

SHORT COMMUNICATION

AGE DEPENDENT CHANGES IN HUMAN SERUM LIPID PEROXIDE LEVELS IN RURAL POPULATION AROUND AMBAJOGAI

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Abstract : Serum lipid peroxide levels were estimated in 205 healthy human subjects. The serum lipid peroxide levels in terms of malondialdehyde/ml was 1.47 nmol in male subjects with 11 - 20 years and which rose to a peak 2.97 in subjects with 51 - 60 years. Male subjects exhibited significantly higher ($P < 0.01$) values as compared to female subjects in whom this increase with age was not observed.

Key words : serum lipid peroxide

age

sex

INTRODUCTION

Serum lipid peroxide plays an important role in several diseases (2-6). Serum lipid peroxide is used increasingly as a marker of tissue damage. The lipid peroxides formed at the primary site would be transferred through circulation to other organs or tissues and provoke damage by propagating lipid peroxidation.

Serum lipid peroxide is particularly useful as an initial event in atherogenesis. It may also be used to monitor prognosis of diabetic patients (10,12). A close relationship between age and atherosclerosis has been reported. Crawford (1) reported that fully developed atherosclerosis is usually present in the fourth decade and that it increases steadily in area with increasing age.

Sumetsu et al (12) and Hagihara et al (7) have reported age dependent changes in serum lipid peroxide levels in healthy individuals from Japanese. Similar reports are not available in Indian population and so the present work was undertaken and extended to both the sexes.

METHODS

One hundred and twenty five male and Eighty female human subjects were studied for the levels of serum lipid peroxides. All the subjects were healthy, symptomless had hemoglobin above 12.5 percent. They showed no abnormality on clinical examination, particularly in the context of metabolic disorders and nutrition deficiencies. None was on any dietary restriction. They were between the age group of 11-60 years. These individuals were further divided into 7 groups of 10 years period, consisting of 11-20, 21-30, 31-40, 41-50, 51-60, 21-40 and 41-60 years for each sex.

Fasting blood samples were obtained in plain bulbs from the cubital vein. Serum was separated by centrifugation and was analysed for lipid peroxide immediately. The method of Yagi (14) using the thiobarbituric acid reaction was adopted. In the method water soluble substances which react with thiobarbituric acid were removed by precipitating lipid peroxides alongwith serum proteins by phosphotungstic acid sulphuric acid system. The effects of sialic acid was avoided by performing thiobar-

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bituric acid reaction in an acetic acid solution and by measuring fluorescence of the reaction product at 553 nm with excitation at 515 nm. Tetramethoxy propane which is converted to malondialdehyde during the reaction, was used as standard. The levels of serum lipid peroxides were expressed in terms of nmol of malondialdehyde per ml.

RESULTS

Mean values of serum lipid peroxide levels in different age groups in male and female are shown in Table I. As can be seen male exhibit marked changes in serum lipid peroxides with aging which are not observed in female.

TABLE I: Serum lipid peroxide levels in normal human subjects.

Sr. No.	Age (years)	Lipid peroxide levels (nmol malondialdehyde/ml serum)	
		Male	Female
I	11 - 20	1.12 ± 0.16 (25)	1.20 ± 0.21 (15)
II	21 - 30	1.47 ± 0.13 (25)	1.33 ± 0.21 (15)
III	31 - 40	1.95 ± 0.29 (25)	1.44 ± 0.24 (20)
IV	41 - 50	2.27 ± 0.45 (25)	1.33 ± 0.13 (15)
V	51 - 60	2.97 ± 0.75 (25)	1.33 ± 0.21 (25)
VI	21 - 40	1.71 ± 0.27 (50)	1.41 ± 0.27 (35)
VII	41 - 60	2.08 ± 0.59 (50)	1.33 ± 0.45 (30)

Mean ± Number in parenthesis indicate the number of subjects. Significance test for the total males I-II**, II-III**, III-IV**, IV-V**, VI-VII**.
(When compared with the corresponding groups of males) Significance test for the total females I-II*, II-III*, III-IV*, IV-V*, VI-VII*.

