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ASSESSMENT OF LIVER ENZYMES LEVELS AMONG SUDANESE THYROID DYSFUNCTION PATIENTS

Nijood Tag Alseer Ahmed[1]* and Omer Fadl Adris[2]

[1]Department of Clinical Chemistry, Faculty of Medical Laboratory Science, University Al Neelain University.
[2]Department of Biochemistry and Molecular Biology, Faculty of Medical Laboratory Science, University Al Neelain University.

***Corresponding Author: Nijood Tag Alseer Ahmed**
Department of Clinical Chemistry, Faculty of Medical Laboratory Science, University Al Neelain University.

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ABSTRACT
Background: 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, and ALP. Thyroid hormones regulate the metabolisms of all cells including hepatocytes and hence, modulate hepatic function.**Objectives**: The main aim of study to assessment of serum AST,ALT and ALP level in hyperthyroidism and hypothyroidism . **Materials and methods**: This study included Abnormal 120 samples (30 under treatment and 30 new diagnosed for hyperthyroidism and 30 under treatment and 30 new diagnosed for hypothyroidism). This study by convenience sampling, serum levels of aspartate transaminase (AST), alanine transaminase (ALT) and alkaline phosphatase were determined by uv -kinetic methods. **Results**: The mean values between cases showed a significant increase in ALT and ALP and no significant shown in AST in both hypothyroidism and hyperthyroidism patients**. Conclusion**: The hyperthyroidism and hypothyroidism particulary (AST,ALT and ALP)elevation.

KEYWORDS: Alanine transaminase, Alkaline phosphatase, Aspartatetransaminase, Hyperthyroidism, Hypothyroidism.

INTRODUCTION
The thyroid is a small butterfly shaped endocrine gland, located in the lower part of the neck, in front of the windpipe which secretes thyroid hormones. The main hormones released by the thyroid are T3 and T4; deliver energy to cells of the body.[1,2] Thyroid hormone synthesis and secretion is regulated by a negative feedback system that involves the hypothalamus, pituitary, and the thyroid gland.[2, 3]

Hyperthyroidism is a relatively common disease in which tissues are stimulated by an increased secretion of thyroid hormones tiroiodothyronin (T3) and/or thyroxin (T4).[4] T3 is the biologically active thyroid hormone. These hormones are required for the normal growth, development and function of nearly all tissues.[5]

There is evidence that hypothyroidism may directly affect liver structure and function.[6] Similarly, thyrotoxicosis cause liver injury of varying degree.[6,7] Majority of patients with hypothyroidism have elevated serum levels of aspartate transaminase (AST) and alanine transaminase (ALT).[8,9] Serum alkaline phosphatase (ALP) levels are also reported to be abnormal in thyroid disorders,[8]

As thyroid hormones are essential for normal organ growth, development, function and regulate the basal metabolic rate of all cells, its alteration can affects the entire metabolism.[10]Thyroid hormones are metabolized within the liver and subsequently excreted into the bile. Increased metabolism in response to hyperthyroidism can cause oxidative damage to certain organs including the cardiovascular, nervous, gastrointestinal, and hepatic systems.[11] Thyroid hormones control the metabolism—the process by which oxygen and calories are converted to energy for use by the cells and organs. When the thyroid works normally, it produces and secretes the amount of T4 and T3 necessary to keep various body functions moving at their proper pace.[12]

The thyroid frequently is a common target of disease or dysfunction.[12] The symptoms of hyperthyroidism are weight loss, rapid or irregular heartbeat, anxiety, irritability, trouble sleeping, trembling in the hands and fingers, increased sweating, increased sensitivity to heat, muscle weakness, etc. The symptoms of hypothyroidism are weight gain, increased sensitivity to cold, muscle weakness, joint or muscle pain, depression, fatigue, pale dry skin, a puffy face, a hoarse voice,ect.[13]

MATERIALS AND METHODS

Patients and method: Blood samples were collected from all patients in plane containers .After verbal consent from all participants .Blood samples were centrifuged for 10 minutes at 3000-4000 rpm and serum was separated in new containers and stord at 20co till tested for AST, ALT and ALP levels. Biosystem111 was used for determined of serum enzymes in ALRAWDA labrotary in Khartoum city.

Study Type: An analytical cross-sectional study was conducted from October2016 to December 2017.

Inclusion Criteria: The individual within 20–60 age with thyroid dysfunctin included in this study.

Exclusion Criteria Individuals with an active infection or a recent infection including liver disease, bone and muscle disease, cardiac, pancreatic, hepatobillary, diabetes, hypertension, malignancy, oral contraceptive pills (OCP), pregnancy, alcoholics and drug abusers were exclusion.

