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Research Article

Effect of aging on various haematological parameters

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Abstract

Background: The present study was done to find out the significant changes in various haematological parameters with advancing age, both in males and females.

Material and methods: The prospective cross sectional study was conducted in the Physiology Department in collaboration with Pathology Department at M.P Shah Govt Medical College, Jamnagar, Gujarat with sample size of 103 in the age group of 20 to 89 years. Out of these, 53 were males and 50 were females. Haematological parameters were measured by automated cell counter.

Result: Our result showed that most of the haematological parameters decrease significantly in males after fifth decades. In females, the changes were not significant in most of the haematological parameters.

Conclusion: Non significant changes of haematological parameters in females might have some hormonal correlation. Poor nutrition resulting in vitamin B_{12} and folic acid deficiency in old age might be the cause of early haematologial changes and early aging. Further study with large sample size may reveal more information.

Keywords: Haematological parameters, aging

1. Introduction

Aging is the progressive deteriorative changes during the adult period of life which underlie an increasing vulnerability to challenges and thereby decrease the ability of the organism to survive.[1]

According to different studies[2,3,4,5] the hemoglobin concentration, red blood cell count and hematocrit value began to decrease in men in their sixth decade and in women in their seventh decade and the change were more prominent with advancing age, especially in men.

The present study was carried out to find the significant changes in various haematological parameters with advancing age both in males and females.

2. Materials and methods

The prospective cross sectional study was conducted in the Physiology Department in collaboration with Pathology Department at M.P Shah Govt Medical College, Jamnagar, Gujarat. The study duration was of six months and sample size was 103. Healthy volunteers in age group of 20 to 89 years were included in our study. Both male and female volunteers were included. Out of these, 53 were males and 50 were females.

The instrument used in this study was automated cell counter, named Sysmex KX-21. The Sysmex KX-21 is an automatic multi-parameter blood cell counters for in vitro diagnostic use in clinical laboratories.[6]

2.1 Statistical analysis

The appropriate statistical method ANOVA was employed. The probability value $p < 0.05$ considered as statistically significant and probability value $p > 0.05$ considered as statistically non significant.

3. Results

Table - 1 show mean values of Haemoglobin, RBC count and Packed cell volume (PCV) among females in all age groups. The difference among females in all the age group was found to be statistically non- significant ($p > 0.05$).

Table -1: Hemoglobin, RBC Count and PCV among Females

Age group(in years)	Hemoglobin (gm %) Mean + SD	RBC Count (million/cumm) Mean + SD	Packed Cell Volume (%) Mean + SD
20-29	12.24 + 0.65	4.54 + 0.60	36.54 ±1.13
30-39	12.40 ± 0.93	4.41 ± 0.24	36.17 ± 1.94
40-49	12.41 ± 1.60	4.63 ± 0.58	36.95 ± 4.51
50-59	12.10 ± 1.06	4.38 ± 0.80	36.47 ± 3.24
60-69	11.41 ± 0.53	4.37 ± 0.52	34.74 ± 2.62
70-79	11.74 ± 1.94	4.34 ± 0.90	36.07 ± 5.19
80-89	11.60 ± 0.65	4.34 ± 0.53	34.46 ± 2.03

Table - 2 shows mean values of Haemoglobin, RBC count and Packed cell volume (PCV) among males in all age groups. The difference among males in all the age group was found to be statistically significant ($p < 0.05$). The difference among males was highly significant in fifth decades.

Table -2: Hemoglobin, RBC Count and PCV among Males

Age group(in years)	Hemoglobin (gm %) Mean ± SD	RBC Count (million/cumm) Mean ± SD	Packed Cell Volume (%) Mean ± SD
20-29	14.60 ± 1.10	5.27 ± 0.50	43.47 ± 2.73
30-39	14.30 ± 0.85	5.08 ± 0.54	42.73 ± 1.59
40-49	12.79 ± 0.95	4.66 ± 0.53	39.14 ± 2.72
50-59	12.45 ± 1.58	4.72 ± 0.60	38.30 ± 4.54
60-69	12.41 + 1.30	4.66 ± 0.23	38.75 ± 3.67
70-79	11.76 ± 1.31	4.20 ± 0.65	36.29 ± 4.43
80-89	11.77 ± 1.04	4.24 ± 0.44	36.75 ± 2.31

Table - 3 shows mean values of MCV, MCH and MCHC among females in all age groups. The difference among females in all the age group was found to be statistically non- significant ($p > 0.05$).

Table -3: MCV, MCH and MCHC among females

Age group(in years)	MCV(femtolitre) Mean ± SD	MCH (picogram) Mean ± SD	MCHC (gm/dl) Mean ± SD
20-29	83.34 ± 9.48	27.91 ± 3.86	32.59 ± 1.65
30-39	82.03 ± 3.62	26.33 ± 4.13	31.84 ± 2.22
40-49	78.50 ± 8.57	26.48 ± 3.15	33.41 ± 1.02
50-59	85.31 + 6.28	28.99 + 3.37	33.37 + 0.90
60-69	81.61 + 9.90	27.00 + 4.19	31.73 + 1.22
70-79	79.04 + 7.73	26.01 + 2.49	31.93 + 1.23
80-89	82.20 + 8.05	27.10 + 3.26	32.90 + 1.37

Table - 4 shows mean values of MCV, MCH and MCHC among males in all age groups. MCV increases significantly ($p < 0.05$) with age in males while MCH shows no significant change ($p > 0.05$). MCHC shows significant decrease with age.

Table -4: MCV, MCH and MCHC among Males

Age group(in years)	MCV(femtolitre) Mean + SD	MCH (picogram) Mean + SD	MCHC (gm/dl) Mean + SD
20-29	81.93 + 8.77	27.61 + 3.85	33.59 + 1.38
30-39	85.67 + 4.00	28.30 + 3.54	33.50 + 1.89
40-49	85.91 + 7.37	28.69 + 3.13	33.03 + 1.16
50-59	85.28 + 4.14	26.79 + 3.64	32.69 + 1.57
60-69	85.29 + 5.04	25.78 + 4.31	32.19 + 2.28
70-79	88.84 + 6.23	29.01 + 2.82	32.58 + 1.02
80-89	87.73 + 7.91	28.50 + 3.34	32.08 + 1.86

4. Discussion

Aging is heterogeneous and varies widely in different individuals. Our aim was to know the effect of aging on various haematological parameters and to understand the cellular and molecular basis of age related changes. By this, we can determine the changes of aging as early as possible and thereby extending the life span as well as decreasing the morbidity and mortality. In our study, males of different age groups having significant changes in different haematological parameters while females of different age groups showed non-significant changes.

5. Conclusion

Aging is not a disease; however, the risk of developing disease is increased[7]. Our result reflected almost same trend with some previous researchers[2,3,4,5]. This can be correlated with some hormonal changes in females. Poor nutrition resulting in vitamin B_{12} and folic acid deficiency in old age might be the cause of early haematologial changes and early aging. Awareness about balanced diet probably slows the aging processes. Further in depth studies with more sample size may provide a concrete point about it.

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