SERUM CREATINE PHOSPHOKINASE IN THYROID DISORDERS

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ABSTRACT

The decreased serum levels of triiodothyronine (T3) and thyroxine (T4) in hypothyroid patients is well established but whether there is any correlation of creatinephosphokinase (CPK) with hypothyroidism is not well established. There is a paucity of reference on this study. Therefore a study of serum CPK and thyroid profile was carried out in thyroid diseases. In hypothyroid patients T3, T4 levels in serum were found to be lowered with an increase level of thyroid stimulating hormone (TSH) associated with marked rise in serum CPK level. In hyperthyroid patients serum levels of T3, T4 were found to be increased with decrease in TSH with significant decrease in creatine phosphokinase level. Serum creatine phosphokinase levels thus show an inverse relation with serum T3, T4 levels.

KEYWORDS

Creatine phosphokinase (CPK), Triiodothyronine (T3), Hypothyroidism

INTRODUCTION

In recent years studies have been conducted to establish a relationship of creatine phosphokinase (CPK) levels in thyroid diseases (1-2). A majority of patients with hypothyroidism have been shown to have an increased serum CPK (3-7). The exact etiology is not known (8,9,10). Thus the assay of CPK activity in serum is extremely valuable in screening hypothyroidism and in present study an attempt has been made to correlate CPK levels with triiodothyronine (T3), thyroxine (T4) and thyroid stimulating hormone (TSH) in hypo and hyperthyroidism.

MATERIALS AND METHODS

The present study was conducted on 50 patients out of which 30 were hypothyroid and 20 were hyperthyroid attending the O.P.D. of J.L.N. Hospital, Ajmer. 25 healthy age, sex matched subjects were taken as control.

The fasting blood samples were collected by standard aseptic technique and analysed for T3, T4, TSH estimation on I-125 Gamma counter model No. IC - 4702 using the kits supplied by Bhabha atomic

research center Trombay and CPK estimated by kit method¹¹.

RESULTS AND DISCUSSION

Results are given in Tables 1-3.

In the present study, in hypothyroid subjects the mean value of T3, T4 and TSH were found to be 0.56 ng/ml, 4.99 µg% and 12 µU/ml respectively (Table 1). The mean CPK levels in these subjects were found to be 54.23 IU/L±6.20 (Table 2)

In hyperthyroid subjects the T3, T4 and TSH levels were 1.73 ng/ml, 16.04 µg% and 1.08 µU/ml respectively (Table 1). The mean CPK levels in these subjects were found to be 13.33 IU/L±3.83 (Table 2)

The results show that mean CPK levels in hyperthyroid subjects are significantly lower as compared to hypothyroid subjects.

In normal healthy subjects the mean serum CPK levels were found to be 36.44 IU/L ± 8.36 and in hypothyroid subjects it is significantly increased i.e. 54.23 ± 6.20 as compared to the control subject.

Table 3 shows that the serum CPK levels in hypothyroid subjects has inverse relation with T3 concentration. Marked decrease in T3 concentration is associated with increase in serum CPK level suggesting that the severity of hypothyroidism increases CPK level.

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CONCLUSION

From this study it can be concluded that there is an inverse relation in the serum levels of T3 and CPK in thyroid diseases. In hypothyroid patients with decrease in serum T3 there is a significant

increase in CPK the fact which may be used as a parameter for screening hypothyroid patients.

Thus the estimation of serum CPK levels will be extremely valuable in screening for hypothyroid patients.

Table 1

LEVELS OF SERUM T3, T4 AND TSH IN HYPO AND HYPERTHYROID SUBJECTS

	Control (n=25)	Hypothyroid (n=30)	Hyperthyroid (n=20)
T3 (ng/ml)	0.7 - 2.0	0.56 ± 0.13	1.73 ± 1.02
Mean ± SD range		(0.34 - 0.77)	(0.82 - 3.2)
T4 (μg%)	5.5 - 13.5	4.99 ± 0.68	16.04 ± 3.24
Mean ± SD range		(3.40 - 6.24)	(14.02 - 21.8)
TSH μU/ML	0.17 - 4.05	12.00 ± 5.69	1.08 ± 1.38
Mean ± SD range		(5.04 - 16.42)	(0.12 - 3.02)

n = number of subjects

NOTE - Normal values of T3, T4, TSH were taken as recommended by Bhabha Atomic Research Centre.

Table 2

Levels of Serum CPK in Controls, hypo and hyperthyroid patients

Study group	CPK (IU/L)
Controls (n=25)	36.44 ± 8.36 (20.06 - 50.35)
Hypothyroid (n=30)	54.23 ± 6.20 (41.81 - 63.53) t = 7.48 (p = <0.001)
Hyperthyroid (n=20)	13.33 ± 3.83 (6.68 - 18.80) t = 10.84

n = number of subjects

p<0.001 (highly significant)

Table 3

Levels of Serum CPK and T3 in hypothyroid patients

T₃ (ng / ml)	CPK (IU/L)
< 0.5 (n=5)	59.90 $\pm$ 1.6 (58.52 - 62.58)
> 0.5 (n = 12)	50.49 $\pm$ 4.98 (41.81 $\pm$ 57.62)

n = number of subjects

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