SERUM TOTAL PROTEIN, ALBUMIN, GLOBULIN POPULATION OF VARIOUS AGES AND SEX IN KARACHI AND THEIR RATIO IN APPARENTLY HEALTHY

Pages with reference to book, From 12 To 16

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Abstract

Serum proteins, albumin and globulin in 456 (274 males and 182 females) subjects were within the normal range and showed unifornt distribution. Mean protein levels were low in infants under 0—1 year of age. No significant change was noted with age and sex in other groups. These values were considered to be normal for our population as all protein values fell within 2.5 and 97.5 percentile (95% of the total population) irrespective of age and sex except babies under 0—1 year. The average intake of protein/kg body weight was almost upto the recommended allowances(JPMA 39: 12, 1989).

INTRODUCTION

Serum protein levels in normals vary from 63—8 g% and albumin 4—6 g%[1-4]. This study repbrts levels of serum proteins, albumin, globulins and albumin/globulin ratios in healthy subjects and their relationship with age, sex and protein intake.

SUBJECTS AND METHOD

One thousand and thirty-six (526 males and 510 females) healthy subjects were selected from the hospital staff, well baby clinics, MCH Centres, primary and secondary schools, colleges and various organizations according to percentage distribution of age and sex in the Karachi population (Census, 1972). Information regarding age, sex, general physical health, dietary history, height and weight were recorded on a preceded proforma. Total serum proteins, albumin and globulin were estimated in 456 (274 males and 182 females) subjects. Dietary intake was recorded according to food consumption of an individual for a week (ICNND-1966[5]). The nutrient intake was calculated from Pellet's food consumption tables[6]. Total serum proteins were determined by Biuret[7] and albumin by Albustrate kit methods[8]. Mean, standard deviation, standard error of the mean were calculated. The significance of difference between mean was determined by applying "t" test. The reference ranges for serum proteins, albumin and globulins were calculated using parametric method, mean ±2 standard deviations.

RESULTS

One thousand and thirty-six divided in 11 groups according to of protein intake. [9] The mean age, and animal protein intake (except babies) and proteins/kg body summarised in Tables I and II.

TABLE I. Mean Age, Weight, T. Protein intake, Animal Protein intake and Protein intake/kg wt of 526 apparently Healthy Males.

No.	Groups	Nos	Mean Age ±SE (yrs)	Mean wt. ±SE (kg)	Total protein intake (kg)	Animal protein intake (G)	Protein intake (Grams) per kg body wt.
1	<1 year	17	0.38 ± 0.58	4.2 ± 0.47	–	–	–
2.	1–3 yrs	36	2.45 ± 1.53	11.6 ± 0.36	29.8	11.3	2.57
3.	4–6 yrs	28	5.47 ± 0.14	17.1 ± 0.68	45.6	10.7	2.67
4.	7–9 yrs	57	8.5 ± 0.11	23.1 ± 0.65	47.8	11.1	2.07
5.	10–12 yrs	50	11.4 ± 0.10	27.8 ± 0.64	47.0	9.2	1.69
6.	13–15 yrs	28	13.8 ± 0.16	39.7 ± 2.43	49.5	10.5	1.25
7.	16–19 yrs	70	17.6 ± 0.11	50.7 ± 0.91	64.0	15.2	1.01
8.	20–29 yrs	93	23.73± 0.31	54.9 ± 0.83	64.3	16.0	1.17
9.	30–39 yrs	55	33.6 ± 0.44	59.0 ± 1.17	68.1	17.4	1.15
10	40–49 yrs	51	43.73± 0.41	58.1 ± 1.41	54.6	14.4	0.95
11	50+	41	58.41± 1.24	60.0 ± 1.51	57.8	14.75	0.96

TABLE II. Mean Age, Weight, T. Protein, Animal Protein intake and Protein intake/kg Body Weight of (510) apparently Healthy Females.

