

Original Article**Effect of aging on WBC count and Platelet count**

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ABSTRACT

Background: Aging is not a disease but due to biochemical changes in tissue it increase risk for development of disease. It also affects the blood cells count.

Aims: To determine the changes of aging as early as possible and thereby extending life span.

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. Blood parameters were measured by automated cell counter.

Result: Our result showed that Platelet count decrease significantly in males after sixth decade. In females, the changes were not significant in most of the blood parameters.

Conclusion: Poor nutrition resulting in vitamin B₁₂ and folic acid deficiency in old age might be the cause of early hematological changes and early aging. Non significant changes of blood parameters in females might have some hormonal correlation. Further study with large sample size may reveal more information.

Key words: Blood cells, aging, Hematological parameters

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].

Aging is not a disease; however, the risk of developing disease is increased, often dramatically, as a function of age. The biochemical composition of tissues changes with age; physiologic capacity decreases, the ability to maintain homeostasis in adapting to stressors declines, and vulnerability to disease processes increases with age. After maturation, mortality rate increases exponentially with age. Studies of aging (gerontology) are aimed at understanding the cellular and molecular basis of age-related changes and have two ultimate therapeutic goals: preserving function as long as possible and extending life span [2].

According to different studies Total WBC count, Differential WBC count show no correlation with age and Platelet count decreases with age [3-9].

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

MATERIALS AND METHODS**Sample size**

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.

Testing methods

All the samples are tested by automated cell counter. 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 [10].

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.

Ethical clearance: Study has been approved by Institutional Ethical Committee

RESULTS**Table 1: Mean of Total WBC Count Females and males (thousand / cu mm)**

Age Group (in years)	Mean of Total WBC Count among females (thousand / cu mm)	SD (\pm)	P value	Mean of Total WBC Count among males (thousand / cu mm)	SD (\pm)	P value
20-29	7.33	1.97	0.633	7.40	1.79	0.101
30-39	6.57	2.32		6.53	1.34	
40-49	7.26	1.65		6.46	1.43	
50-59	7.23	1.36		7.64	1.96	
60-69	6.56	1.61		7.93	2.39	
70-79	7.00	2.40		7.83	1.86	
80-89	7.01	1.57		7.80	2.42	

Table -2: Differential count among females

Differential count among females						
Age Group (in years)	Mean of Neutrophil (%)	SD (\pm)	Mean of Lymphocyte (%)	SD (\pm)	Mean of Others (%)	SD (\pm)
20-29	58.01	6.07	33.83	5.00	8.17	3.10
30-39	61.89	9.30	29.83	6.49	8.29	3.78
40-49	58.88	8.38	31.80	5.85	9.31	3.92
50-59	56.19	4.89	33.67	4.96	10.14	4.16
60-69	59.09	5.54	33.70	5.14	7.21	2.24
70-79	58.73	6.95	30.71	5.43	11.41	3.90
80-89	57.26	7.28	33.09	5.97	9.66	3.73

Others: Monocytes, Eosinophils and Basophils

Table -3: Differential count among males

Differential count among males						
Age Group (in years)	Mean of Neutrophil (%)	SD (\pm)	Mean of Lymphocyte (%)	SD (\pm)	Mean of Others (%)	SD (\pm)
20-29	56.89	6.57	34.64	5.84	8.47	3.67
30-39	57.60	2.89	32.77	2.31	9.63	4.18
40-49	60.17	5.55	29.37	5.78	10.47	2.36
50-59	63.76	5.92	27.30	3.87	8.84	2.78
60-69	61.96	8.64	29.01	8.13	9.03	2.47
70-79	60.40	8.65	29.95	7.86	9.65	1.66
80-89	62.10	5.99	27.87	6.88	10.03	2.26

Table No. - 1 show mean values of Total WBC count among females and males in all age groups. Mean of Total WBC Count among females ranges between 6.56 thousand / cu mm and 7.33 thousand / cu mm. Mean of Total WBC Count among males ranges between 6.46 thousand / cu mm and 7.93 thousand / cu mm. There is no age wise up or down trend in Total WBC Count among females or males.

Table No. - 2 show mean values of Neutrophil, Lymphocyte and other cells (Monocytes, Eosinophils and Basophils) count among females in all age groups. The range of Mean Neutrophil value is 56.19 % – 61.89 %. The range of Mean Lymphocyte value is 29.83 %- 33.83 %. The range of Mean other cells value is 7.21 %-11.41 %. This doesn't show any relationship of variation with age in females.

Table No. - 3 show mean values of Neutrophil, Lymphocyte and other cells (Monocytes, Eosinophils and Basophils) count among males in all age groups. The range of Mean Neutrophil value is 56.89 % – 63.76 %. The range of Mean Lymphocyte value is 27.30 %- 34.64 %. The range of Mean other cells value is 8.47 %-10.47 %. This doesn't show any relationship of variation with age in males.

Table 4: Total Platelet Count among females

Total Platelet Count among females			
Age Group (in years)	Mean of Total Platelet Count (Lakhs / cu mm)	SD (±)	P value
20-29	3.67	0.50	0.018
30-39	2.83	0.52	
40-49	3.15	0.33	
50-59	3.23	0.60	
60-69	2.56	0.48	
70-79	2.97	0.87	
80-89	2.87	0.38	

Table No. - 4 show mean values of Platelet count among females in all age groups. Mean of Total Platelet Count among females ranges between 2.56 lakhs /cu mm and 3.67 lakhs /cu mm and it decreases with age. The difference was found to be statistically significant ($p < 0.05$). The difference among females was highly significant in seventh decades but it does not remain consistent. So it needs larger study to prove.

Table 5: Total Platelet Count among males

Total Platelet Count among males			
Age Group (in years)	Mean of Total Platelet Count (lakhs / cu mm)	SD (±)	P value
20-29	2.98	0.59	0.045
30-39	3.01	0.67	
40-49	2.87	0.64	
50-59	2.97	0.75	
60-69	2.79	0.88	
70-79	2.74	0.68	
80-89	2.71	0.38	

Table No. - 5 show mean values of Platelet count among males in all age groups. Mean of Total Platelet Count among males ranges between 2.71 lakhs /cu mm and 3.01 lakhs /cu mm. It progressively decreases with age from 2.98 lakhs /cu mm (in 20-29 yr age group) to 2.71 lakhs /cu mm (in 80-89 yr age group).The difference in all the age group was found to be statistically significant ($p < 0.05$). The difference among males was highly significant in seventh decade.

DISCUSSION

Change in total WBC count in either males or females seem to be insignificant. Results found in study done by Balasubramaniam et al WBC count show no correlation with age [3]. Another study done by Bovill et al also supports our results [4].

Differential count shows no significant variation with age either in males or in females. Results are also supported by other study as well [5].

While observing the mean of total platelet count among females no significance is found but in case of males it is decreasing and another point is mean platelet count in females is higher at any age in comparison to males. In study done by Balasubramaniam et al results found are almost same [3]. In study done by Biino et al mean platelet count in male and female both is progressively decreasing and Platelet count is higher in female than in male [6]. Results are supported by other studies also [5, 7-9].

CONCLUSION

In our study, males of different age groups having significant changes in different heamatological parameters while females of different age groups

showed non-significant changes. This can be correlated with some hormonal changes in females.

Poor nutrition resulting in vitamin B₁₂ and folic acid deficiency in old age might be the cause of early hematological 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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