"SOME BIOCHEMICAL STUDIES ON HUMANS BLOOD BEFORE AND AFTER EXERCISE"

BY

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ABSTRACT

Two healthy male student athletes specializing in track and field were used for this study. A total of 10 individuals were exposed to two types of exercise in which the first type of exercise was running in the track for a duration of 20 minutes. The second type of exercise (exercise II) was carried out on five individuals for a duration of 20 minutes without the assistance of any external support. At the end of exercise, serum samples were obtained from each individual and subjected to measurement of various biochemical parameters such as glucose, lactate, creatine concentration, plasma protein, etc. The results of this study revealed that exercise significantly increased serum glucose, lactate, and creatine concentrations. Exercise also significantly decreased plasma protein concentration. The results obtained in this study are in agreement with previous studies indicating that exercise induces major biochemical changes in skeletal muscle. The nutritional state, intensity and duration of exercise, and degree of physical fitness are all factors that qualitatively and quantitatively affect the metabolic pathways used in the generation of energy for muscular contraction. Overall, exercise will cause a significant increase in certain biochemical analytes. Altering these changes in plasma volume of the individual. A change in plasma volume resulting from physical activity will vary depending on the intensity and the duration of the exercise bout. Generally, acute exercise of long duration causes the plasma volume to...
be increased, resulting in hemococoncentration. In this situation, a temporary relative increase in electrolytes and plasma proteins occurs. Metabolic changes are particularly glucose disposal and turnover. The term and prolonged exercise, a long with the possible adaptations that take place after physical training, have been studied in various human and animal populations.

Subsequent studies have shown that many factors determine the degree to which such activities of serum enzymes increase either during or after physical exercise. Deliberate or accidental trauma to tissues can lead to biochemical enzyme activities in the plasma. It was believed that the protein is not used as a source of fuel to any appreciable extent during exercise. This was based on the nitrogen excretion did not change significantly following muscular work in humans (Astrand and Rodal, 1976). However, there have been several studies which indicated that significant alterations in protein metabolism can occur during and/or after exercise. These observations have been made during exercise on both humans (Lemon et al., 1981) and animals (Lemon et al., 1983).

The major protein degradation and product in the human is urea - 99% of total nitrogen loss in both urine and sweat with exercise (Coxey, 1975). This suggested that protein utilization was increased as a result of the same exercise (Daha et al., 1982).

Furthermore, strenuous or prolonged exercise can result in significant, transient alteration of the biochemistry and homeostatic profile. However, modification of biochemical parameters via exercise occur owing to accumulation and consumption of metabolic fuels triggered by the sympathetic nervous system. There is also an increased permeability of cell membranes to proteins and enzymes. Also, the excessive loss of sodium and chloride through sweating results in salt depletion which leads to hypotension, nausea, illness, dizziness, and irritability. This occurs. Salt and water of the sweat is not replaced before extensive depletion of the body occurs (Nature, 1987; and Lodell, 1949).

Accordingly, this work was planned to determine the effect of different durations of exercise on biochemical blood parameters in California humans before and after muscular exercise.

MATERIAL AND METHODS

The present work was carried out in the faculty of physical education for men, Zagazig University. A group of healthy male student participants were divided into two groups: one group served as control group and the other group served as pre-exercise group. The mean age of the control group was 20 ± 2 years. The study involved the determination of biochemical parameters in blood samples taken before and after an exercise training program.

Venous blood samples were obtained from 36 individuals, those samples represented the control and pre-exercise groups. The control group was exposed to two types of exercise. First, the light exercise (Exercise I) was carried out as soon as possible of muscle groups of exercise I. Second type of exercise (Exercise II) was carried out after 10 minutes. The second type of exercise (Exercise II) was carried out after 10 minutes for a duration of 20 minutes. Blood samples were collected. These second type of exercise (Exercise II) was carried out as soon as possible of muscle groups of exercise II. The collected data were differentiated into pre-exercisive (control), light exercise (Exercise I) and heavy exercise (Exercise II). Venous blood samples were collected into sterile plastic vials and serum were separated by centrifugation and stored at −70°C until the biochemical analysis could
RESULTS AND DISCUSSION

As shown in Table 1, the serum total protein levels were increased significantly after exercise I and II, whereas the albumin level was increased significantly after exercise II. The serum globulins levels were increased significantly after exercise I and II, whereas the pre-exercise values were increased significantly after exercise II. The serum levels of serum creatinine, uric acid, and glucose were increased significantly after exercise II. The serum levels of sodium and potassium were increased significantly after exercise I and II.

Statistical analysis of the data was performed using the method of Snedecor and Cochran (1946).

The increase in serum creatinine level was due to the increased production of creatinine by the working muscle. The increase in serum uric acid level was due to the increased production of uric acid by the working muscle. The increase in serum glucose level was due to the increased mobilization of glycogen from the liver and muscles.

The values of blood urea levels revealed a non-significant increase during exercise I, whereas the levels were significantly decreased after exercise II. The values of serum creatinine concentration were increased significantly after exercise II but not significantly after exercise I. The values of serum glucose concentration were increased significantly after exercise II but not significantly after exercise I.
the pre-exercise values (Table 2).

The obtained results are in agreement with those reported by Apple (1982) and others (1991). The decrease of alkaline phosphatase activity after endurance exercises, in both men and women, is similar to the findings of previous studies. The obtained results are in agreement with those reported by Apple (1982) and others (1991). The decrease of alkaline phosphatase activity after endurance exercises, in both men and women, is similar to the findings of previous studies.

