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Effect of intermittent glucose supplementation on blood Uric acid during endurance performance

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Abstract

Complete inconclusive results were obtained in case of blood uric acid during the entire study period. It was found that in place-bo study, the decreasement of blood uric acid level was found to be 0.102 ± 0.048 mg /dl (mean ± SD, n=20). When single dose of glucose supplementation was given, the blood uric acid level also get decreased (0.072 ± 0.024 mg/dl). But in the contrary to the previous two observations, it was found to be increased (0.137 ± 0.02 mg/dl) when glucose supplementation was given for two times. The level was found to be decreased again when glucose supplementation was given for three times (30,50 and 70 minutes after commencement of the work).

When 't' test was performed by taking μ_o (Null hypothesis) = their was no relationship between glucose supplementation (single dose) and blood uric acid level, it was found that 't' =1.34. It was smaller than the critical value at 5% level of significance (2.09), df =19. Therefore, the null hypothesis was accepted. So, there was no relationship between blood uric acid level and glucose supplementation.

When 't' test was performed by taking μ_o (Null hypothesis) = their was no relationship between glucose supplementation (double dose) and blood uric acid level, it was found that 't' = 0.964. It was well below than the critical value, at 5% level of significance (2.09), df =19. Therefore, the null hypothesis was accepted. So, there was no relationship between blood uric acid level and double doses of glucose supplementation.

When 't' test was performed by taking μ_o (Null hypothesis) = their was no relationship between glucose supplementation (triple dose) and blood uric acid level, it was found that 't' = 1.07. It was well below than the critical value, at 5% level of significance (2.09), df =19. Therefore, In this case also, the null hypothesis was accepted. So, there was no relationship between blood uric acid level and triple doses of glucose supplementation.

Therefore, It can be concluded that glucose supplementation has no definite role in the increasement or decreasement of blood uric acid level during prolonged extensive activity.

Introduction:

Sports have become inseparable phenomenon of our social life. It has made its own place at the apex of human civilization because of its trial, competitive event and improving nature. Physiological aspects of exercise in sports are gaining much attention among sports administrators. Work efficiency is directly related with the accumulation of lactic acid in the body muscles. No significant work has not been reported from India, It was thought desirable to put some light on the effect of glucose supplementation on blood uric acid.

Considering the importance of endurance in atheletics and every day life, it was thought desirable to conduct a study regarding the improvement of work efficiency during prolonged performance by supplementation of glucose in different times of the work.

Materials and Methods

20 “Cross Country” runners who had represented West Bengal state for national “Cross Country” Championship, age ranging between 23-26 years had been selected as subject randomly. In Place bo trial supplimentation of single dose (saccharine mixed water) was given to the individuals after at 30^{th} minutes of run. Supplementation of a single dose (glucose mixed water) was administrated at 30^{th} minutes of run. Supplementation of double doses of glucose mixed with water was administrated at 30^{th} and 50^{th} minutes of run. Supplementation of triple glucose mixed water was given at 30^{th}, 50^{th} and 70^{th} minutes of run. In previous three cases, the dose of the given glucose was 6mg in 500 ml /

Kg body weight. Blood glucose, blood lactic acid and blood uric acid were tested by latest scientific Autoanalyzers. Those instruments were available in clinical centers MEDILAB, 23 Raja S.C. Mallick Road, Garia, Kolkata-84 and SERUM, Bidhan Sarani, Shyambazar, Kolkata-6.

To ensure that the investigator was well versed with the technique of conducting the tests, the investigator had a number of practice session in testing procedure, under the guidance of experts from Doctors Diagnostic and Research Centre, Kolkata Tester reliability was established by test – retest process where by consistencies of result were obtained by product moment correlation method. Estimation of blood uric acid was done following the method (Uricase – pod method with DHBS) of Praful,B.Godkar (1994)[1], Thefeld, C *et.al.*(1973)[2], Town *et. al.* (1985)[3] and Trinder, P. (1969)[4].

The tests were conducted in the early morning (6.30 am) all those days. Subjects were well informed about the day and time of tests. They were also advised to have a comfortable life style during entire study period.

In all the four days of the testes the subjects were suppose to run for 90 minutes continuously at a pace of 400 meters (one lap of the standard track). They are advised to run the distance within two and half minutes.

The first day of the test was the Placebo trial. In that day, subjects were run in a notion that they were supplied with glucose mixed water but virtually only saccharine water (without any amount of glucose) were supplied at 30th minutes of run.

