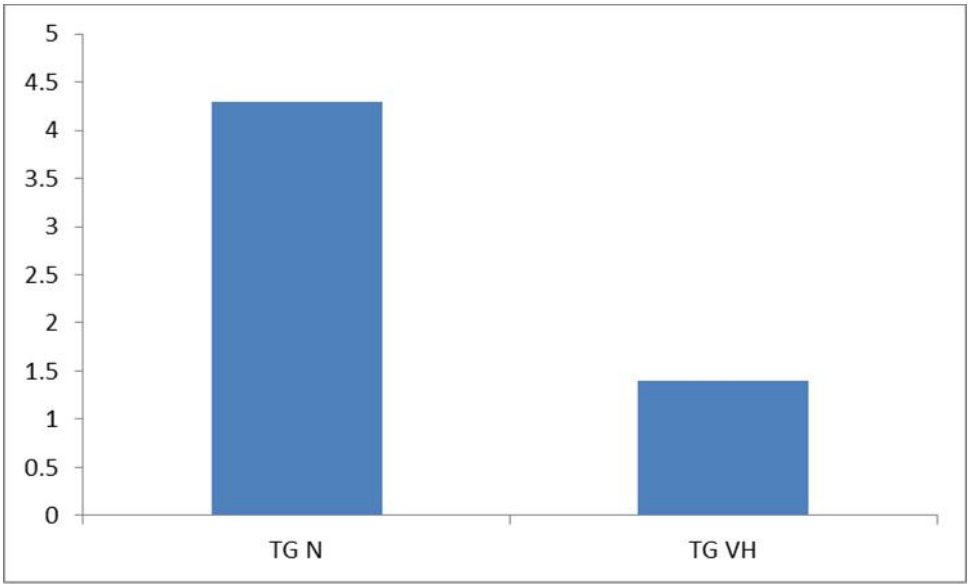

Figure (4) Mean value for serum triglyceride in VH patients and control group

Table (2) Mean ±SD of Fasting blood sugar , cholesterol ,triglyceride in R patients and control groups

Parameters	studied groups		
	R patients Mean ±SD n =73	control Mean ±SD n =73	p-value
Cholesterol mmol/L	4.376 ±1.244	4.506 ±0.832	0.410 NS
Triglyceride mmol/L	2.493 ±1.592	1.571 ±0.270	0.000 S

Table (3) Mean ±SD of Fasting blood sugar, cholesterol , triglyceride in VH patients and control groups

	studied groups		
Parameters	**VH patients Mean ±SD n =25**	**control Mean ±SD n =25**	**p-value**
Cholesterol mmol/L	**4.48 ±0.828**	**4.94 ±1.740**	**0.260 NS**
Triglyceride mmol/L	**4.55 ±1.759**	**1.53 ±0.280**	**0.000 S**

From tables and figures of the mechanism result reached to that lead to histopathological changes in DM are complex and likely secondary to metabolic dysregulation including hyperglycemia.

Microangiopathy with vascular abnormalities such as increase permeability of retinal vascularization and serum leakage contribute to capillary loss and subsequent ischemia .Retinal hypoperfusion and increase in the local product of vaso proliferative factor (VEGF) which occurs as maladaptive protective mechanism and induces changes in the permability that regulate the tight junction between retinal endothelial cells making them leaky with increase level (VEGF) which are strongly associated with neovascularization via induction of new vessel development and lipid exudates. Either on the optic disc or elsewhere in the retina which compounds the damaged by contributing the development of vitreous hemorrhage. Fibrosis and blindness

Conclusion

Diabetic retinopathy effects over 93 million people worldwide and is one cause of blindness among working age adults.

These indicators coupled with projected rise of patients diagnose with DM makes diabetic retinopathy serious and prevalent vision threatening disease.

Data from our clinical trial demonstrate that in addition to the well accepted role of hyperglycemia – hypertryglyceridema is an important but often over looked factor in the development of diabetic retinopathy and its progression.

Recommendation

Assessment of absolute risk with treatment of all modifiable risk factor and optimistation of life style.

Diet and exercise are impartment in management in all cases.

Improved patient education program can motivate patients to take better care of themselves and enable them to improve the control of diabetes will lead to fewer secondary complications.

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