Ethical consideration: This study was approved by faculty of medical laboratory science Alneelain University, Khartoum, Sudan and ethical clearance was obtained from ministry of health. All participant Patients was signed an informed consentbeforesample collection.

Statistical Analysis: Statistical analysis was performed using SPSS (SPSS,version 20.0),data were expressed as mean and standard deviation (M±SD), the means were compared using independent T.test and Pearson's correlation analysis was used for correlation of parameters measured, P-value < 0.05 was considered as statistically significan.

RESULTS AND DISCUSSION

This study involve 120 patients with hyperthyroidism and hypothyroidism their age ranged between 20-60 years .Blood sample were collected from patients to assess serum level of AST,ALT and ALP, this level was compared with refranses value., the mean of age and standard deviation of hyperthyroidism cases;[37] [12] years, when the mean and Standard deviation was;.[9][10] months, respectively. On the other hand, the mean of age and standard deviation of hypothyroidism cases;[35] [10], when the mean and Standard deviation was;.[20][20] months, respectively show in table(1). .

Associating AST, ALT and ALP levels of patient with thyroiddysfunction with normal population values.AST new diagnosed and AST under treatment of hypothyroidism, their P-values of association were (0.008, 0.000) respectively. Furthermore, AST new diagnosed and AST under treatment of hyperthyroidism, their P-values of association were (0.001, 0.000) respectively. Also, ALT new diagnosed and ALT under treatment of hypothyroidism, their P-values of association were (0.033, 0.041) respectively. Furthermore, ALT new diagnosed and ALT under treatment of hyperthyroidism, their P-values of association were (0.068, 0.113) respectively. ALP new diagnosed and ALP under treatment of hypothyroidism, their P-values of association were (0.070, 0.145) respectively. Furthermore, ALP new diagnosed and ALP under treatment of hyperthyroidism, their P-values of association were (0.181, 0.000) respectively. All AST, ALT and ALP levels with thyroid alteration patients with normal population values at the level of confidence 95%, and (P<0.05), show in table(2).Associating the relation of variable means; (AST, ALT and ALP) with each other by using paired sample t-test and correlation.A significant association between ALT newly diagnosed with under treatment of hypothyroidism patients with p-value (0.017), with positive correlation; (0.483). Also there was a stronger association between ALT under treatment hypothyroidism patients with ALT newly diagnosed hyperthyroidism patients with p-value (0.005), with positive correlation; (0.498). In addition, ALP has a strong significant association among newly diagnosed hypothyroidism with under treatment hyperthyroidism patients with p-value (0.008), with positive correlation; (0.472), show in table(3). In this study the association when P-value < (0.05) between age and duration of illness with AST, ALT and ALP levels. Among Hyperthyroidism cases, A strong association between ALP among newly diagnosed cases with Duration and age; (.001), (.000) respectively. And same findings, under treatment patient's Alp with duration and age, AST and ALT with age; it was; (.024), (0,036), (.000), (.031), respectively. Among hypothyroidism patients, According to our findings, there is no association between AST, ALT and ALP levels with patient's age or duration of illness. The duration of illness and AST, ALT and ALP levels of newly diagnosed and under treatment patient; (.907), (.589), (.987), (.985), (.991), (.328), (.706), (.846), (.796), (.874), (.815), (.945), respectively.
Figure (1) shows AST levels of patient with thyroid dysfunction

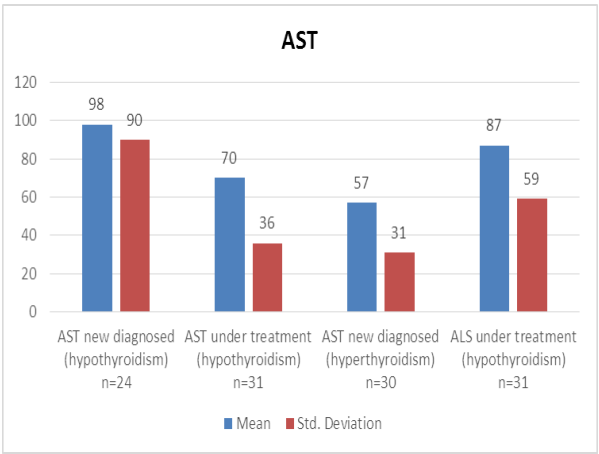

Figure (1) shows AST levels of patient with thyroid dysfunction, which showed that: the mean of AST level among newly diagnosed and under treatment hypothyroidism patients; (98) (70), with standard deviation; (90) (36), respectively. The mean of AST

level among newly diagnosed and under treatment hyperthyroidism patients; (57) (87), with standard deviation; (31) (59), respectively

