



VARIATIONS IN PLATELET COUNT WITH PHYSICAL ACTIVITY

Physiology

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ABSTRACT

Background: The beneficial effect of regular exercise on physical fitness is well documented. There is also evidence that acute and chronic exercise affect platelet activation in different ways. Few studies are available on effect of exercise on platelets function. Therefore, present work has been undertaken to study the effect of exercise on platelets.

Materials and Methods. The study was conducted on 40 healthy female subjects in the age group of 20-25. Samples for platelet counts, were obtained prior to training and after 12 wk. Data obtained was compiled using computer software MS Excel for Windows. Statistically significant differences among quantitative variables were evaluated by Independent t-test and with the help of SPSS software (version 20). A p-value less than 0.05 was considered as statistically significant.

Conclusion. according to results of present study platelet count was found to be increased in subjects who did physical exercise for 12 weeks.

KEYWORDS

Introduction .

Most organs and tissues are affected by physical activity and adapt to regular exercise. Physical activity refers to all bodily movements that results from the contraction of the skeletal muscles and, results in increased energy expenditure. Physical activity can be carried out at different levels of intensity. The more intense, the greater the immediate impact on various bodily functions. The length of the period of exercise training also plays a major role. Although some effects of exercise can be seen after short time of one to a few weeks. other important factors are frequency (how often the person exercises), duration (how long a session is) and intensity. Physical activity has various effects on various systems of the body including blood parameters. An exercise session leads to a significant increase in the number of platelets in the blood., but due to a release of blood platelets from various organs, such as the spleen, bone marrow and from pulmonary. (Jan Henriksson and Carl Johan 2010). Activation of platelets is closely related to the liberation of growth factors and inflammatory mediators. This is of special interest as the inflammatory and immunomodulatory consequences of platelet activation are increasingly recognised and platelets seem to be of central importance not only to final stage of cardiovascular disease but also to the development of these diseases. As blood platelets are of central importance to the process of primary haemostasis and coagulation any abnormalities in platelet function result in severe and potentially lethal consequences. Activation of platelets results in platelet aggregation and subsequent thrombus formation(Stefan and Ivo 2015) .

Today, sportive and physical activities and its effects on various organelles of the body is under consideration. Research's and studies in this field have shown that sport and exercise has a positive effect on efficiency and keeping the body healthy. (Ellahe et al 2014)

Materials and Methods.

The study was conducted on 40 healthy female subjects in the age group of 22-25. Subjects were divided into two groups. Group I comprised of 20 physically active female subjects. Group II (control group) consisted of 20 sedentary subjects taken from the Girls Hostel of Government Medical College, Jammu. The subjects in Group I were taken from different health clubs located in different parts of Jammu city. All participants gave written informed consent. Subjects have been selected among people who do not use drugs and do not drink addictive beverages. Subjects with history of hematological disease, and heart disease were excluded from study. The subjects (participated in supervised program of treadmill exercise. Subjects exercised for 20 min, three times weekly, for 12 wk. Blood samples taken from the volunteers from their forearm antecubital area in line with hygiene rules were analyzed in the central laboratory by means of an auto-analyzer

for haematological levels such as platelets Samples for platelet counts, were obtained prior to training and after 12 wk .

Statistical Analysis

Data obtained was compiled using computer software MS Excel for Windows. Statistically significant differences among quantitative variables were evaluated by Independent t-test and with the help of SPSS software (version 20). A p-value less than 0.05 was considered as statistically significant.

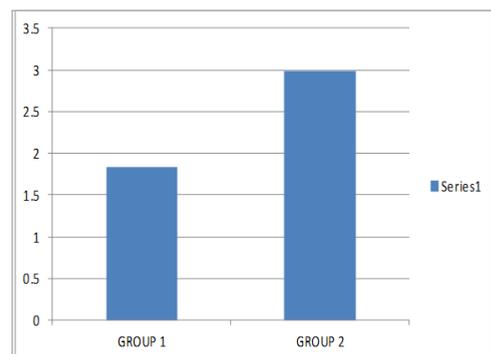
RESULTS.

Before exercise absolute platelet count ranged from 1.56 to 2.56 with a mean \pm standard deviation of 1.84 ± 0.30 lacs. After exercise absolute platelet count ranged from 1.72 to 4.85 with a mean \pm standard deviation of 2.98 ± 0.90 lakhs/mm³.

Platelet count	Range (lakhs/mm ³)	Mean \pm Standard deviation (lakhs/mm ³)	
Before exercise	1.56 to 2.56	1.84 ± 0.30	p<0.0001
After exercise	1.72 to 4.85	2.98 ± 0.90	p=0.004

Platelet count before and after exercise in a bar diagram.

Group 1- Before exercise-1.84
Group 2- After exercise-2.98



DISCUSSION

It is being reported that exercise exerts physiological stress on the body and results number of chemical (hormonal) and cellular changes. This depends on number of factors such as type and duration of exercise(Rashida, and Din et al 2007). The results of present study showed that exercise increases platelet count. Several studies show that acute exercise results transient increase in platelet count. This increase is caused by hemoconcentration and

by platelet release from liver, lungs and spleen. (K.G Chamberlain et al.1990) (K. G. Schmidt and J. W. Rasmussen et al 1984). Our results are also in agreement with the study conducted by (Davis et al. 1990), who studied, the effects of exercise and exercise conditioning on blood platelet function. Platelet function were investigated in six healthy individuals who had not engaged in regular exercise for at least 1 yr prior to the study. It was found that Platelet counts increased after exercise .Our findings are in agreement with the study conducted by (Ghanbari et al 2005) who observed that physical activity improves platelet count which may be associated with release of fresh platelet from vascular bed of the spleen, bone marrow and other platelet reservoir. (Arazi et al 2005) Observed that epinephrine causes a strong contraction of the spleen (where 1/3 of body platelets are stored); as epinephrine levels rise in physical activity this may account for elevated level of platelets after exercise. (Ahmadizad S and El-Sayed 2003) also observed increased platelet count after exercise. (Özdengül 1998) also support our findings that platelet count increases after exercise. (Drygas, and W.K.1988) observed increased platelet count after exercise. (Ribeiro and Almeida 2007) also supports our study. Results of present study are consistent with the work of (Odland PD et al. 1994), who reported increased platelet count after exercise. Similarly (Rock et al. 1997) reported increased platelet count after exercise. (Salimeh Mahmoodinezhad et al 2016) conducted a study on 30 female athletes and observed that physical exercise increases platelet count. An activation of blood platelets has also been observed during acute exercise. Such an activation is due to increased occurrence of the protein, P-selectin, on the platelets, surface, with greater aggregation tendency of platelets and greater formation of thrombin and fibrin leading to a shortened coagulation time (Fotios 2012). (Patlar and Keski 2007) also observed increased platelet count after exercise. Our findings are also supported by (Bourey and Santoro 1988), who measured the effects of exercise and training on coagulation, platelet function and fibrinolysis in normal human subjects. They reported that platelet count, Factor VIII activity and fibrinolytic potential increased after exercise.

Conclusion.

We conclude that platelet count was higher in physically active subject.

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