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Evaluation the Effect of Oral Contraceptive on Thyroid Hormone Among Sudanese Women

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Abstract:-Thyroid hormones with significant role in human body can be affected with outsider effects, such as hormones contented as contraceptives, which used to prevent pregnancy. As following up of contraceptive program, this study enrolled among women who used oral contraceptives, to evaluate their thyroid function tests in comparison with TFT of women free of contraceptives. It revealed that T3 has low significant difference among women on drugs rather than women of drug free, while increased significant difference obtained for both T and TSH.

Keyword:- Thyroid Function Test, Contraceptives, Drug Free.

I. INTRODUCTION

Thyroid hormones and other hormones regulate body protein metabolism and, thereby, are closely linked to the processes involved in growth and development[1-2-3-4].The thyroid gland synthesizes and releases triiodothyronine (T3) and thyroxine (T4), which represent the only iodine-containing hormones in vertebrates. T4 is the main product of thyroid secretion and local deiodination in peripheral tissues produces T3, the biologically active thyroid hormone. T3 and T4 are bound to thyroglobulin, providing a matrix for their synthesis and a vehicle for their subsequent storage in the thyroid[5]. Thyroid hormones can rapidly be released from these proteins, this process facilitating their entry into cells. The production of thyroid hormones is controlled by serum thyrotrophin (TSH) synthesized by the anterior pituitary gland in response to TSH-releasing hormone (TRH), which is secreted by the hypothalamus. Unbound or free T3 and T4 (fT3 and fT4 respectively) exert a negative feedback on the synthesis and release of TSH and TRH in order to maintain circulating thyroid hormone levels within the required range[5].It is well established that thyroid hormone status correlates with body weight and energy expenditure[6-7-8]. Hyperthyroidism, excess thyroid hormone, promotes a hyper metabolic state characterized by increased resting energy expenditure, weight loss, reduced cholesterol levels, increased lipolysis, and gluconeogenesis[9-10]. Conversely, hypothyroidism, reduced thyroid hormone levels, is associated with hypometabolism characterized by reduced resting energy expenditure, weight gain, increased cholesterol levels, reduced lipolysis, and reduced gluconeogenesis [11]. TH stimulates both lipogenesis and lipolysis, although when TH levels are elevated, the net effect is fat loss [12]. TH influences key metabolic pathways that control energy balance by regulating energy storage and expenditure[7-13-14].

Contraceptives are the absolutely methods to prevent unwantedpregnancy. They can be divided into mechanical and chemical contraceptives, which include oral contraceptives, which are biochemical compounds which contain sex hormonesand can be divided into combined contraceptives which are mixture of asynthetic estrogen and progestin, the other type is containing onlyprogestin and less effective than combined oral contraceptives, and theiruse is often restricted to women whose fertility is already reduced, such as older or lactating women[15].(David, et al, 1993)

II. MATERIAL AND METHOD

This case control study involved 60 Sudanese women, 30 were under birth control, oral contraceptives as case group and the other 30 were not using oral contraceptives, as control group, they were at reproductive age, the mean$\pm$SD of case age 29.53+5.9 years and control group 28.03+6.8 years. Under hygienic condition whole blood samples withdrew, left for clot formation and then separation of serum, which preserved at 0^{o}C till laboratory work timeline. Thyroid hormones, T3, T4 and TSH were measured by means of enzyme linked immunosorbant assay (ELISA) at Algialy Khalid Musa medical laboratory-Omdurman, device used BTS350 (Germany), kits were commercially available.

III. RESULT

Case control study conducted on serum of women under oral contraceptive drugs and women free from such drugs, used as control group to compare their data with the case study group. T3 level was lower among case group than control group, providing significant difference with p value 0.000, while both T4 and TSH brought increased significant difference among case group with p value 0.000 for T4 and 0.024 for TSH as in table 1. The case group can be called having hyperthyroidism.

Hormones	Mean+SD Case group	Mean+SD Control group	*P value*
T3 ng/ml	1.03±0.77	1.02±0.16	0.000
T4 µg/dL	6.8±0.93	6.66±5.10	0.000
TSH mIU/L	6.40±1.46	1.88±0.87	0.024

Significant difference p value <0.05.

Table 1: Independent T-Test for TFT of Case Group and Control Group

Considering duration of taking oral contraceptive drugs, Pearson correlation was set for duration with each hormone. A negative correlation was obtained with T3 with duration, while positive correlation was obtained with each of T and TSH as well, as in figures 1, 2 and 3.

