DYSLIPIDEMIA IN DIABETES MELLITUS PATIENTS - A MAJOR RISK FACTOR IN CARDIOVASCULAR DISEASES

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Abstract: *Cardiovascular diseases (CVD) are the main cause of morbidity and mortality in diabetes mellitus patients.(1) Dyslipidemia is an abnormality within the lipid profile, common especially in type II and it is a major risk factor for CVD among hypertension, obesity and smoking.(2,3) In the current study, we have observed the relation between the lipid panel and cardiovascular complication on 100 patients with diabetes mellitus. We have analyzed plasma levels of total cholesterol, triglycerides and individual lipoproteins. We also analyzed the body mass index and the relation with the type of diabetes.*

INTRODUCTION

Diabetes mellitus (DM) has become a public healthcare problem because of the frequent long term complications. Over the last 30 years, DM had changed from being associated with aging to one of the major causes of premature morbidity in most countries. The relation between diabetes mellitus and serum lipid profile had been much discussed during the past decades (figure no. 1).(2,4)

Major diabetes complications are: cardiovascular diseases (CVD), nefropathy, retinopathy, neuropathy.(2)

CVD is the major complication responsible for more than 50 % and up to 80 % of deaths in people with Diabetes.(4)

The mechanism by which diabetes leads to these complications is complex: injury from AGEs, polyol accumulation and oxidative stress is not yet fully understood, but involves: high glucose levels and abnormal lipid levels.(2,4,5)

Figure no. 1. Major complications of diabetes mellitus (4)

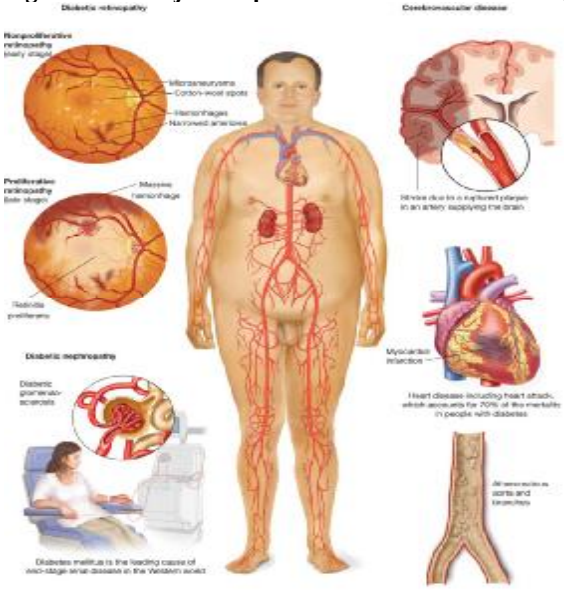
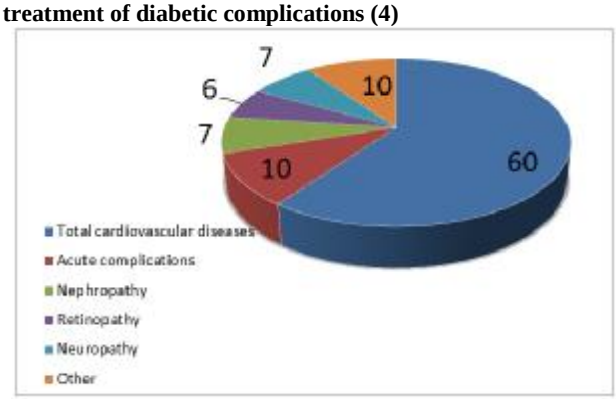


Figure no. 2. Proportion of hospital bed days used for the treatment of diabetic complications (4)



The number of hospital bed days for the treatment of complications of diabetes brought about cardiovascular diseases represents more than half of the total days of hospitalization for all types of complications (figure no. 2).

Dyslipidemia is present in the most patients with diabetes mellitus. Is elevation of plasma cholesterol, triglycerides (TGs), or both, or a low high-density lipoprotein level that contributes to the development of atherosclerosis?(4,6) Causes may be primary (genetic) or secondary.

Diagnosis is by measuring plasma levels of total cholesterol, TGs, and individual lipoproteins.(1) Different mechanisms are responsible for the development of dyslipidemia in individuals with diabetes.

Defects in insulin action and hyperglycemia could lead to dyslipidemia in patients with diabetes.(2,5)

A characteristic pattern, called diabetic dyslipidemia, consists of specifically mild to marked elevation of triglyceride-rich lipoproteins (VLDLs) and VLDL remnants concentrations and low levels of HDL-C.

Raised serum triglycerides and low HDL-C often precede the onset of T2DM for many years. In addition, LDL particles are converted to smaller, perhaps more atherogenic, lipoproteins termed "small-dense LDLs" (figure no. 3).(7)

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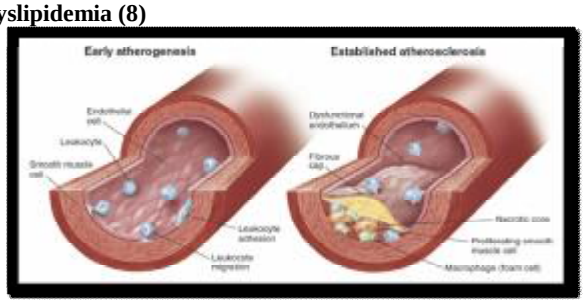
Figure no. 3. Atherogenesis, atherosclerosis and dyslipidemia (8)



PURPOSE

The relation between the lipid panel and cardiovascular complications in 100 patients with diabetes mellitus.