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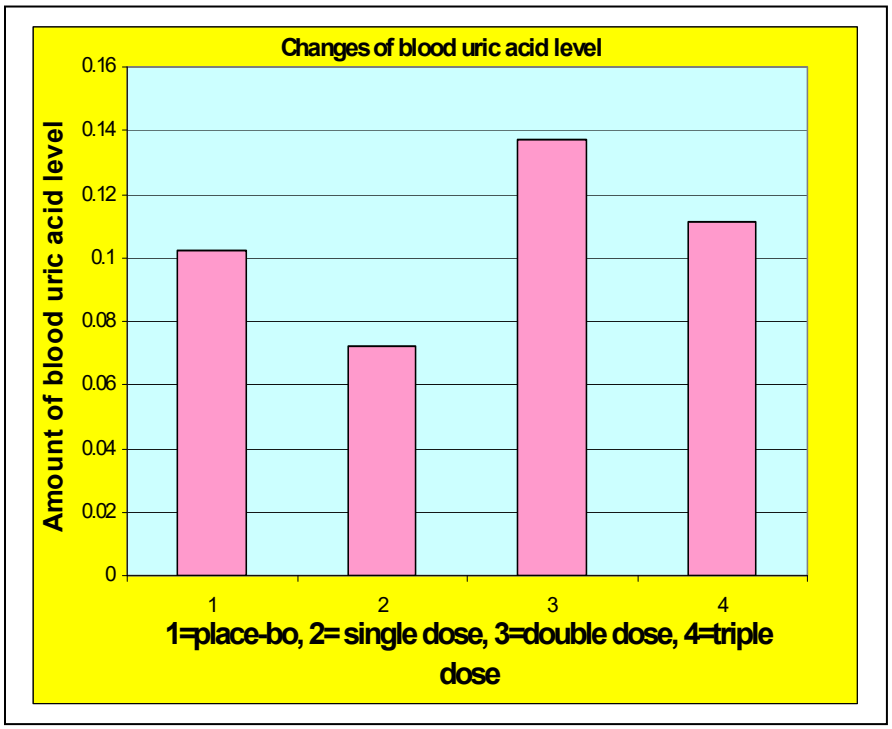
On the second day of the test, subjects were supplemented glucose mixed water (6mg in 500ml / Kg body weight, at 30th minute of the run.

On the third day of the test the subjects were supplemented to glucose mixed water at 30th and 50th minute of run. The glucose was supplemented to the subjects in a proportion of 6mg in 500ml / Kg body weight. During this time same 500ml was given twice during the endurance performance.

On the fourth day of the test the subjects were supplemented glucose mixed water at 30th, 50th and 70th minutes of run. The glucose will be supplemented to the subjects in a proportion of 6mg in 500ml / Kg body weight. During this time same 500ml was given thrice during the endurance performance. The data thus collected were subjected to statistical analysis for the conclusion.

Results

Complete inconclusive results were obtained in case of blood uric acid during the entire study period. It was found that in place-bo study, the blood uric acid level dropped down from 6.05 ± 0.96 mg/dl (mean ± SD, n=20) to



5.90 ± 0.38 mg/dl. So, the decreasement was found to be 0.102 ± 0.048 mg /dl (mean ± SD, n=20). When single dose of glucose supplementation was given, the blood uric acid level also get decreased (0.072 ± 0.024 mg/dl) (table-1). But in the contrary to the previous two observations, it was found to be increased (0.137 ± 0.02 mg/dl) when glucose supplementation was given for two times. i.e. 30 and 50 minutes, after commencement of the work. (Table-1). The level was found to be decreased again when glucose supplementation was given for three times (30,50 and 70 minutes after commencement of the work) .

In place-bo condition, the level of uric acid in the blood, before and after the extensive work was found to be 6.05 ± 0.96 mg/dl and 5.90 ± 0.38 mg/dl respectively. Therefore, the difference between the two was found to be (-) 0.102 ± 0.048 mg/ dl. When single dose of glucose was given to the objects, the level of uric acid in the blood, before and after the extensive work was found to be 6.08 ± 0.23 mg/dl and 6.01 ± 0.23 mg/dl respectively. So, the difference between the two was found to be (-) 0.072 ± 0.024 mg/ dl. When double doses of glucose were given to the subjects, the level of uric acid in the blood, before and after the extensive work were found to be 6.06 ± 0.18 mg/dl and 6.21 ± 0.17 mg/dl respectively (Table-1). So, the difference between the two was found to be (+) 0.137 ± 0.028 mg/ dl.

When triple doses (30,50 and 70 minutes after the commencement of the work) of glucose were given to the objects, the level of uric acid in the blood, before and after the extensive work was found to be 6.05 ± 0.26 mg/dl and 5.96 ±

0.31 mg/dl respectively. So, the difference between the two was found to be (-) 0.111 ± 0.55 mg/ dl (Table-1).

Table- 1: Change of blood uric acid level during the study period.

