NORMAL VALUES OF THE LIPOPROTEIN ELECTROPHORESIS OF SUBJECTS LIVING IN ERZURUM (x)

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SUMMARY

This study was done to investigate the lipoprotein fractions and ratios by cellulose acetate electrophoresis of 124 subjects living in Erzurum and surroundings with no signs of atherosclerosis. The lipoprotein fractions were determined. and the ratios β/α, $\text{pre}\beta/\alpha$, and $(\text{pre}\beta + \beta)/\alpha$ were calculated.

The results obtained were discussed by comparing with literature findings.

INTRODUCTION

In the 20.th centruy, atherosclerotic events, mainly heart ischemia, are agreed as the cause of death in an increasing rate (1,2). It is generally agreed that tehre is a relation between atherosclerosis ann hyperlipidemia (3-5).

According to the researchers being done by WHO the incidence of atherosclerosis shows differences between regions, races, ann continents (5).

We have wanted to investigate lipid metabolism in Erzurum and surroundings which have definite regional properties such as cilimate, height, nutrition and social standarts.

MATERIALS AND METHODS

We have started to our study by determining the normal values of healthy subjects at first and choosed especially those subjects who did not have any atherosclerotic sign. The exact decision for the presence of atherosclerosis in any one is

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possible only by autopsy. Some authors give information about "child atherosclerosis" (6). For this reason, there are some difficulties in the classification of atherosclerotic cases.

We included in our research those subjects with no finding about atherosclerosis and no pathology in their physical examination. Also, those with high lipemia were not included.

In this study, totally 124 subjects composed of 63 men and 61 women aged higher than 25 years, were studied.

Each serum was evaluated electrophoretically (7-9) and the preferred cellulose acetate papers were used in order to obtain the convenient separation. The instrument of Buchler Instrument with catalogue number of 3-1008, Sepharose III acetate paper of Gelman Instrument Co., High Resolution Buffer of Gelman Instrument with pH 8.8, ionic strenght 0.06 and catalogue number 51104 were used. Bands were dyed with Oil-Red O. After clearing in dimethyl sulfoxide, bands were evaluated in Densicord Densitometer (Photovolt Corp., Model 49) semiquean-antitatively (as percent of total).

RESULTS

We have divided our cases into 3 age groups as between 25-44, 45-64 and higher than 65 ages. We have done this by considering atherosclerotic differentiation. 50.81 % of cases are men and 49.19 % are women. Totally 124 cases were studied which 55 cases were between 25-44 ages with 30 men and 25 women, 45 cases 65 ages with 12 men and 12 women.

The data obtained are given in Table-I. According to the table, in statistically evaluation, it was found a significantly difference in pre- β fraction (p<0.05) only between second and third age groups of men. It was found, however, significantly differences in FFA (p<0.01), α (p<0.01), pre-β (p<0.05), β (p<0.001), β/α (p<0.05) pre-β/α (<0.05) and (pre-β + β)/α (<0.001) parameters between first and third age groups and also in β (p<0.01). γ (p<0.05) and (pre-β + β)/α (p<0.05) paramenters between second and third age groups of women. In comparison of men and women, it was established statistically significant differences in FFA (p<0.05), β (p<0.001) and γ (p<0.05) fractions.

DISCUSSION

In the present study we have aimed to determine the findings in normal subjects. So it is like a preliminary study to prepare a ground for atherosclerotic siudies. Since direct evaluation of atherosclerosis, which is an anatomo-patho-

