

Comparison of Hematological and Ventilatory Parameters in Exercising and Non-Exercising Recruits of Police Training School

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Abstract:

Background: Policemen and Sportsmen are symbol of physically fit healthy individuals. Medical facts are contrary as police recruits in training are anemic.

Material & Method: 50 physically fit recruits aged 20-29 years of Police Training School, Indore were subdivided into three groups according to their exercising period as non-exercising, exercising for 2 months and 10 months respectively. Fasting sample of blood was collected for hematological parameters. These 3 groups were assessed for pulmonary function tests. Students t-test and Chi square tests were applied to all 3 groups.

Results: Hematological parameters were lower in group B and C whereas the PFT were recorded higher in group B and C in comparison to group A but was not statistically significant.

Conclusion: Hematological parameters shows decrease with increase in exercise indicating sports anemia.

Keywords: Hematological parameters, Pulmonary function test, Training, Anemia.

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Introduction

Athletes are, by definition, healthy subjects, but they often have out-of-range hematological or biochemical parameters due to physical exercise, training, physiological and psychological stress, environmental conditions, etc. [1] Hemodilution and redistribution is by far the most common cause for sports anemia.

Material and Method

Fifty members of police training school, Indore, who were physically fit, young males (aged 20 to 29 years), volunteered as subjects for this study. They were selected randomly. We subdivided these

recruits into three groups according to their period of exercising. All the subjects were examined thoroughly and a Complete Medical Check-up was done in each individual. We found no family history of asthma. Their Height, Weight was taken & Chest Expansion was measured by the circumference of chest at mid-thoracic (nipple line) level in complete inspiration & expiration. The instrument Modern Med Spiror was used to determine forced expiratory Spirogram in exercising & non-exercising groups FVC, FEV1, PEF, FEF, MVV were recorded along with

hemoglobin, hematocrit and serum iron parameters. values for each group.

Results:

Table 1: General Details

S. No.	Physical characteristics	Group A(=10)	Group A(=20)	Group A(=20)
1.	Age (yrs)	24.6±2.22	24.25±2.63	23.7±2.47
2.	Height (cms)	165.3±5.12	169.95±4.96	168.8±3.77
3.	Weight (kgs)	53.9±4.70	59.5±4.81	58.6±3.67
4.	Chest (inches)	32.4±.96	33.85±1.29	33.5±.94

Table 2: Hematological parameters of control and exercising groups

Parameters	A	B	C
Hb gm%	14.5±0.63	13.10±1.20	13.85±1.45
PCV %	43.5±2.27	40.85±3.04	42.79±3.52
S. Iron mg%	112.78±16.32	81.80±29.80	32.89±2.16
TIBC mg%	302.31±22.81	317.58±43.42	329.48±31.34

Table 3: p- value Hematological parameters

Parameters	A vs B	A vs C	B vs C
Hb gm %	0.001*	0.001*	0.04
PCV %	0.01*	0.287	0.03
S. Iron mg %	0.003*	0.56	0.01*
TIBC mg %	0.15	0.1	0.16

It is evident from the above table that decrease in hemoglobin in group B and C is statistically significant.

Table 4: Ventilatory parameters of control and exercise

Parameters	A	B	C
FVC	3.55±.42	3.73±0.48	3.38±0.91
FEV1	3.38±.29	3.50±0.42	3.21±0.28
MVV	127.33±.47	163.60±36	162.75±23.97

Table 5: p- value ventilatory parameters

Parameters	A vs B	A vs C	B vs C
FVC	0.16	0.28	0.53
FEV1	0.21	0.067	0.01*
MVV	0.001*	0.005*	0.46

FEV1 and MVV is statistically significant depicting improved ventilation.

Discussion

Present study compares hematological parameters and ventilatory parameters being done on 50 recruits of police training school, Indore. Recruits were divided into 3 groups depending on the time period of training of 1 month, 3 month and 9 month. It is evident from the study that group B shows decrease in Hb%, PCV% and Serum iron % in comparison to control

group A. Also, there is decrease in serum iron in group C and is significant. The study is in consonance with other authors [2,3]. The decrease in hematocrit (Hct), hemoglobin (Hb), and red blood cell (RBC) count caused by endurance training is explained by an exercise-induced plasma volume expansion, which takes place within few days of intensive training [4-6] apart from increased demands, iron

reduced absorption, iron sequestration, and losses, as well as other causes of anemia in athletes [7].

Also, the ventilatory parameters shows improvements in group B and C in comparison to control group A though it is not statistically significant except for FVC. This result is in consonance with that of Shepherd et al. [8] who suggested that the changes may be due to increase in strength of skeletal muscle. Sinning et al, fox and Lakhera et al also explained that improvement may be due to increase in functioning alveoli number, their dilation, increased capillary vascularization and strength of respiratory muscles. [9,10,11,12]

Conclusion

Sub optimal hemoglobin and low serum iron level is seen in athletes depicting sports anemia at the same time increase in respiratory muscle strength leads to increase in ventilation of the lungs. Nutritional intervention and counselling will improvise the hematological picture in athletes.

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