4. Discussion, conclusion and recommendations

4.1 Discussion:

Thyroid hormones exert their effect on all tissue and modulate the rate of metabolic activity. Alterations in thyroid function can affect the various organ system of body and perturb measures like AST, ALT, GGT, ALP, CPK and LDH. Both hypothyroidism and hyperthyroidism have potentially fatal systemic manifestations (Pandey et al, 2013).

This is a case control study aimed to assess the effect of hypothyroidism in CK, ALT and AST activity levels in serum. Sixty Sudanese patients were enrolled in this study classified in tow groups, (30) were hypothyroidism (30) as control group. After evaluation of serum CK, ALT and AST activity levels using spectrophotometer, the data analysis was done by using SPSS computer program. The results showed that CK, ALT and AST activity levels were significantly increased in patients with hypothyroidism with mean values (93.83±63.63, 18.07±7.53, and 28.02±9.39) and P.value (0.00, 0.04, and 0.00) respectively, this results agreed with study results done in Nepal by Pandey and his team to assess serum enzymes level in patients with thyroid alteration which clearly revealed a positive association between increased serum CK, ALT and AST hypothyroidism with mean values (232.76±102.03, 46.93±9.64, and 50.70±8.48) and (P.value < 0.005) (Pandey et al, 2013).

Comparison of means between hypothyroidism patients under treatment with patients who were not under

treatment showed significant difference in CK, ALT, and AST activity levels with mean values for patients under treatment (49.29±21.65, 14.57±3.90, 23.29±8.20) V mean values for patients' who were not under treatment (132.81±62.83, 21.13±8.37, 32.19±8.52) and P.value (0.00, 0.012, and 0.007) respectively. This result justified by Saito and his team (One effect of substitution therapy is a rapid return to normal serum enzyme levels. Four from five of the patients of Saito et al. (1963) demonstrated normal levels within three weeks of commencement of treatment, (Saito et al 1963).

Correlation between CK activity levels and T_3, T_4 and TSH was done in hypothyroidism and hyper thyroidism and there was a significant negative association between CK activity levels and T_3 level in hypothyroidism (P.value = 0.00, r = -0.788), this result agreed with study done by Negi and his team in India in which serum CK levels in hypothyroid subjects have inverse relation with T_3 concentration, whenT_3 <0.8ng/ml Ck mean value = 224.71± 22.90 compared withT_3 > 0.8 ng/ml CK mean value 160.57 ±25.19. Marked decrease in T3 concentration is associated with increase in serum CK level (Negi et al, 2007). But no significant correlation was found with T_4 (P.value = 0.592, r= -0.102) and TSH (P.value=0.749, r =-0, 61) this disagreed with McGrowder and his team which report a positive correlation was found between CK activity and TSH levels (r = 0.292, p = 0.015), and a negative correlation between CK activity and FT4 concentration (r = - 0.325, *P* = 0.007) (McGrowder et al, 2011)

ALT in hypothyroidism has a moderate negative association with T_3 level (P.value 0.024, r =-0.411). This result agreed with the study of Pandey with (P.value<0.005, r = -0.320). (Pandey et al, 2013).also there is no significant correlation between T_4 and TSH and ALT activity level, (P.value =0.989, r = -0.003), (P.value = 0.445, r = -0.145).

AST in hypothyroidism has no significant correlation with T_3 (P.value =0.18, r = -0.248) T_4 (P.value =0.614, r = 0.096) and TSH (P.value =0.547, r =0.114).

4.2 Conclusion:-

From the study results it's concluded that:-

1. CK, ALT, and AST serum activity levels are significantly increased in hypothyroidism patients.
2. Treatment of hypothyroidism decreases the abnormal high level of CK, ALT and AST activity to return to normal.
3. CK activity level is highly increased when T_3 level is decreased, and there is a slight increase in ALT activity level with decreased T_3 level while AST activity level is not altered.
4. Low T_4 and TSH not affect CK, ALT, and AST activity levels.

4.3 Recommendations:

1. Evaluation of highly sensitive C-reactive protein is recommended to be measured routinely for hypothyroidism patients as a predictive marker for atherosclerosis as Ck activity found to be elevated.
2. Additional researches should be done in this topic to confirm results, also body mass index and duration of the disease should be included.