

## Biochemical Changes in Fibroid Patients

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### ABSTRACT

Some biochemical parameters were determined in sixty fibroid patients in University Teaching Hospital. Mean value for plasma total cholesterol ( $5.56 \pm 3.25$  mmol/L), Triglycerides ( $1.14 \pm 0.61$  mmol/L, Sodium( $\text{Na}^+$ ) ( $140 \pm 3.0$  mmol/L), Chloride( $\text{Cl}^-$ ) ( $106 \pm 4.2$  mmol/L) Calcium( $\text{Ca}^{2+}$ ) ( $2.5 \pm 0.17$  mmol/L), and Phosphorus(P) ( $1.40 \pm 0.3$  mmol/L) showed an increase when compared with the control. Analysis of the result showed a decrease in the mean value of total protein ( $6.01 \pm 0.15$  g/dL), Albumin ( $4.01 \pm 6.25$  g/dL), Potassium(K) ( $3.64 \pm 0.32$  mmol/L) when compared with the control. The mean value of bicarbonate( $\text{HCO}_3^-$ ) ( $24.0 \pm 2.3$  mmol/L) was significantly higher ( $P < 0.05$ ) when compared with the control. The raised level of cholesterol and triglycerides in fibroid patient reveal a possible link between fibroid and hypertension while increase concentration of  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$  and low concentration of  $\text{K}^+$  characterise increase oestrogen level which has been implicated in fibroid growth.

**Keywords:** Total cholesterol, triglycerides, total protein, Albumin, fibroid.

### Introduction.

Fibroid (uterine leiomyomata) are the most common benign tumours in females and typically found during the middle and late reproductive years (Collins et al, 2008).

Fibroid tumours originate from the smooth muscle, layer (myometrium) of the uterus and consist mainly of smooth muscles, rather than fibroid tissues. Uterine fibroid is estimated to be present in 20-40% of reproductive age women indicating that they are the most common gynaecologic pelvic neoplasm. The underlying cause of uterine leiomyomata is not known but it is clear that ovarian steroid hormones play a role in their growth.

Cholesterol and triglycerides which are both important components of the body lipids and play important physiological roles. Cholesterol is required to build and maintain membranes, it functions in intracellular transport, cell signalling and nerve conduction. (Haines, 2001).

Triglycerides are the main constituents of vegetable oil and animal fats. In humans, triglycerides are a mechanism for storing unused calories and major component of very low density lipoproteins and chylomicrons which play an important role in energy sources and transport of dietary fat. High levels of cholesterol and triglycerides in the blood have been linked to atherosclerosis and by extension the risk of heart diseases and stroke.

Plasma total protein are majorly albumin and globulins with small amount of peptide hormones and blood clotting factors. Albumin which has the highest percentage of plasma total protein, function in transportation of poorly water soluble substances like hormones, vitamins, lipids, bilirubin, calcium, trace metals and drugs. The globulins help in inflammatory response and control of infections. Also plasma proteins help to control extra-cellular fluid distribution between the intra and extra-vascular compartments. (Phillip 1994). Measurement of plasma total protein or albumin is therefore a diagnostic tool for monitoring certain diseases and organ function especially the liver.

Dietary minerals are the chemical element required by living organism and when metabolized support growth, development and vitality of such organism (Skinner, 2005, Newman and Benfield, 2002). The most important dietary minerals include: calcium, magnesium, sodium, potassium, chlorine and phosphorus.

Increase concentration of  $\text{Na}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Fe}^{2+}$  and reduced concentration of  $\text{K}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Zn}^{2+}$  has been found to characterize increase level of oestrogen which is a major factor in fibroid growth (Ross, 1955).

This work therefore evaluates the plasma level of total cholesterol, triglycerides, total protein, Albumin and mineral composition in fibroid patient and their possible link to the growth and development of fibroid.

### MATERIALS AND METHOD

Blood samples were collected from sixty patients (with fibroid) and sixty healthy subjects (without fibroid) in University Teaching Hospital, Ado Ekiti. A biodata form was given with information such as demographic data, family history of fibroid, age, weight and educational status.

5ml of Venous blood was collected in heparin bottles and centrifuged. The plasma was collected and placed in a new bottle containing no anticoagulant for analysis.

Serum total cholesterol and triglycerides were estimated by the enzymatic method as described by Allain et al (1974). Total protein was estimated by the biuret method as described by Peter et.al., (1982). Albumin was estimated Spectrophotometrically by the method described by Rodkey (1964). The mineral analysis was carried out using flame photometry technique, using Gallenkamp flame photometer (AOAC, 1990), while bicarbonate was analysed using titrimetric method (Henry et al, 1974).