S. No.	Groups Yrs.	Nos.	Mean Age ±SE (yrs)	Mean wt. ±SE (kg)	Total protein intake (G)	Animal protein intake (G)	Protein intake per kg body wt. (G)
1.	<1	20	0.41 ± 0.08	4.34 ± 0.28	–	–	–
2	1 – 3	37	2.4 ± 0.13	10.5 ± 0.56	29.0	11.7	2.76
3	4 – 6	27	5.20 ± 0.18	16.84± 0.78	40.0	9.4	2.38
4	7 – 9	55	8.40 ± 0.11	21.72± 0.98	43.3	7.8	2.0
5.	10 – 12	41	11.20± 0.10	29.27± 0.10	48.3	9.8	1.65
6.	13 – 15	82	13.70± 0.09	41.58± 0.83	51.7	9.8	1.25
7.	16 – 19	39	17.54± 0.19	44.51± 0.99	59.2	11.6	1.33
8.	20 – 29	96	22.88± 0.27	47.12 ±0.75	59.8	14.5	1.27
9.	30 – 39	50	33.6 ± 0.41	54.4 ± 1.50	59.4	15.0	1.09
10.	40 – 49	31	42.64± 0.54	53.9 ± 1.65	59.8	11.3	1.04
11	50+	25	56.30± 1.20	54.7 ± 2.17	52.8	12.0	0.96

The average protein intake varied from 30-68 gm in males and 29-59.8gm in females. Maximum animal protein intake was in group I in males and group 11 in females. Mean values of serum protein in various age groups in males and females showed uniform distribution. Total serum proteins ranged from 6.4-8.0 G% in males and 6.5-7.8 G% in females. Serum albumin levels varied from 3.6-5.2 g% and 3.6-4.9 g% and globulin levels from 2.7-3.1 g% and 2.5-3.2 g% in males and females, respectively.

Slightly lower values for albumin and globulin were observed in infants below 1 year of age. No statistical differences were observed in total protein, albumin and globulin levels in both sexes in various age groups. The average albumin/ globulin ratio ranged from 1.3-2.0 in males and 1.2-1.8 in females. Mean ± 2 S for total protein in all groups except babies from 0-1 years was 7.6g% (5.9 - 93) in males and 73 g% (5.8-8.8) in females and for albumin, 4.8(3.4-6.2) in males and 4.6 (3.3-5.9) in females.

DISCUSSION

Mean values of serum protein, albumin and globulin are within the range of other reported series in this country and elsewhere[1-4,10-12]. Mean protein levels were also low in the babies under 1 year of age. [13] No significant change was noted with age and sex in other groups (Table III, IV).

TABLE III. Mean Serum,T. Protein, Albumin, Globulin & A/G ratio in 274 apparently Healthy Males of various Age Groups.

S. No.	Groups Yrs.	Nos	T. Protein ±SD with observed Range (G%)	Albumin ± SD with observed range (G%)	Globulin ± SD with observed range (G%)	A/G ratio
1	<1 yr	5	6.4 ± 0.36 (5.8 – 6.8)	3.5 ± 0.58 (2.3 – 4.1)	2.8 ± 0.46 (2.1 – 3.5)	1.30
2.	1 – 3	16	6.7 ± 0.61 (5.4 – 7.6)	4.0 ± 0.38 (3.2 – 4.8)	2.7 ± 0.54 (1.5 – 3.6)	1.50
3	4 – 6	11	7.5 ± 0.71 (5.9 – 8.3)	4.6 ± 0.85 (3.4 – 5.4)	2.9 ± 0.65 (2 – 3.8)	1.56
4.	7 – 9	40	7.1 ± 0.78 (5.6 – 8.5)	4.5 ± 0.63 (3.5 – 5.8)	2.6 ± 0.69 (1.1 – 3.9)	1.80
5	10 – 12	36	7.2 ± 0.97 (5.8 – 8.8)	4.8 ± 0.57 (3.2 – 5.8)	2.4 ± 0.88 (1.1 – 3.5)	2.0
6	13 – 15	17	7.2 ± 0.85 (5.9 – 8.6)	4.8 ± 0.58 (3.5 – 5.7)	2.4 ± 0.68 (1.0 – 3.2)	1.9
7.	16 – 19	38	7.9 ± 0.66 (6.2 – 8.9)	5.1 ± 0.52 (4.2 – 5.8)	2.8 ± 0.59 (1.9 – 4.3)	1.85
8	20 – 29	48	7.90 ± 0.51 (6.8 – 8.9)	5.1 ± 0.66 (3.6 – 5.8)	2.9 ± 0.69 (1.5 – 4.0)	1.82
9	30 – 39	25	7.8 ± 0.66 (6.2 – 8.7)	5.1 ± 0.64 (4.0 – 5.8)	2.7 ± 0.50 (2.0 – 3.4)	1.35
10	40 - 49	22	7.9 ± 0.64 (6.0 – 8.7)	4.8 ± 0.61 (3.5 – 5.8)	3.2 ± 0.71 (2.0 – 4.4)	1.50
11	50+		7.9 ± 0.63 (6.6 – 8.9)	4.8 ± 0.68 (3.5 – 5.8)	3.1 ± 0.62 (2.1 – 4.1)	1.50
#Mean ± 2S (95% confidence limit)			7.6 ± 0.63 (5.9 – 9.3)	4.8 ± 0.68 3.4 – 6.2)	2.7 ± 0.72 (1.3 – 4.1)	