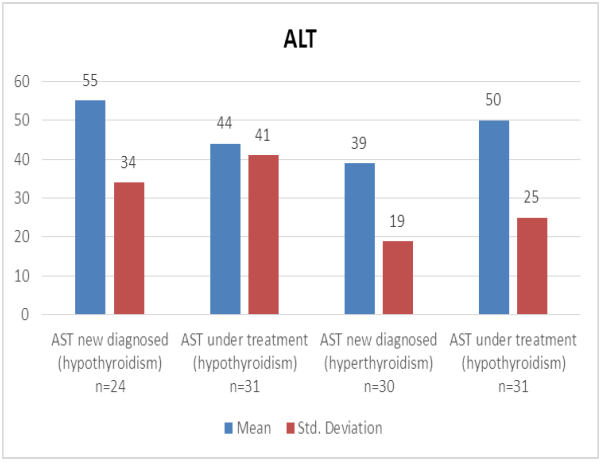

Figure (2) shows ALT levels of patient with thyroid dysfunction

Figure (2) shows ALT levels of patient with thyroid alteration, which showed that: the mean of ALT level among newly diagnosed and under treatment hypothyroidism patients;.[55] .[44], with standard deviation;.[34] .[40], respectively. The mean of ALT level among newly diagnosed and under treatment hyperthyroidism patients;.[39], [50], with standard deviation;.[19] [25], respectively.

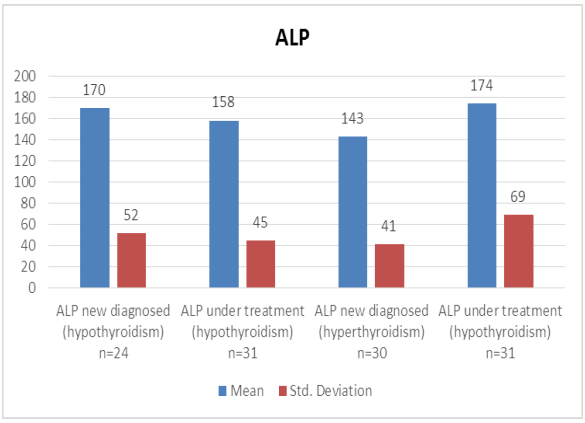

Figure (3) shows ALP levels of patient with thyroid dysfunction.

Figure (3) shows ALT levels of patient with thyroid alteration, which showed that: the mean of ALP level among newly diagnosed and under treatment hypothyroidism patients;[170] [158], with standard deviation; [52] [45], respectively. The mean of ALP level among newly diagnosed and under treatment hyperthyroidism patients; [143] [174], with standard deviation;.[41] [69], respectively

Table (1) mean and SD of age and duration of illness.

	Mean	Std. Deviation
Hyperthyroidism		
Age (years)	37	12
Duration (months)	9	10
Hypothyroidism		
Age (years)	35	10
Duration (months)	20	20

Table (2) Variable means compared with test values

AST Test value= 46	Sig. (2-tailed)	**ALT Test value= 46**	Sig. (2-tailed)	**ALP Test value= 46**	Sig. (2-tailed)
AST new diagnosed (hypothyroidism)	**.008***	ALT new diagnosed (hypothyroidism)	**.033***	ALP new diagnosed (hypothyroidism)	**.070**
AST under treatment (hypothyroidism)	**.000***	ALT under treatment (hypothyroidism)	**.041***	ALP under treatment (hypothyroidism)	**.145**
AST new diagnosed (hyperthyroidism)	**.001***	ALT new diagnosed (hyperthyroidism)	**.068**	ALP new diagnosed (hyperthyroidism)	**.181**
AST under treatment (hyperthyroidism)	**.000***	ALT under treatment (hyperthyroidism)	**.113**	ALP under treatment (hyperthyroidism)	**.000***

*Significant on p-value < (0.05).

Table (3): Significant Variable means compared with each others

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	**ALT** new diagnosed & ALT under treatment hypothyroidism	**24**	**.483**	**.017***
Pair 2	**ALT** under treatment hypothyroidism & ALT new	**30**	**.498**	**.005***

	diagnosed hyperthyroidism			
Pair 3	ALP under treatment hypothyroidism & ALP new diagnosed hyperthyroidism	**30**	**.472**	**.008***

*Significant on p-value (0.05).

