

Serum levels of LP (a) with LDL, VLDL, and HDL in 218 hospitalized cases with AMI or UA

Khosrou Amozadeh (MD)^{*1}
Mehrdad Saravi (MD)¹
Saeed Abrotan (MD)²
Mohammad Jafar Soleimani Amiri (PhD)³

1- Department of Cardiology, Yahyanejiad Hospital, Babol University of Medical Sciences, Babol, Iran.
2- General Physician, Babol University of Medical Sciences, Babol, Iran.
3- Department of Laboratory Medicine, Yahyanejiad Hospital, Babol University of Medical Sciences, Babol, Iran.

*** Correspondence:**

Khosrou Amozadeh (MD), Assistant Professor of Cardiology, Department of Cardiology, Yahyanejiad Hospital, Babol University of Medical Sciences, Babol., Iran.
Post Code: 47176-47754
E-mail: amozadeh@yahoo.com
Tel: 0111-3232962
Fax: 0111-2227667

Received: Jul 16 2009

Revised: Sep 14 2009

Accepted: Nov 15 2009

Abstract

Background: Unstable angina and myocardial infarction are developed due to atherosclerosis of coronary arteries. At present, cholesterol, triglyceride, and lipoproteins are the most common risk factors of death. The purpose of this study was to assess the serum levels of LP (a), LDL-C, VLDL-C, HDL-C in cases of unstable angina and myocardial infarction.

Methods: This study was conducted to compare the serum level of LP (a) with LDL-C, VLDL-C, HDL-C in 218 cases of unstable angina and myocardial infarction who were admitted at the Department of Cardiology of Babol Medical University from October 2004 to October 2005. Serum levels of LP (a) with LDL, VLDL, and HDL in these cases were measured and recorded.

Results: Two-hundred-eighteen cases (188 unstable angina, 30 with myocardial infarction) were studied. There were significant differences between serum levels of LDL-C LP (a), cholesterol, HDL-C, in patients with unstable angina and myocardial infarction, but regarding VLDL-C or TG the differences were not significant.

Conclusion: The results show that there is a relation to high levels of LDL-C, LP (a), cholesterol, HDL-C, and HDL-C with unstable angina and myocardial infarction. The level of LP (a) in MI subjects was higher than that of unstable angina.

Key words: Myocardial infarction, Unstable angina, Lipoprotein a, LDL-C, Cholesterol, HDL-C, VLDL-C.

Casp J Intern Med 2010; 1(1): 12-15.

Unstable angina and myocardial infarction are developed due to atherosclerosis of coronary arteries. Other risk factors like hyperlipidemia, cigarette smoking, hypertension, diabetes, history of coronary diseases in parents or other close relatives, all increase the incidence of atherosclerosis (1). At present, cholesterol, triglyceride and lipoproteins and their relation to death are being investigated in many countries. Their unusual concentrations in the blood are associated with coronary diseases, but changing their levels due to food or drug intervention may reduce the incidence of the disease (2). Lipoprotein a is a risk factor of coronary artery disease (CAD). Its structure is similar to LDL-C and apoprotein a. If the serum levels of lipoprotein a or LDL-C or both rise, the risk for developing of CAD might increase. Angiographic study showed positive relation with the severity of atherosclerosis of coronary artery and lipoprotein a, but the role of lipoprotein a with atherosclerosis has not been clearly determined. On the other hand, lipoprotein a probably prevents the delivery of LDL-C to plaque of atherosclerosis (1). Since cardiovascular diseases especially acute coronary syndrome are the main causes of death among the middle-aged people in the developing countries, finding tests to predict this risk is mandatory. The purpose of this study was to assess the serum levels of LP (a) with LDL-C, VLDL-C, HDL-C in cases of unstable angina and myocardial infarction.

Methods

From October 2005 to October 2006, patients with unstable angina and myocardial infarction who were admitted at the Department of Cardiology of Babol Medical University were entered into the study. Our department serves to more than 500,000 individuals living in Babol, Northern Iran across the Caspian Sea.

Those patients who received anti-hyperlipidemic agents (lovastatin, jenfibrasil) and those patients with chest pain of more than 12 hours were excluded from this study.

For all the patients, the demographical data and the clinical symptoms and signs at the baseline were recorded. We also tested the serum levels of LP (a) with LDL-C, VLDL-C, and HDL-C, triglyceride (TG).

LDL-C<160, HDL-C>30, VLDL-C between 40-80, TG between 50-200 and LP (a) <30mg/ml were normal range. Based on the positive or the negative test for troponin, these were divided into two groups; (myocardial infarction, unstable angina).