Excluding group I.

TABLE IV. Mean Serum Total Protein, Albumin, Globulin and A/G ratio in 182 apparently Healthy Females of various Age Groups.

Groups Yrs	Nos.	T. Protein ± SD with observed (Range) G%	Albumin ± SD with observed (Range) G%	Globulin ± SD with observed (Range) G%	A/G ratio
<1 yr	4	6.5 ± 0.77 (5.2 – 7.2)	3.6 ± 0.69 (2.5 – 4.4)	2.9 ± 0.46 (2.5 – 3.7)	1.24
1 – 3	12	6.7 ± 0.50 (6.1 – 7.5)	4.2 ± 0.52 (3.5 – 5.1)	2.5 ± 0.55 (1.7 – 3.2)	1.70
4 – 6	13	7.0 ± 0.77 (5.7 – 8.0)	4.0 ± 0.52 (3.4 – 5.4)	3.0 ± 0.52 (2.2 – 3.8)	1.30
7 – 9	18	6.9 ± 0.85 (5.1 – 8.0)	4.3 ± 0.57 (3.1 – 5.5)	2.6 ± 0.41 (2.0 – 3.3)	1.60
10 – 12	13	6.8 ± 0.56 (6.0 – 7.8)	4.4 ± 0.50 (3.5 – 5.4)	2.4 ± 0.38 (1.6 – 3.0)	1.80
13 – 15	16	7.7 ± 0.46 (6.8 – 8.4)	4.9 ± 0.40 (3.1 – 5.5)	2.8 ± 0.47 (2.0 – 3.4)	1.77
16 – 19	18	7.4 ± 0.65 (6.4 – 9.0)	4.9 ± 0.76 (3.0 – 5.8)	2.5 ± 0.73 (1.5 – 4.1)	1.50
20 – 29	41	7.4 ± 0.71 (6.0 – 8.7)	4.7 ± 0.67 (3.3 – 5.8)	2.7 ± 0.80 (0.9 – 4.0)	1.77
30 – 39	29	7.6 ± 0.79 ((5.9 – 9.0)	4.7 ± 0.66 (3.2 – 5.8)	2.9 ± 0.74)1.7 – 4.0)	1.43
40 – 49	8	7.7 ± 0.45 (7.0 – 8.6)	4.9 ± 0.65 (4.1 – 5.9)	2.8 ± 0.78 (1.7 – 4.0)	1.53
50+	10	7.2 ± 0.51 (6.4 – 8.2)	4.6 ± 0.43 (4.0 – 5.5)	2.6 ± 0.61 (1.5 – 3.2)	1.70
#Mean ±2S (95% confidence limit)		7.3 ± 0.68 (5.8 – 8.8)	4.6 ± 0.67 (3.3 – 5.9)	2.7 ± 0.67 (1.4 – 4.0)	–

Excluding group I

Serum protein intake rather than age higher levels of proteins comparatively higher intake of total proteins and animal proteins (Table I & II). The mean A/G ratio was within normal range in all age groups in both sexes (Table III & IV). A/G ratio is reliable only when it is done in serum. Ratio is incorrect in plasma because of fibrinogen. Protein values reach the normal levels observed in this series and other series after the age of 1 year[3,4,14]. All proteins value were within 2.5 and 97.5 percentile (95% of the total popqlation) irrespective of age and sex in an individual except babies under 1 year (Table III & IV). These values were considered to be normal as their total protein intake/ nearly upto the recommended intake[9,15-17]. In addition to providing baseline data on healthy individuals of various

ages and sex, this study also furnishes the necessary foundation for the interpretations and findings in various disease states in our population.

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