However, another significant decrease was observed in the increase of exercise and usually results improved in endurance exercises (Waller, 1991). The results obtained in this study are in agreement with those reported by Apple (1982) and others (1991). The decrease of alkaline phosphatase activity after endurance exercises, in both men and women, is similar to the findings of previous studies.

In conclusion, endurance exercises have an effect on the serum phosphatase activity, especially after long distance running or cycling. The observed decrease in the serum phosphatase activity after endurance exercises, in both men and women, is similar to the findings of previous studies. However, the decrease of alkaline phosphatase activity after endurance exercises, in both men and women, is similar to the findings of previous studies.
physiological changes and sweat in some equines. Ph. D. diss. Sci.
14: 915-922.
- Astrand, P. O. and Rodal, K.
New York: North.
### Table 1: Results of test procedures

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Pre-Exercise</th>
<th>Exercise-1</th>
<th>Exercise-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triglycerides (mmol/L)</td>
<td>0.96 ± 0.19</td>
<td>2.07 ± 0.11</td>
<td>3.07 ± 0.15</td>
</tr>
<tr>
<td>Cholesterol (mmol/L)</td>
<td>4.32 ± 0.21</td>
<td>5.45 ± 0.23</td>
<td>6.57 ± 0.25</td>
</tr>
<tr>
<td>HDL cholesterol (mmol/L)</td>
<td>1.34 ± 0.18</td>
<td>1.56 ± 0.17</td>
<td>1.78 ± 0.19</td>
</tr>
<tr>
<td>Blood glucose (mg/dL)</td>
<td>102 ± 12</td>
<td>107 ± 13</td>
<td>112 ± 14</td>
</tr>
</tbody>
</table>

*P < 0.05

### Table 2: Serum ALP and Alkaline phosphatase activities before and after exercise.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Pre-Exercise</th>
<th>Exercise-1</th>
<th>Exercise-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaline phosphatase (U/L)</td>
<td>16.79 ± 7.27</td>
<td>15.89 ± 6.89</td>
<td>14.93 ± 6.98</td>
</tr>
<tr>
<td>ALP (U/L)</td>
<td>16.92 ± 7.27</td>
<td>16.32 ± 6.89</td>
<td>15.76 ± 6.93</td>
</tr>
<tr>
<td>AST (U/L)</td>
<td>26.43 ± 6.89</td>
<td>25.63 ± 6.89</td>
<td>24.83 ± 6.89</td>
</tr>
</tbody>
</table>

### Table 3: Serum sodium, potassium, calcium, inorganic phosphate and magnesium levels before and after exercise.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Pre-Exercise</th>
<th>Exercise-1</th>
<th>Exercise-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium (mEq/L)</td>
<td>135.0 ± 0.50</td>
<td>135.5 ± 0.50</td>
<td>136.0 ± 0.50</td>
</tr>
<tr>
<td>Potassium (mEq/L)</td>
<td>4.16 ± 0.50</td>
<td>4.20 ± 0.50</td>
<td>4.23 ± 0.50</td>
</tr>
<tr>
<td>Calcium (mEq/L)</td>
<td>9.94 ± 0.50</td>
<td>9.97 ± 0.50</td>
<td>9.99 ± 0.50</td>
</tr>
<tr>
<td>Inorganic phosphate (mg/dL)</td>
<td>0.41 ± 0.10</td>
<td>0.42 ± 0.10</td>
<td>0.43 ± 0.10</td>
</tr>
<tr>
<td>Magnesium (mg/dL)</td>
<td>2.19 ± 0.10</td>
<td>2.21 ± 0.10</td>
<td>2.23 ± 0.10</td>
</tr>
</tbody>
</table>

*P < 0.05

All values are presented as mean ± SD.
بعض الدراسات البيوكيميائية على دم الإنسان قبل وبعد الإجهاد البدني
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** قسم الدراسات البيوكيميائية للدكتور Aba Alalouf - جامعة الشام.

أجرى هذا البحث على طائفة تخصص أطفال الفئة الثانية للكليات البديلة البدنية للسنين جامعة الزقاق.

يركز البحث على دراسة الأداء المحوري وفق الكليات الإيجابية والإنجازات الرياضية، ولقد تم إجراء هذا البحث...

على عدد 100 طالب وفاز جميعهم في حالة صحية جيدة حيث تم تأثير التدريبات الرياضية...

وإنهاء النتائج على بعض مكونات الدم البيوكيميائية، بروتينات النزيف، إنزيمي، نزيف ...

والنشاق، وقد تم أخذ عينات الدم قبل وبعد التمارين مباشرة (الجري) على فترة مختلفة من الوقت.

- 20 دقيقة تالية التمارين التي قد تحدث في مكونات على كل الأيام منهم نتيجة لهذا الإجهاد البدني وقد...

أسفرت النتائج على التالي: أظهرت التحليلات البيوكيميائية للدم إنخفاض معرفي في مستوى البروتينات الكلي...

وتعتبر عضوية والانخفاض العالي للكليا إنخفاض في نسبة البروتين والإنزيمي. وخصوصا في الدم البيوكيميائي...

والبيوطني. بعد التمارين الرياضية بنبئتهم إما بالنيكوتين أو إفرازات سمية...

بعد أداء الإجهاد البدني عند ممارستها تقلل الإجهاد التعب وتنخفض من هذه الدورة أن عملية الإجهاد...

على التمارين العضلية الرياضية وكذلك الإجهاد البدني يمكنهم فحص التمرين كثيرة لا تستهدف بها...

من العناصر والأنسجة المفيدة للمitiousة ودرة ذلك يجب تعريض الأفراد الرياضيين الممارسين للإجهاد...

النوع من الإجهاد العضلي للقدرة المناسب من هذه العناصر بالإضافة إلى النشاط الجيد الممارس.