The data were analyzed by SPSS version 14. Student's t-test was used to compare the continuous variables and χ^2 test was used to compare the categorical variables in these two groups. Ninety-five percent confidence intervals (CIs) were calculated. The difference with a $p<0.05$ was considered significant

Results

Thirty-three cases had AMI and 188 cases had unstable angina. The mean \pm SD for all cases was 67.77 \pm 0.78 (ranged 45 to 87 years). The mean LDL-C in AMI group was 166.77 \pm 7.47 (mg/dl) and in UA group was 141.75 \pm 3.26 (mg/dl) ($p=0.004$). LP (a) in AMI was 120.47 \pm 18.3 (mg/dl) and in UA group was 56.33 \pm 5.16 (mg/dl) ($p=0.0000$).

Cholesterol in AMI group was 246.80 \pm 9.02 (mg/dl) and for UA group was 217.36 \pm 3.95 (mg/dl) ($p=0.006$). HDL-C in AMI group was 43.88 \pm 0.75 (mg/dl) and for UA group was 48.27 \pm 1.6 (mg/dl) ($p=0.029$). Other findings are shown in table 1.

LP (a) with VLDL-C, cholesterol and its relation to AMI and UA was significant (table 2).

Table 1. Mean comparison of serum lipids in the two groups of acute MI and unstable angina

| Variable | Serum Lipid Mean \pm SD | p-value |
|---------------|---------------------------|---------|
| LDL-C | | |
| AMI | 166.77 \pm 7.47 | 0.004 |
| UA | 141.75 \pm 3.26 | |
| VLDL-C | | |
| AMI | 29.67 \pm 2.52 | 0.743 |
| UA | 31.08 \pm 1.67 | |
| LP(a) | | |
| AMI | 120.47 \pm 18.31 | 0.00001 |
| UA | 56.33 \pm 5.16 | |
| TG | | |
| AM | 148.2 \pm 12.62 | 0.739 |
| UA | 155.4 \pm 8.36 | |
| Chol | | |
| AM | 246.8 \pm 9.02 | 0.006 |
| UA | 217.36 \pm 3.95 | |
| HDL-C | | |
| AM | 43.88 \pm 0.75 | 0.029 |
| UA | 48.27 \pm 1.6 | |

LDL-C; Low density lipoprotein-cholesterol, HDL-C; high density lipoprotein-cholesterol, Chol; cholesterol, TG; triglyceride LP (a); lipoprotein (a)

Table 2. Comparison of the level of LP (a) With, LDL-C, VLDL-C and HDL-C in Patients with MI and unstable angina In Yahyanegad Hospital

| Variable | LP (a) | | p-value |
|---------------|--------|----------|---------|
| | Normal | Abnormal | |
| LDL-C | | | 0.556 |
| Normal | 71.6 | 67.5 | |
| Abnormal | 32.5 | 28.4 | |
| VLDL-C | | | 0.035 |
| Normal | 100 | 95.8 | |
| Abnormal | 0 | 4.2 | |
| TG | | | 0.348 |
| Normal | 87.4 | 82.1 | |
| Abnormal | 12.6 | 17.9 | |
| Chol | | | 0.0001 |
| Normal | 52.6 | 27.6 | |
| Abnormal | 47.4 | 72.4 | |
| HDL-C | | | 0.061 |
| Normal | 91.6 | 97.6 | |
| Abnormal | 8.4 | 2.4 | |

LDL-C; Low density lipoprotein-cholesterol, HDL-C; high density lipoprotein-cholesterol, Chol; cholesterol, TG; triglyceride LP (a); lipoprotein (a)

Discussion

Primary assessment of lipoproteins and serum lipids are necessary to evaluate the safety of the vascular system. In recent years, the measurement of lipoprotein with low and high density has a special place in CAD (3). In spite of these tests, the early diagnosis and appropriate treatment has been important issue in this field. The purpose of this study was to evaluate lipoprotein (a) as an index for helping in the early diagnosis of cardiovascular diseases and its comparison with serum levels of LDL-C, VLDL-C, and HDL-C in cases of AMI and UA. In this study, the mean age of the male cases was 55 ± 0.18 and for the female cases it was 67.77 ± 0.78 years and both are higher than the age of those at risk for cardiovascular disorders (4,5). The number of male patients was more than female and was similar to the report of Sadr et al. (6). Other findings in this study was the similarity of the serum levels of LP (a) in male and female and was in agreement with the report of Garcia-Diaz et al in Spain (3). Tavidou in Greece did not find the similar results as we found in this study (7). We suppose that the difference in the results of the different studies may be due to the environmental and racial factors as reported by the others (8).