*P > 0.05, **P < 0.01

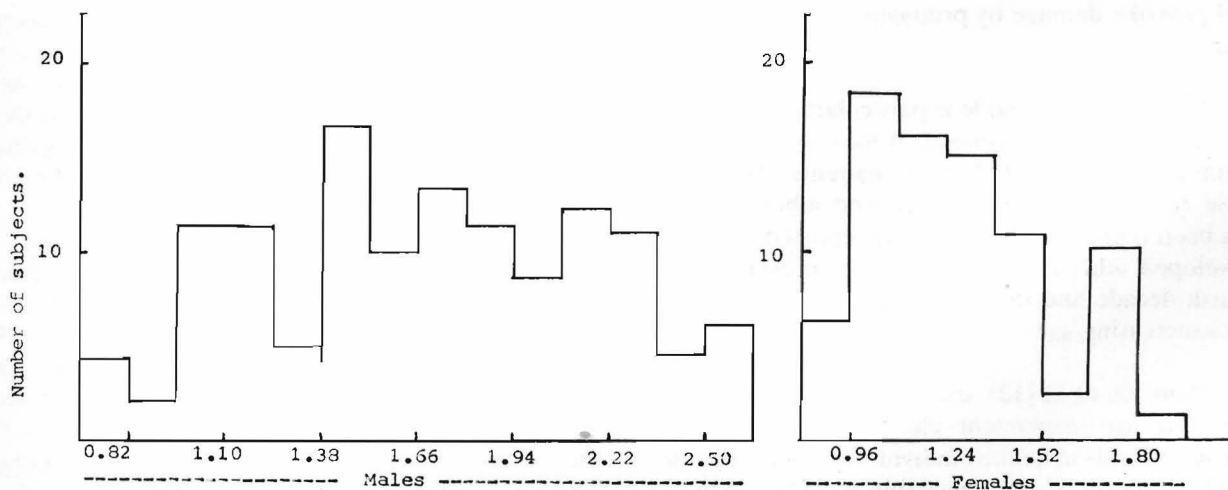


FIG. 1: Frequency distribution of lipid peroxide levels in healthy human subjects. Lipid peroxide level is expressed in terms of malondialdehyde (nmol/ml serum). Males (n = 100); Females (n = 65)

The distribution conform to a unimodal Gaussian pattern with some skewing to the right.

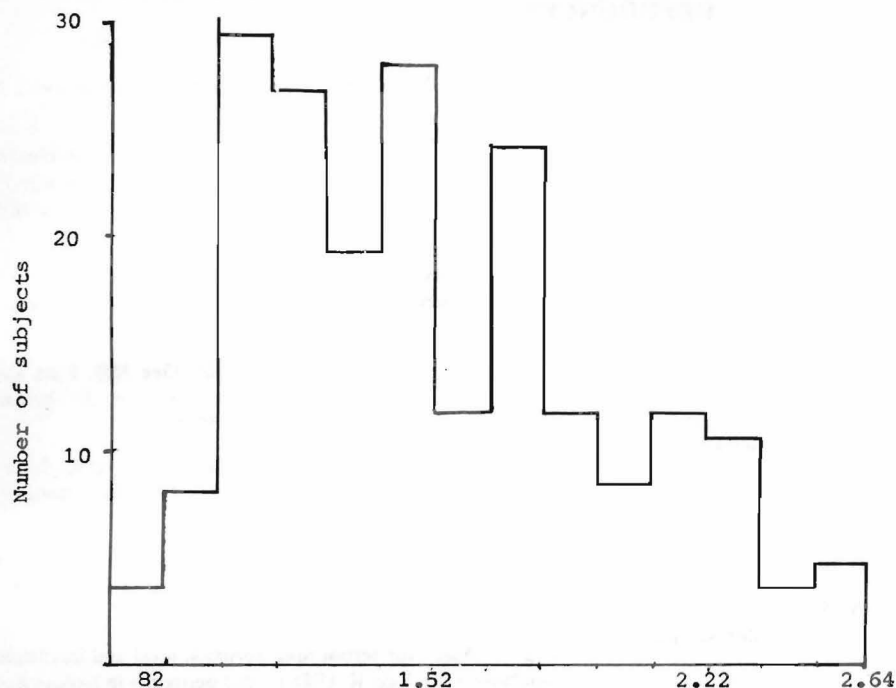


FIG. 2. Frequency distribution of lipid peroxide levels of human subjects. Lipid peroxide level is expressed in terms of malondialdehyde (nmol/ml serum). Combined sexes (n=165). The distribution conform to a unimodal Gaussian pattern with some skewing to the right.

The frequency distribution of serum lipid peroxide levels in male and female are shown in Fig. I and II. The frequency distribution confirm to a unimodal gaussian pattern with some showing to the right.

DISCUSSION

The present study shows a linear increase in serum lipid peroxide levels with age in male subjects. Sumetsu et al (12) and Yagi et al (15) also showed linear increase in serum lipid peroxide in male subjects in Japanese population. The increase in serum lipid peroxide in aging can be explained on the basis that aging is associated with a linear accumulation of chromolipids (11) which results from the polymerisation of oxidized unsaturated lipids (13). Free radicals usually produced by cellular oxidation

reactions lead to peroxidation of lipids and subsequently to tissue degeneration (8).

The serum lipid peroxide levels were significantly lower ($P < 0.01$) in females are compared to males in all age groups. This result agrees with that reported by Yagi et al (15). Nakakimura et al (9). It is possible that females are endowed with a system of inhibiting lipid peroxide production or accelerating its removed by a mechanism different from that in males (9).

In view of the findings that the serum lipid peroxides fluctuate markedly with respect to age and sex it should be considered essential to use uniform distribution of age and sex among experimental groups while carrying out studies with serum lipid peroxides as a parameter of biological response.

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