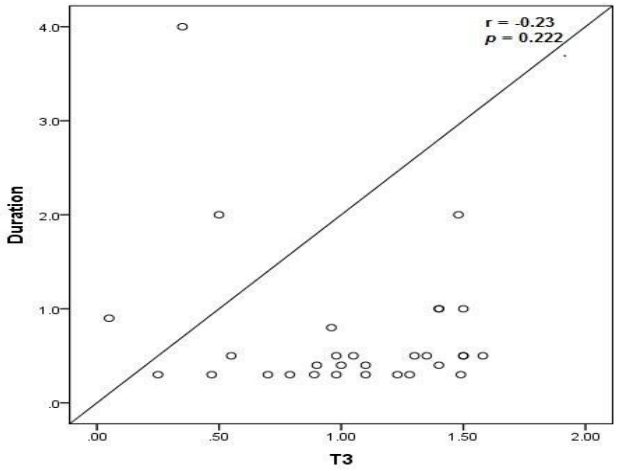

Fig. 1 Correlation of T4 and Duration of Drug Administration

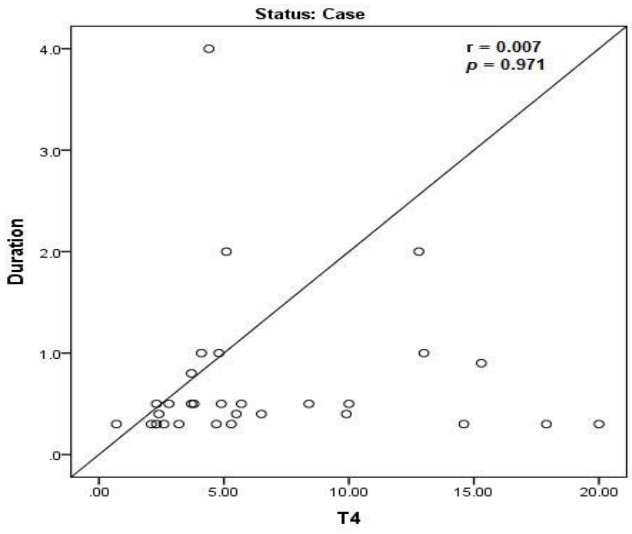

Fig. 2 Correlation of T4 and Duration of Drug Administration

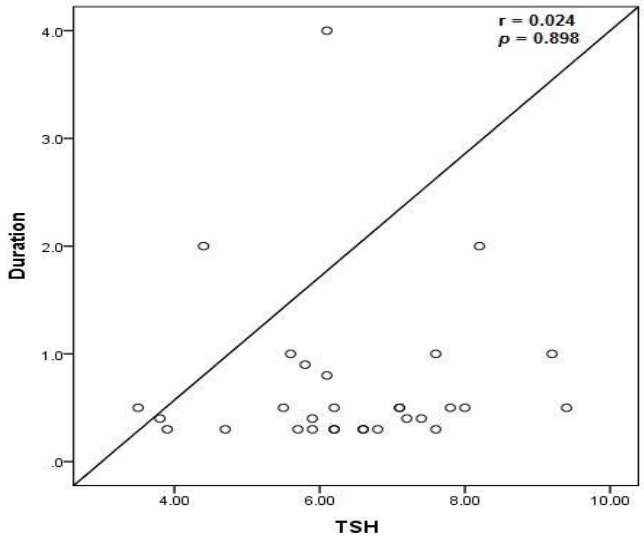

Fig. 3 Correlation of TSH and Duration of Drug Administration

IV. DISCUSSION

The pill is a highly effective method of birth control when taken correctly (at the same time daily), with only 0.1% of women experiencing an unintended pregnancy, according to the Association of Reproductive Health Professionals (ARHP); around 1 in 100 women taking the pill experience an unintended pregnancy in the first year of pill use[16-17]. There are two types of contraceptive pills, both of which contain synthetic forms of the hormones estrogen and progesterone (progestin)[18]. Combination pills contain both of these hormones, whereas the "mini pill" - known as the progestin-only pill - contains only the hormone progestin[16].

Thyroid hormones regulate growth by several mechanisms. In addition to their negative feedback effect on the stimulatory hormones thyrotropin-releasing hormone (TRH) and thyrotropin (TSH), thyroid hormones also regulate their receptors in various physiological and pathological conditions[19]. Hypothyroidism occurs when there is an inadequate secretion of thyroid hormones,resulting in a slowing down of the body's metabolism[20]. While It results from excessive secretion of thyroid hormones[21]. this study, thyroid function testes were evaluated among women under oral contraceptives (case study group) and compared their results with those of other women who were not having contraceptives at all (control group), for case group, T3 results showed decreased levels than of control group and opposite for both T4 and TSH which showed increased levels, that partially disagree of study conducted among women under contraceptive pill, as T3, T4 and TSH were found elevated[22]. The same issue was detected in Sudanese study involved oral contraceptive programmed women, but they were divided to 3 groups according to the far long on contraceptives, beside using free oral contraceptive drugs, as they were control

group, one group finding same as this study finding for T4, elevated among women who were under drugs for longest period of time than other groups and control one and disagree with T3 and TSH, which were found lower among all groups than control group[23].

V. CONCLUSION

In this study oral contraceptive drugs have obvious effects on thyroid function test of women under regular contraceptive program according to control group of women.

VI. RECOMMENDATION

Women under contraceptive drugs should conduct routine investigation of thyroid function test, to avoid permanent effects of these drugs and symptoms could not be loosed.

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