The Effects of Testosterone on Serum CPK Level in Male Rats

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Abstract— There are associations between sex steroid hormones and biochemical enzymes activity. The aim of this study was to determine the effects of testosterone on serum CPK (Creatine Phospho Kinase) level in male rats. In our study, male Wistar rats were randomly divided into control, orchidectomised and testosterone receiving groups of 5 rats in each. Testosterone enanthate (10mg/kg/ body weight) was administered intraperitonially. After 7 weeks blood samples were collected using cardiac puncture method and serum CPK level was measured using spectrophotometry method and data were statistically analyzed and compared between groups (ANOVA). The results indicated that increased testosterone level resulted in decreased serum level of CPK (P<0.05); however, decreased testosterone level could not significantly change serum level of CPK. Our finding indicates that testosterone has reducing effect on serum CPK level in male rats.

Keywords— Testosterone, Orchidectomy, CK, Rat.

I. INTRODUCTION

SEX steroid hormones influence the function of various organs including muscular system, digestive system and heart[1]. Testosterone is a hormone from the androgen group primarily secreted in the testicles of males. Testosterone is sex a hormone which have anabolic effects [2],[3]. Studies show that there is association between testosterone level and function of tissues of various types [4]. Creatine kinase (CK) or creatine phosphor kinase (CPK) is an enzyme expressed by various tissues. Serum levels of CK is abnormally changed in kidney, heart and liver or other disorders[5], [6]. Kidney and liver damage have been also observed when serum testosterone level is higher than normal, indicating the effects of testosterone on liver and kidney function [7]-[9]. The serum CK level can be raised from the damage of the muscle tissue as a consequence of intense prolonged training. This may be a consequence of both metabolic and mechanical causes[10]. Despite many reports indicating the effects of sex steroid hormones on liver, heart and muscle function [11]-[13], there are still conflicting data concerning the effects of androgens on biochemical functions of liver, heart and muscle. The current study was carried out to determine the effects of testosterone on serum creatine kinase level in male rats.

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II. MATERIAL AND METHODS

A. Animals

Adult male Wistar rats weighting 200±30g were purchased and raised in our colony from an original stock of Pasteur institute (Tehran, Iran). The temperature was at 23±2 °C and animals kept under a schedule of 12h light: 12h darkness with free access to water and standard laboratory chow.

B. Protocol of Study

Male Wistar rats were randomly divided into control, orchidectomised and testosterone receiving groups of 5 rats in each. Testosterone enanthate (10mg/kg/ body weight) was administered intraperitonially. For orchidectomy, the scrotal sac was cleaned with alcohol and a small incision of approximately 2cm was made midsagittally at the scrotal septum. The spermatic cord was dissected, tied and cut. The testes were carefully removed from the scrotal sac. The incision was sutured. After 7 weeks blood samples were collected using cardiac puncture method. Serum CPK level was measured using spectrophotometry.

C. Statistical Analysis

All values are presented as mean±SD. Statistical significance was evaluated by one-way analysis of variance (ANOVA) using SPSS 19. Significance was measured using Game-s Howell significant for the exact P values and significant differences are noted in the results. Differences with P<0.05 were considered significant.

Fig. 1 Serum CK (CPK) levels in control, T (testosterone) receiving and orchidectomised (ORCX) rats. * indicates significant difference compared to control group.
IV. DISCUSSION

In our study, serum CPK level was significantly decreased in testosterone receiving rats compared with control animals. It has also been shown that the enhanced serum testosterone level is followed by reduced serum creatine kinase level. In accordance with this study, some other studies have shown that serum creatine kinase level is significantly decreased after administration of steroids [14]. Low serum creatine kinase values also has been reported in contraceptive steroid users [15]. However, in contrast to our finding there are studies showing that chronic administration of testosterone is associated with increased creatine kinase level [16]. Enhanced testosterone level may result in cellular changes in various target tissues leading to decreased serum level of creatine kinase; however, it is required to investigate the effects of enhanced testosterone level on CK level at cellular and molecular level to find the exact mechanism involved.

V. CONCLUSION

We have shown that testosterone has reducing effect on serum CPK level in male rats; according to which, the relationship between testosterone and disorders associated with abnormal CK enzyme level is of importance in clinical considerations.

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REFERENCES


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