TABLE-I: Lipoprotein electrophoresis values in normal subjects living in Erzurum

Age Groups	Sex	n	FFA	α	preβ	β	γ	B/α	per β/α	(preβ+)/α
Ist 25-44	Men	30	7.5±4.4	18.2±4.3	15.5±5.9	44.6±3.9	11.2±4.5	2.25±0.58	0.83±0.34	3.08±0.77
	Women	25	10.3±6.1	22.9±6.3	13.4±5.3	42.3±5.6	10.7±5.8	2.08±0.66	0.66±0.37	2.69±0.96
	Total	55	8.8±5.4	20.7±6.2	14.6±5.1	43.8±4.8	11.0±5.1	255±0.62	0.75±0.36	2.90±0.86
IInd 45-64	Men	21	7.4±5.6	20.9±5.6	14.3±5.7	44.3±6.1	9.6±5.3	2.40±0.70	0.77±0.46	3.17±1.06
	Women	24	7.9±3.4	20.7±6.1	13.8±5.4	45.1±7.3	12.±6±4	2.35±0.71	0.77±0.45	3.12±506
	Total	45	7.7±4.5	20.8±5.7	14.0±5.5	46.1±6.7	11.2±5.2	2.37±0.70	0.77±0.44	3.14±1.03
IIIrd >65	Men	12	9.1±4.4	18.7±5.6	18.0±3.8	44.1±4.3	9.9±4.2	2.6a±1.36	1.14±0.73	3.83±2.07
	Women	12	5.7±3.2	18.7±2.4	16.6±3.6	50.0±3.5	9.0±4.4	2.75±0.28	0.99±0.20	3.65±0.34
	Total	24	7.7±4.1	18.7±4.3	17.4±3.6	46.1±4.9	9.5±4.1	2.72±1.00	1.04±0.55	3.75±1.52
TOTAL	Men	63	7.8±4.8	19.5±5.8	15.6±5.1	45.4±5.1	10.4±4.7	2.38±0.81	0.87±0.48	3.25±1.21
	Women	61	8.6±4.9	1.3±5.8	14.1±5.1	45.0±.6.6	11.3±5.2	2.27±0.67	0.74±0.38	3.02±0.97
	Total	124	8.2±4.9	20.4±5.8	14.9±5.2	45.2±5.8	10.8±5.0	2.33±0.75	0.81±0.44	3.14±1.11

logic diagnosis, is only possible by autopsy, we have tried to select subjects with no clinical signs (10,11). However the possibility of our subjects to be atherosclerotic or no may be questionable.

Other than the role of lipids in the pathogenesis, the presence of atherosclerosis with hyperlipidemia at the same time is a fact.

In order to evaluate the deviations in lipoprotein fractions and ratios in with atherosclerosis which can be determined by clinical symptoms, 124 uncomplicated persons were included in this study and above mentioned results were obtailicated persons were included in his study add above Hen ioned rusults were obtained. Our results and those of literatures are given in Table-II. As is seen from the table our results are in accord with literature findings and no difference could be determined for our region.

TABLE-II: Serum lipoprotein electrophoresis values obtained from ours tudy and those of several authors

Authors	αLPs	Pre-β LPs	β LPs	γLPs	B/α ratito
Rodier-Mallein (12)	10-20	0-16	55-75	—	1.5-3
Özer-Büyükkeçeci (13)	13.06±2.9	15.2±2.77	29.1±4.14	—	—
Bauer (14)	25-35	8-12	55-65	—	—
Mgnani (19)	31.6±1.4	14.1±1.2	54.6±1.3	—	—
Çil (7)	20.8±5.6	14.9±5.6	41.9±6.2	13.7±5.8	2.16±0.7
Present study	20.4±5.8	14.9±5.2	45.2±5.8	10.8±5.0	2.33±0.75

No statistically important difference was present in age groups ut men , while in women α-LP-decreased and important increasing was determined in sevâ?-fractions. So it seems to be possible to argue that age is a risk factor in women. It must be possible to explain this with hormonal differences.

αLP'-which is a rarely mentioned fraction in literature (9,15-17), was obtained as a separate fraction approximately in all of our cases and was found as in tables.

Here we will mention about two results of our results :

1— FFA fraction (Free Fatty Acids: In cellulose acetate electrophoresis weakly dyed band with Oil-Red O is obtained. This band runs ahead of all other bands. There is information about this band in literature (7,9,14,18,19;. Çil (7) reported that FFA band of diabetics was reduced. There is not more information about this band in other literatures. We obtained this band in approximately all of our cases.

2—γ-fraction: Again, we obtained this band in approximately all of our cases and evaluated as a separate fraction. Although some literatures (7,9,15,16, 20,21) give information about this band, since it is appearance couldn't be

explained there is not information in more literatures. Possibly some authors evaluate it together with β fraction. We obtained both FFA and γ-fractions as distinct bands and although we couldn't give any pathologic or physiologic explanation, we evaluated them as different fractions by hoping that they can be used in future.

In this study, our aim is to obtain normal values for our future researchs on atherosclerosis and some other pathologic cases.