The liver enzymes elevation, have been reported in hyperthyroidism and hypothyroidism. The mechanism of this elevation appears to be relative hypoxia in periventricular regions of the liver. show that elevated levels of T3 induces apoptosis of hepatocytes and causes hepatic dysfunction through the activation of the mitochondrial dependent pathway. a positive association between increased serum AST, ALT and ALP in hyperthyroidism and hypothyroidism. Another study was done in study carried out in Western Development Region, Nepal. On 2011 by Raju Pandey. The main aim of study was to determine the relationship between thyroid alteration and serum enzymes level. In conclusion, conducted study demonstrated that there is a positive association between increased serum AST, ALT, GGT, CPK, ALP and LDH in hyperthyroidism and hypothyroidism. In contrast, while $p<0.05$ was considered statistically significant.[14] on2011.Study of Serum enzymes and liver function tests in thyroid by A.Y, V.R .and Mane. Conclusion: The results indicate that liver functions in both hypo and hyperthyroid patient s are normal. Marginally elevated AST and ALT levels point to muscle dysfunction while high ALPlevel in hyperthyroids suggests disturbance in bone homeostasis. Serum CPK assay together with thyroid profile increases diagnostic sensitivity in subclinical hypothyroidism.[15]

CONCLUSION

hyperthyroidism and hypothyroidism is often associated with abnormal hepato cellular enzymes particularly ALT,AST and ALP. A significantly high level of ALT and ALP with duration of disease was observed and AST not significant. This study presents high level of AST, ALT and ALP of thyroid dysfunction patients.

RECOMMENDATION

This study presents guidance to clinicians and other professional investigating high level of AST, ALT and ALP of thyroid dysfunction patients. Prospective study with large sample size should be conducted for further investigations of thyroid dysfunction patients. We propose more study with more cases to determine clearly results about liver enzymes in hyperthyroidism and hypothyroidism.

REFERENCES

1. Khan T. M., Malik S, Diju I.U. Correlation between plasma thyroid hormones and liver enzymes level in thyrotoxic cases and controls in Hazaradivision. J Ayub Med Coll Abbottabad 2010; 22(2): 176–179.
2. Shomon M. J, Guide to Thyroid Disease. 2010 edition, Kensington, MD 20895- 0565- 888-810-9471.
3. Jonklass J, Helfand M. Thyroid Disease, U.S. Department of Health and Human Services 2010.
4. Huang MI, Li KL, Wei JS, Wu SS, Fan KD and Liaw YF. Sequential liver and bone biochemical changes in hyperthyroidism. Am. J. Gastroenterol. 1994; 89(7): 1071-6.
5. Nobakht H, mousavi S, Rashidy Pour A. Abnormalities of liver function test in hyperthyroidism. JSUM Sciences. 2000; 1: 25-29.
6. Thomson R Strum D, Boehm T, Wartofskyl. Abnormalities of liver function tests in thyrotoxicosis. Mil Med 1978; 143: 548-551.
7. Doran GR. Serum enzyme disturbances in thyrotoxicosis and myxoedema. J Roy Soc Med 1978; 71: 189-193.
8. Fleisher GA, Mcconaheyw M, Pankow M. Serum creatine kinase, lactic dehydrogenase and glutamic-oxalacetic transaminase in thyroid diseases and pregnancy. Mayo Clin Proc. 1965; 40: 300-311.
9. Griffiths PD, Hodgson H. Serum etrzymes in diseases of thyroid gland. J Clin Pathol 1965; 18: 600-663.
10. Targher G., Montagnana M., Salvagno G. et al. Association between serum TSH, free T4 and serum liver enzyme activities in a large cohort of unselected outpatients. Clin Endocrinol 2008; 68(3): 481–484.
11. Khemichian S, Ling Fong T. Hepatic Dysfunction in Hyperthyroidism. Gastro enterol Hepatol. 2011; 7(5): 337–339.
12. Shomon M. J, Guide to Thyroid Disease. 2010 edition, Kensington, MD 20895- 0565- 888-810-9471.
13. De R. J. Thyroid Hormone Tutorial: Thyroid Pathology. Endocrine Module (PYPP 5260), Thyroid Section.
14. Raju Bandey. assessment of serum enzyme level in thyroid patient, Ajurnal of life scines. 2013; 2249-3656: 1-9p.
15. A.Y. Mane and V.R. Bhagwat serum enzymes and LFT in thyroid disorders.International Journal for Biomedical Scinces 2011; 31(4): 517-522.