MATERIALS AND METHODS

A retrospective study including 100 patients from Sibiu County Emergency Hospital: 61 men and 39 women.

A total of 100 patients (11 type I, 89 type II, 61 men, 39 women, age range: 38 - 69 years, mean age: 55.52 years, mean time since diagnosis 8 years [range 2 – 29]), HbA1c 7.45 [range 4 - 14], Treatment: 61 % insulin-dependent, 39 % oral diabetes medication), from Emergency Country Hospital of Sibiu were included in a retrospective study.

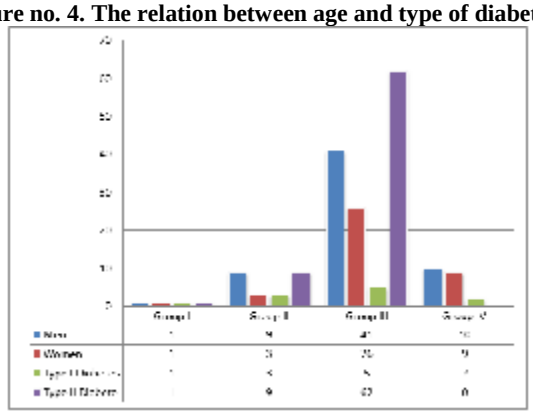
We have analyzed the levels of lipids in relation with the chronic cardiovascular complications in 100 patients with Diabetes mellitus.

RESULTS

- The mean age of the population was 55.52 years old.
- Range: 38 - 69 years old.

By age, the batch of patients was divided in 4 groups: I (< 40 years old); II (40 – 50 years old); III (50 – 60 years old) – the predominant group; IV (> 60 years old) (figure no. 4.).

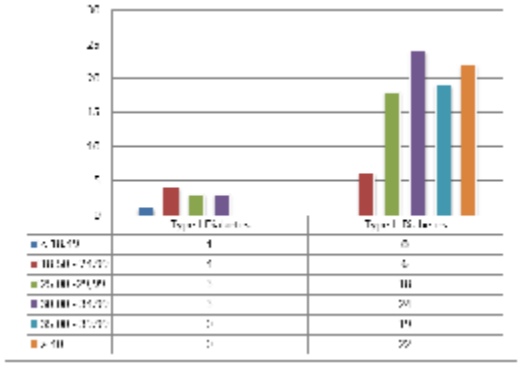
Figure no. 4. The relation between age and type of diabetes



2. BMI (Body Mass Index) calculated by dividing weight in kilograms by the square of height in metres shown that over 60 % of patients had BMI > 30.00 kg/m^2, most of them are Type II Diabetes Mellitus patients (figure no. 5).

- 60 % of patients are obese (moderate / severe / very severe);
- 21 % of patients are overweight (> 25 kg/m^2);
  - Mean BMI: 33.45;
  - Mean BMI in men: 31.56;
  - Mean BMI in women: 35.28.

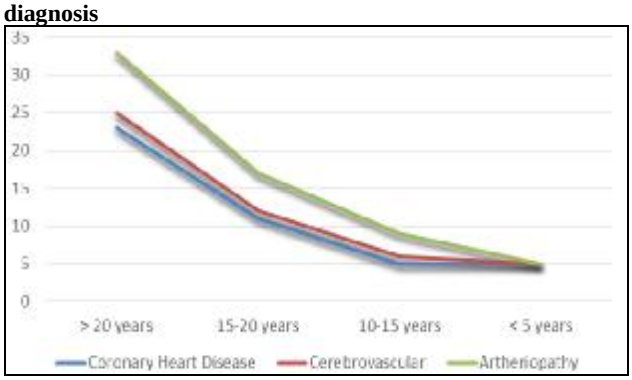
Figure no. 5. The relation between BMI and type of diabetes



3. The effect in time since diagnosis on chronic complications

By the time since diagnosis, the batch was divided in 5 groups: *1. > 20 years old; 15-20 years old; 5-10 years old; < 5 years old* (figure no. 6).