ÖZET

Erzurum ve çevresinde yaşayan aterosklerotik olarak klinik belirti vermemiş 124 şahısta selüloz asetat elektroforezi ile lipoprotein fraksiyonları ve bunların oranları değerlendirildi. Elde edilen sonuçlar literatür bulgulariyla karşılaştırılarak tartışıldı.

REFERENCES

1. Kaunitz., H.: Cholesterol metabolism and tissue repair in atherosclerosis. Rudolf Virchow Med. Soc. 28: 57-634, 1970.

2. Seidel, D.: Lipoproteins in liver disease. J. Clin. Chem. Clin. Biochem. 25: 541, 551, 1987.

3. Stein, A.E.: Lipids, Lipoproenis, and Apolipoproteins. Tietz, N.W., editor, Textbook of Clinical Chemistry. W.B. Saunders, Philadelphia, 1986, pp. 829-900.

4. Mjos, O.D.: High density lipoprotein and coronary heart disease. Scand. J. Lab. Invest. 37: 191-193, 1977.

5. Wollenweber, J.: Sex hormone und atherosklerosis. Med. Welt. 23: 214-216, 1974.

6. McMillan, G.O.: Develpment of atherosclerosis. Amer. J. Cardiol. 31:

7. Çil, M.Y.: Erzurum ve Civarındaki Sağlam Şahıslar ile Diabetes Mellituslu Hastaların Serumlarında Lipoprotein Fraksiyonların Elektroforezi Değerlendirilmesi. Atatürk Üniv. Tıp Fak. Biyokimya İhtisas Tezi, Erzurum, 1976.

8. Clinical Electrophoresis. Gelman Instrument Co., Ann Arbor, Michigan, 1970, pp. 21-23.

9. Çil, M.Y.: Sağlam şahısların serum lipoproteinlerinin sellüloz ase tatelektroforezi ile değerlendirilmesi. Doğa 2: 183-187, 1977.

10. Bierman, E.L.: Fat metabolism, atherosclerosis and aginagin man. Mechanism of Aging and Development 3: 315-332' 1973.

11. Kuo, P.T.: Hyperlipidemia and coronary artery disease: principles of diet and drug treatment. Med. Clin. North Amer. 58: 351-362' 1974.

12. Rodier, J., Malein, R.: Manuel de Biochemie Pratique. 4 eme ed., Malonie S.A. Editeur, Paris, 1973, pp. 285-286.

13. Özer, A., Büyükkeçeci, F.: Atherosklerosiste serum lipoproteinleri ile kolesterol ve lipid fraksiyonlarının mukayeseli araştırılması. Ege Üniv. Tıp Fak. D. 14: 85-95, 1975.

14. Bauer, J.D., Ackerman, P.G., Toro, G. : Bray's Clinical Laboratory Methods, 7th ed., The Mosby Cv Co.' St. Louis, 1968, pp. 381, 374-376.

15. Beckering, R.E., Ralph, D., Ellefson, R.D.: A rapid method for lipoprotein electrophoresis using cellulose acetate as support medium. Amer. J. Clin. path. 53: 84-88, 1970.

16. Wurm, M., Reuben, S.: Characterization of human serum proteins and lipoproteins. Amer. J. Clin. Path. 50: 175-193, 1968.

17. Dangerfield, W.G., Smith, E.B.: An investigation of serum lipids and lipoproteins by paper electrophoresis. J. Clin. Path. 132-139, 1955.

18. Beaumont, J.L.: Classification of hyperlipidemias and hyperlipoproteinemias. Nutr. Metab. 15: 9-16, 1973.

19. Magnani, H.N., Howard, A.N.: A quantitative method for blood lipoproteins using cellulose acetate elctrophoresis. J. Clin. pathol. 25: 837-845, 1971.

20. Müderrisoğlu, V.: Normal kan serumlarının protein, glusid ve lipid fraksiyonları yönünden elektroforetik separasyonu ve sonuçlara etki eden bazı faktörler üzerinde araştırmalar. Ank. Nümune Hast. Bül. 9: 355-380, 1969.

21. Müderrisoğlu, V.: Normal kan serumlarınn protein, glikoprotein ve lipoprotein fraksiyonları yönünden elektroforetik seperasyon ve sonuçlara etki eden faktörler üzerinde araştırmalar. Ank. Nümune Hast. Bül. 11: 9-28, 1970.