High serum levels of lipoprotein a in cases with AMI in our study is consistent with the report of Garcia-Diaz et al. in Spain, but the result is in contrast with the report of Tavidou in Greece (3, 7). Palumbo et al. reported that high levels of lipoprotein a are seen in subjects with ACS in comparison with the healthy group. They also noted that the only index related to ischemia and destruction of vascular wall was lipoprotein a (7, 9, 10). In the United States of America, the serum levels of Apo B-100 and lipoprotein a in cases with ACS were higher than that the control group, and they concluded that the levels of lipoprotein a may anticipate to CAD (8). Sun in China reported a significant difference for the serum levels of lipoprotein a with cardiac ischemic attack (10). Although in several studies they have not found any relation with the serum levels of lipoprotein a and atherosclerosis of carotid and femoral arteries (5, 11-12). In summary, the result of our study show that there are relations to high levels of LDL-C, LP (a), cholesterol, HDL-C, and HDL-C with unstable angina and myocardial infarction. The

level of LP (a) in MI subjects was higher than that of unstable angina.

Acknowledgement

The authors would like to thank the personnel of the Department of Cardiology for their help in this study. Likewise, we thank the personnel and staff of Razi Laboratory for performing the different tests.

References

1. Austin MA, Rodriguez BL, McKnight B, et al. Low-density lipoprotein particle size, triglycerides, and high density lipoprotein cholesterol as risk factors for coronary heart disease in older Japanese-American men. *Am J Cardiol* 2000; 86: 412-16.
2. Newman AB, Naydeck BL, Sutton-Tyrrell K, Feldman A, et al. Coronary artery calcification in older adults to age 99: prevalence and risk factors. *Circulation* 2001; 104: 2679-84.
3. Garcia-Diaz JD, Gaspar Blazquez MJ, Arribas Gomez I, Cantero Sanchez M. Effect of lipoprotein (a) on the risk of coronary heart disease in adults aged less than 65 years in function of gender differences. *Rev Clin ESP* 2003; 203: 129-32.
4. Simo JM, Camps J, Gomez F, Ferre N, Joven J. Evaluation of a fully-automated particle-enhanced turbidimetric immunoassay for the measurement of plasma lipoprotein (a). Population – based reference values in an area with low incidence of cardiovascular disease. *Clin Biochem* 2003; 36: 129-34.
5. Sramek A, Reiber JHC, Baak-Pablo R, Sturk A, Rosendaal FR. Lipoprotein (a) and ultrasonographically determined early atherosclerotic changes in the carotid and femoral artery. *J Thromb Headmost* 2003; 1: 374-9.
6. Sadr Bafti SM, Rafiee M, Salari M, et al. Evaluate of the Specifications of acute MI of the people In YAZD City. *Yazd J of Medical* 2005; 63: 936-927.
7. Tavidou A, Unwin N, Bhopal R, Laker MF. Predictors of lipoprotein (a) levels in a European and South Asian population in the Newcastle Heart Project. *Eur J Clin Invest* 2003; 33: 686 -92.
8. Hoogeveen RC, Gambhir JK, Gambhir DS, Kimball KT, Ghazzaly K, et al. Evaluation of LP [a] and other independent risk factors for CHD in Asian Indians and their USA counterparts. *J Lipid Res* 2001; 42: 631-8.

9. Palumbo B, Lupattelli G, Siepi D, bianchi A, Anniboletti PF, Blandini V, et al. Correlation in different entities of CHD severity. *Wien Klin Wochenschr* 2002; 114: 987-91.
10. Sun L, Li Z, Zhang H, Ma A, Liao Y, Wang D, et al. pentanucleotide TTTTA repeat polymorphism of apolipoprotein (a) gene and plasma lipoprotein (a) are associated with ischemic and hemorrhagic stroke in Chinese: a multicenter case control study in China. *Stroke* 2003; 34: 1617-22.
11. Velmrugan K, Deepa R, Ravikumar R, Lawrence JB, Anshoo H, Senthilvelmurugan M, et al. Relationship of lipoprotein (a) with intimal medial thickness of the carotid artery in Type 2 diabetic in South India. *Diabet Med* 2003; 20: 455-61.
12. Grebe MT, Schoene E, Schaefer CA, Boedeker RH, Kemkes-Matthes B, Voss R, et al. Elevated Lipoprotein (a) does not promote early stherosclerotic changes of the carotid arteries in young, healthy adults. *Atherosclerosis* 2007; 190: 194-8.

This document was created with Win2PDF available at <http://www.daneprairie.com>.
The unregistered version of Win2PDF is for evaluation or non-commercial use only.