Experiments	Blood uric acid level before the commencement of the work (mean ± SD, n=20)	Blood uric acid level after work (mean ± SD, n=20)	Difference (mean ± SD, n=20).
Place-bo condition	6.05 ± 0.96 mg/dl	5.90 ± 0.38 mg/dl	(-) 0.102 ± 0.048 mg/ dl.
Glucose supplement single time	6.08 ± 0.23 mg/dl	6.01 ± 0.23 mg/dl	(-) 0.072 ± 0.024 mg/ dl.
Glucose supplement twice	6.06 ± 0.18 mg/dl	6.21 ± 0.17 mg/dl	(+) 0.137 ± 0.028 mg/ dl.
Glucose supplement thrice	6.05 ± 0.26 mg/dl	5.96 ± 0.31 mg/dl	(-) 0.111 ± 0.55 mg/ dl

Table -2: Increasement or decreasement of blood uric acid level during prolonged work

No of individuals	Age (Year)	Weight (Kg)	Difference Before-After work (Place-bo)	Difference Before-After work (Single dose)	Difference Before-After work (Double dose)	Difference Before-After work (Triple dose)
1	26	59	(-)0.10	(-)0.10	(+)0.15	(-)0.10

2	24	56	(-)0.01	(-)0.01	(+)0.20	(-)0.20
3	25	52	(-)0.20	(-)0.05	(+)0.10	(-)0.20
4	25	59	(-)0.15	(-)0.01	(+)0.09	(-)0.01
5	25	59	(-)0.10	(-)0.08	(+)0.13	(-)0.05
6	26	58	(-)0.02	(-)0.05	(+)0.18	(-)0.15
7	26	52	(-)0.05	(-)0.04	(+)0.14	(-)0.12
8	26	55	(-)0.10	(-)0.09	(+)0.10	(-)0.14
9	24	55	(-)0.15	(-)0.10	(+)0.16	(-)0.08
10	25	56	(-)0.04	(-)0.08	(+)0.15	(-)0.09
11	25	51	(-)0.16	(-)0.07	(+)0.12	(-)0.03
12	25	58	(-)0.08	(-)0.01	(+)0.13	(-)0.13
13	25	59	(-)0.12	(-)0.10	(+)0.14	(-)0.07
14	24	53	(-)0.09	(-)0.06	(+)0.15	(-)0.06
15	25	54	(-)0.11	(-)0.04	(+)0.17	(-)0.16
16	24	62	(-)0.08	(-)0.05	(+)0.10	(-)0.12
17	25	58	(-)0.13	(-)0.07	(+)0.13	(-)0.10
18	24	56	(-)0.10	(-)0.08	(+)0.12	(-)0.09
19	24	52	(-)0.08	(-)0.09	(+)0.14	(-)0.07

20	23	55	(-)0.14	(-)0.06	(+)0.15	(-)0.15

(+) = Increasement, (-)= Decreasement.

When 't' test was performed by taking μ_o (Null hypothesis) = their was no relationship between glucose supplementation (single dose) and blood uric acid level, it was found that 't' =1.34. It was smaller than the critical value at 5% level of significance (2.09), df =19. Therefore, the null hypothesis was accepted. So, there was no relationship between blood uric acid level and glucose supplementation.

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When 't' test was performed by taking μ_o (Null hypothesis) = their was no relationship between glucose supplementation (triple dose) and blood uric acid level, it was found that 't' = 1.07. It was well below than the critical value, at 5% level of significance (2.09), df =19. Therefore, In this case also, the null hypothesis was accepted. So, there was no relationship between blood uric acid level and triple doses of glucose supplementation.

Therefore, It can be concluded that glucose supplementation has no definite role in the increasement or decreasement of blood uric acid level during prolonged extensive activity.

Discussion

Very little work report on blood uric acid level and endurance performance is available in India and else where. Some of them are-

Lancaster, *et. al.* (2003)[5] reported that prolonged strenuous exercise is immuno suppressive and this may account for the increase incidence of upper infection following endurance.

Coggan, A.R., Coylee, E.F (1991)[6] reported that during first hour of exercise, most of the energy is derived from muscle glycogen. They also reported that the contribution of muscle glycogen decreases over time as muscle glycogen stores become depleted and that blood glucose uptake and oxidation increase progressively to maintain –CHP oxidation. During prolonged performance, blood can potentially provide all of the –CHO energy needed to support the exercise. In our present study, It is also revealed that intermittent glucose supplementation can increase blood glucose level during prolonged extensive activity. According to their earlier observation, uric acid does not play role in this regard. Therefore, the present result confirms the previous observations.

Febbraio & Stewart (1996)[7] reported that intermediate glucose supplementation increases the power of endurance performance. Therefore our present findings confirms the previous observations.

Sayed, Rattu and Roberts (1995)[8] examined the effect of carbohydrate ingestion on exercise performance capacity. None male cyclists performed two separate trials for 60 min followed by a maximal ride for 10 min. During trials subjects were fed either an 8% glucose solution or a placerbo solution, which were administrated at rest and during and immediately after submaximal exercise.

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