## RESULTS

Parameters of blood plasma showing the mean total cholesterol, triglycerides, total protein, albumin, and minerals in fibroid patients.

DATA OF STUDY	NON-FIBROID PATIENTS		FIBROID PATIENTS	
	RANGE	MEAN±S.D	RANGE	MEAN±S.D
AGE(YRS)	25-35	28.0±4.2 <sup>a</sup>	26-39	37.67±5.51 <sup>b</sup>
WEIGHT(KG)	46-65	62.3±12.212.2 <sup>a</sup>	50-75	69.1±14.10 <sup>b</sup>
CHOLESTEROL(mmol/L)		4.13±0.64 <sup>a</sup>		5.56±3.25 <sup>b</sup>
TRIGLYCERIDES(mmol/L)		0.51±0.51 <sup>a</sup>		1.14±0.61 <sup>b</sup>
TOTAL PROTEIN(g/dL)		7.04±0.32 <sup>a</sup>		6.01±0.15 <sup>b</sup>
ALBUMIN(g/dL)		4.82±11.01 <sup>a</sup>		4.01±6.25 <sup>b</sup>
SODIUM(mmol/L)		138.0±9.60 <sup>a</sup>		140±3.0 <sup>b</sup>
POTASSIUM(mmol/L)		3.67±0.32 <sup>a</sup>		3.64±0.32 <sup>a</sup>
CHLORIDE(mmol/L)		104.0±3.20 <sup>a</sup>		106.0±4.2 <sup>b</sup>
BICARBONATE(mmol/L)		19.0±1.30 <sup>a</sup>		24.0±2.30 <sup>b</sup>
CALCIUM(mmol/L)		2.4±0.14 <sup>a</sup>		2.5±0.7 <sup>a</sup>
PHOSPHORUS(mmol/L)		1.04±0.11 <sup>a</sup>		1.40±0.8 <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

## DISCUSSION

Uterine fibroid is estimated to be present in women of reproductive age and are the most common gynaecologic neoplasm.

The result shows that the mean weight of the fibroid patient(69.1±14.10Kg) was higher than that of the non fibroid patient(62.5±12.2Kg). This result is in agreement with Shikoral et al (2001) that the risk of fibroid increases with age, and by 21% with each 10Kg increase in fibroid mass which indicates that age and weight may be related to fibroid.

The result also shows a raised level both cholesterol and triglycerides in fibroid patients(5.56±3.25mmol/L and 0.51±0.51mmol/L) respectively compared with the non fibroid patients(4.13±0.64mmol/L and 0.51mmol/L) respectively. This confirms an earlier report by Luoto et al (2001) who reported a possible link between fibroid and hypertension.

The mean plasma level of total protein and albumin in fibroid patients(6.01±0.15g/dL and 4.01±6.25g/dL) was slightly lower than that of the non fibroid patients(7.04±0.32g/dL and 4.82±11.01g/dL) respectively. The low plasma total protein and albumin levels have not been reportedly linked with fibroid but to other factors.

Result of plasma minerals analysis in fibroid patients reveal mean value for Na<sup>+</sup>, Cl<sup>-</sup>, HCO<sub>3</sub><sup>-</sup>, Ca<sup>2+</sup>, and P (140±3.0mmol/L, 106±4.2mmol/L, 24.0±1.3mmol/L, 2.5mmol/L and 1.4mmol/L) to be higher than that of non fibroid patients (138.0±9.6mmol/L, 104±3.20mmol/L, 19.0±1.30mmol/L, 2.4±0.14mmol/L and 1.04±0.11mmol/L) respectively. The mean plasma of K<sup>+</sup> in fibroid patients(3.64±0.32mmol/L) was slightly lower than that of non fibroid patients(3.67±0.32mmol/L). This confirms earlier report by Ross(1955) who reportedly linked increase level of Na<sup>+</sup>,Ca<sup>2+</sup>, and reduced level of K<sup>+</sup> to a raised level of oestrogen. High oestrogen level in the absence of pregnancy is a factor in the growth and development of fibroid.

The significant high level of  $\text{HCO}_3^-$  (Bicarbonate ion) in fibroid patients ( $24.0 \pm 2.30 \text{ mmol/L}$ ) when compared to non-fibroid patients ( $19.0 \pm 1.30 \text{ mmol/L}$ ) is a pointer to a possible presence of acidosis in fibroid-patient.

## CONCLUSION

The result obtained from this study show a possible link between the levels of some minerals in the body of fibroid patients and oestrogen level, which play a significant role in fibroid growth and development. Managing the level of this minerals could be helpful in controlling the oestrogen level and subsequently fibroid growth. The study also revealed possible cases of hypertension and acidosis in fibroid patients.

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