Figure no. 6. Patients' distribution per age groups and diagnosis



4. Lipid profile

- 58 % of patients had elevated Cholesterol levels;
- 50 % of patients had increased Triglycerides;
  - 31 % both (Cholesterol and Triglycerides);
- 41 % had increased LDL – Cholesterol;
- 40 had decreased HDL – Cholesterol;
  - 25 both (HDL – C, LDL - C) (figure no. 7);

Figure no. 7. The lipid profile

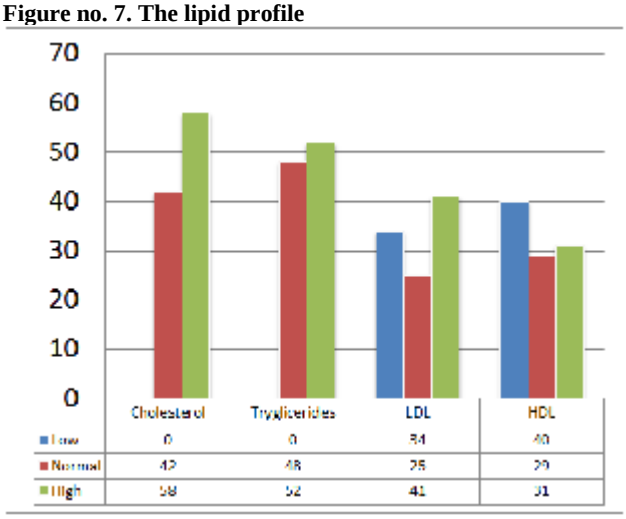
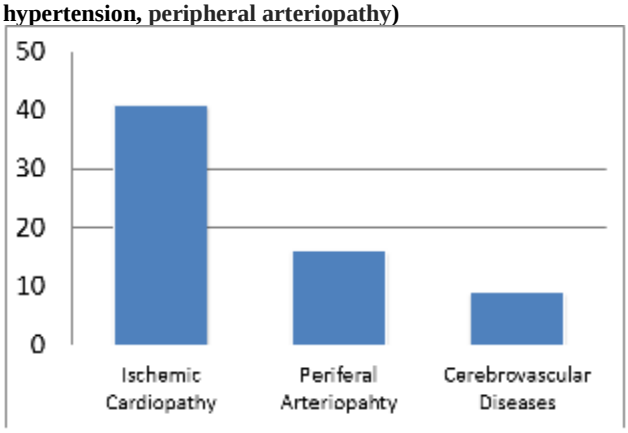
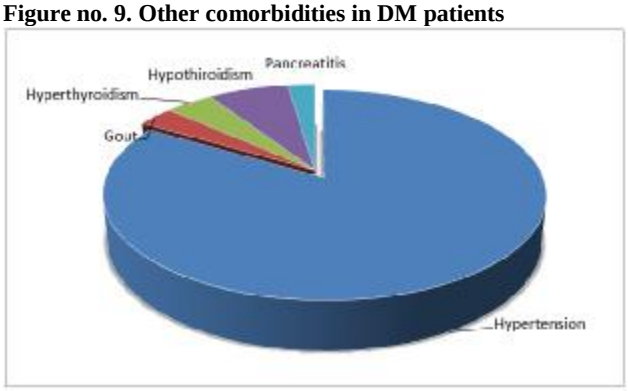


Figure no. 8. Cardiovascular complications (ischemia, hypertension, peripheral arteriopathy)



6. Besides obesity, which is the main risk for DM patients, hypertension, hypothyroidism and other comorbidities had a substantial risk for cardiovascular diseases (figure no. 8).

Figure no. 9. Other comorbidities in DM patients



More than 50% of patients had elevated triglycerides, LDL-Cholesterol, Cholesterol, and low HDL-Cholesterol levels. Dyslipidemia is more frequent in type II (94 %), BMI influenced the lipid profile (21 % > 25 kg/m2, 68 % > 30 kg/m2 [3 % > 25 kg/m2, 3% > 25 kg/m2 had type I]), over 60 % had dyslipidemia. CVD and comorbidities: Hypertension (72 %), Ischemic Cardiomyopathy (48 %), Cardiac Insufficiency (17 %), Gout (3 %), Pancreatitis (2 %), Hyperthyroidism (4 %), Hypothyroidism (6 %) (figure no. 9).

CONCLUSIONS

- CVD is more frequent in men, the group of age between 50 – 60 years old.
- Type II Diabetes Mellitus is more predictable to a CV risk.
- Obesity is more frequent in Type II DM patients.
- Dyslipidemia is influenced by gender (men had more elevated Tryglicerides, decreased HDL – Cholesterol and decreased LDL – Cholesterol, comparing to women who had increased LDL – Cholesterol than men).
- The prevalence of dyslipidemia was slightly lower in subjects with type 1 diabetes.
- Despite lower cholesterol and LDL in type 1 diabetes, these patients are still at higher risk for CVD, than the general population.
- The main CVD, possible complications of dyslipidemia of DM patient are: coronary heart disease, arteriopathy, cerebrovascular diseases.
- There is a correlation showed in one third of patients: the increases of LDL-C level and the decrease of HDL-C and the risk of CVD is very high (more than 60% suffers of hypertension, cardiomyopathy or cardiac Insufficiency), the reduction of HDL-C is more important than a higher increase of LDL-C.
- Dyslipidemia is a major risk factor for CVD and remains largely undiagnosed and undertreated in high-risk populations.
- Both lipid profile and diabetes have been shown to be the important predictors for metabolic disturbances including dyslipidaemia, hypertension, cardiovascular diseases, hyperinsulinemia etc.
- Efforts to increase public awareness and to treat dyslipidemia with medication should be maintained if not increased in both, the general population and, especially in patients with type 1 diabetes.

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