

## Evaluation of Marker Enzymes in Fibroid Patients

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**Abstract:** Marker enzymes such as acid phosphatase (ACP), alkaline phosphatase (ALP) and aspartate transaminase (AST) levels were estimated in the serum of 60 fibroid patients and 60 non-fibroid patients from UTH, Ado-Ekiti. The age, weight and height of the patients were also considered. Results obtained showed a significant increase in the level of ACP ( $12.15 \pm 6.02^a \mu/L$ ), significant decrease in AST ( $10.24 \pm 3.10^a \mu/L$ ) level, and no significant difference was recorded in ALP ( $14.99 \pm 2.20^a \mu/L$ ) level when compared to the control ( $10.10 \pm 6.15^a \mu/L$ ), ( $12.40 \pm 3.11^a \mu/L$ ) and ( $15.52 \pm 1.30^a \mu/L$ ) respectively. Significant increase in both the age and weight of fibroid patients were also observed which could be related to the etiology of fibroid while height (not significant) may not be related to fibroid. However, this study showed that the activity of ALP does not change in fibroid cases while there are changes in the activities of both ACP and AST.

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### I. Introduction

The uterus or womb is a major female hormone responsive reproductive sex organ of most mammals including human in which foetus is developed (Blackburn and Flemming, 2011). One of the major and pathological disorder affecting the uterus is a disease called uterine myomas, fibromyomas and leiomyomas (Okolo, 2008), which develops during the early and later reproductive years of women. About 20 to 80% of women within the age of 30 to 50 years and approximately three out of four women usually develop one or more fibroid in her life time (Garg et al., 2011).

Fibroid is a benign or non cancerous tumor that grows from the smooth muscle layer (myometrium) of the uterus which can range from small size as that of a pea to bigger size as that of a melon. The disease is common in women who weigh over 70kg. This is thought to be due to higher level of oestrogen hormone that occurs in larger women (Neiger et al., 2006). When it is often multiple and if the uterus contains too many leiomyomata to count, it is then referred to as diffuse uterine leiomyomatosis.

The exact etiology of the disease is not clearly understood but working hypothesis has it that genetic predisposition, prenatal hormone exposure and the effect of hormones, growth factor and xenoestrogen causes fibroid growth (Garg et al., 2011). Known risk factors are African-American women as likely as Caucasian women, nulliparity, obesity, polycystic ovary syndrome, diabetes and hypertension (Okolo, 2008).

While a bimanual examination typically can identify the presence of larger fibroids gynaecologic ultrasonography (ultrasound) has evolved as the standard tool to evaluate the uterus for fibroids. Sonography will depict the fibroids as masses with a heterogeneous texture, which usually cause shadowing of the ultrasound beam. The location can be determined and dimensions of the lesion measured. Also, magnetic resonance imaging (MRI) can be used to define the depiction of the size and location of the fibroids within the uterus (Goto et al., 2002).

Enzymes on the other hand are biological catalysts which speed up the rate at which chemical reactions take place, particularly within the cells of organisms. This process involves the binding of the substrate and breaking or making of chemical bonds. The outcome is a specific change to the substrate which creates a new chemical molecule or product.

Enzymes such as alkaline Phosphatase (ALP), acid Phosphatase (ACP) and Aspartate transaminase (AST) can be used as tumor marker (Eissa, 1999). Tumor markers are produced in small concentration by normal cells but increase in concentration when produced by tumor cells.

However, the levels and the association of these marker enzymes (ACP, ALT and AST) with the development of fibroids in the uterus were therefore evaluated in this study.

### II. Methodology

5mls of venous blood collected into an heparin bottle and centrifuged. The plasma was collected and placed in another bottle containing no anticoagulant for analysis.

Aspartate transaminase activity was determined by the method described (Tietz, 1986). Alkaline phosphatase and acid phosphatase was assayed using the method described by (Tietz and Rinker, 1986).

### III. Result

Table 1: Parameters of blood plasma showing the mean acid Phosphatase, Aspartate transaminase and alkaline Phosphatase values in fibroid patients.

DATA OF STUDY	NON-FIBROID PATIENTS		FIBROID PATIENTS
	RANGE	MEAN±SD	RANGE MEAN±SD
Ages (yrs)	25-35	28.0±4.2 <sup>a</sup>	30-46 41.0±3.2 <sup>b</sup>
Weight (kg)	46-65	52.5±12.02 <sup>a</sup>	59.91 74.5±2.10 <sup>b</sup>
Height (Ft)	4.0-6.1	5.2±4.02 <sup>a</sup>	3.91-6.15.3±4.0 <sup>a</sup>
Alkaline Phosphatase (μ/L)		10.10±6.40 <sup>a</sup>	12.15±6.02 <sup>a</sup>
Aspartate transaminase (μ/L)		12.4±3.11 <sup>a</sup>	10.24±3.10 <sup>a</sup>
Alkaline Phosphatase (μ/L)		15.25±1.30 <sup>a</sup>	16.79±2.10 <sup>a</sup>

Values are given as mean ± S.D

Values not showing a common superscript letter differ significantly as P<0.005. Hence, superscript a and b indicate significant difference P<0.05.

### IV. Discussion

Fibroids are the most common benign tumors in females and typically found during the middle and later reproductive years. However, result earlier published suggested that in addition to the parent molecule of the oxidative metabolites of oestrogen, including the CE<sub>2</sub> 2-hydroxyl E<sub>2</sub>, 4-hydroxyl E<sub>2</sub> and 16-hydroxyl E<sub>2</sub> may also affect oestrogen induced human uterine leiomyoma growth (Al-Hendy and Salome, 2006). Recent report from the same lab demonstrated that the development of uterine leiomyoma is associated with high COMT expression, and that specific COMT genotypes are associated with higher enzyme activity (Salama et al., 2006). Therefore, interrupting oestrogen metabolism or the oestrogen receptor (ER) signalling pathway may be a viable strategy for many therapeutic modalities.

The table above shows the mean value of the age, weight, height, ACP, AST, ALP of both fibroid and non fibroid patients. The weight of the fibroid patient (74.5±2.10<sup>b</sup>kg) was higher than that of non-fibroid patients (52.5±12.02<sup>a</sup>kg). Also, the age of fibroid patients (41.0±3.2<sup>a</sup>kg) was higher than that of non-fibroid patients (28.0±4.2<sup>a</sup>kg). The T-test shows a significant difference in their mean values. This result is in agreement with Okolo 2008 that the risk of fibroid increases with age, and weight increases by 21% with each 10kg increase in fibroid mass which indicates that age and weight may be related to fibroid.

Result of the activity of ALP shows a reduction in the activity of ALP in fibroid patients(14.99±2.2μ/L) to that of non-fibroid patients(15.25±1.30μ/L) indicating no significant difference in their mean values. The decrease in the activity of alkaline phosphate activity may not be related to fibroid. This result agreed with the previous work of Lange et al (1992) that activity of serum ALP in fibroid patients shows an overlap with the control and therefore not predictive of fibroid.

Result of the activity of Acid phosphatase shows a significant increase in the activity in the enzyme in fibroid patients(12.15±6.02μ/L) compare to that of non-fibroid patients(10.10±6.15μ/L). The increase observed in the ACP level could be attributed to the presence of fibroid in the uterus of the patient, this in agreement with that of Allen (1995).

### V. Conclusion

This study revealed that the Serum activity of acid phosphatase increases in fibroid patient and could therefore be used as a marker both for diagnosis and to monitor treatment.

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