Magnesium and Body Mass Index Relationship between Serum Estrogen, Women in Tikrit City/ Iraq . in premature Ovarian Failure

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Abstract: This study was conducted to evaluate serum estrogen, magnesium level and body mass index of 30 women with premature ovarian failure and 30 women as control group attended to emergency department/ Tikrit teaching hospital in Tikrit City Their ages ranged between 40-48 years. The samples collection started from October /2012 till January /2013. The results showed that serum estrogen level of premature ovarian failure women was statistically significantly P <0.05 lower than in control group. Also the mean serum magnesium in premature ovarian failure women was significantly lower than in normal group p<0.01 .This study showed that body mass index in patient women was significantly higher when compared with control group p<0.05.

Keywords : Serum Estrogen, Magnesium ,Body Mass Index , Ovarian Failure  Women , Tikrit City.

Introduction:
Premature ovarian failure refers to menopause that occurs before age 40 years, and early menopause refers to menopause that occurs at or before age 45 years, both ranges being well below the median age of natural menopause (age 51 years) ( 1,2 ). Premature ovarian failure or early menopause can be spontaneous or induced; if induced, it can be due to medical interventions such as chemotherapy or surgical interventions such as bilateral oophorectom (3). While the hormonal milieu is quite different for women with spontaneous premature ovarian failure (4). Regardless of cause, women who experience estrogen deficiency at an age well before the median age of natural menopause are now recognized to be at increased risk for premature morbidity and mortality. The risk of adverse outcomes increases with earlier age at the time of menopause. Some of the adverse out comes may be prevented by estrogen treatment initiated after the onset of menopause. Premature ovarian failure (POF), also now referred to as primary ovarian insufficiency (5) or primary ovarian dysfunction is a syndrome of amenorrhea (6). Low sex steroid levels and elevated gonadotropin levels among women younger than age 40 years. POF is most frequently idiopathic but may also be due to autoimmune disorders, genetic causes, infections or inflammatory conditions (7, 8). Estrogen is a sex hormone that increase the rate that body tissues and bone absorbed magnesium from the blood (9). As estrogen levels decrease as woman ages the risk of osteoporosis and heart disease greatly increases (10, 11, 12). Magnesium is an essential nutrient mineral needed for healthy and functioning body. Estrogen deficiency may cause loss of tissues magnesium .During menopause estrogen levels are starting to decline which means magnesium levels are also dropping (13). Depleted estrogen levels can result in increased LDL and decreased HDL which may in turn lead to obesity and increase BMI (14).

The aim of this study is to evaluate the changes in serum estrogen, magnesium level and body mass index in premature ovarian failure women compared with normal women.

Materials and methods
Two groups' women were enrolled in this study. Group 1 consisted of 30 premature ovarian failure women which previously diagnosed by physicians. Group 2 consisted of 30 control women. Their ages were ranged between (40 – 48) years. They attended the emergency department of Teaching Tikrit hospital in Tikrit city / Iraq. Blood samples were collected from both groups and centrifuged for 15 minutes at 3000 rpm and the serum was separated and stored at 4°C for analysis.

Biochemical Assay:
1. Determination of serum estrogen.: Serum estrogen level was assayed according to the kit and device mini VIDAS (15).
2. Magnesium level estimation.: Serum magnesium level was assayed according to the kit and Heth & Khayam-Bashi method method (16).
3. **Body mass index:** Weight status was determined by using the body mass index (BMI) which can be obtained by dividing weight in Kilogram by height in meter squared (17).

**Statistical analysis:**

The results were expressed as mean ± SD. Students t-test was used to compare differences in means between 2 groups, P value less than (p<0.05), (p<0.01) is regarded as statistically significant (18).

**Results**

Serum estrogen level was evaluated in premature ovarian failure woman and normal women. The serum estrogen in patients was significantly lower than that the control group (p≤ 0.05) which was (80.911 ± 10.375), (124.743 ± 6.403) pg/ml as shown in figure 1.

Also results in figure 2 showed that the mean of serum magnesium value in patients women (0.96 ± 0.16 4) mmol/l was significantly lower than the Control group (p≤ 0.01) which was (1.71 ± 0.175) mmol/l.

The body mass index was measured in this study, the result indicated that the mean of body mass index in patients groups was significantly higher than the control group (p<0.05) which was( 28.104 ± 1.231), (24.188±1.855) kg/m² respectively, as showed in figure 3.

**Discussion**

Evidence suggests that most premature ovarian failure women have ovaries stopped to egg production and her body slowly starts gradual decreasing in making of the both hormones estrogen and progesterone (19,20).
As the ovaries become less function and produce less of this hormone accordance with(21). Young women with premature ovarian failure have estrogen deficiency for more years than do naturally menopausal women, thereby resulting in a significantly higher risk for bone loss and cardiovascular disease (22). Menopause characteristic by low estrogen levels as ovaries stopped producing estrogen (8), estradiol concentrations were found to be significantly positive with HDL-cholesterol. This explains why the premenopausal women are more protected against atherosclerosis and coronary heart diseases . Estrogen exerts protective effects on the cardiovascular system, including total cholesterol- and low density lipoprotein (LDL) cholesterol- lowering (23).

It is impossible to consider estrogen and progesterone in isolation from other hormones and from precursors like cholesterol and magnesium all steroid hormones are created from cholesterol in a hormonal cascade cholesterol cannot be synthesized without magnesium and cholesterol is a vital component of hormones (24) . Low level of estrogen in blood stream can lead to problem like weight gain, increase LDL and decrease HDL which may turn lead to obesity accordance with (25). An often overlook factor that may contribute to premature ovarian failure is Magnesium. Mg is responsible for many biochemical processes within the bone. Magnesium is essential for the conversion of vitamin D to its biologically active form (26). Estrogens enhancement of magnesium utilization and up take by soft tissues and bone may explain resistance of young women to heart disease and osteoporosis (27). Estrogen increases the rate that body tissues and bone absorbed magnesium from the blood (28).

Another factor that found to be associated with premature ovarian failure from this study is body mass index. Most studies of fertility and body mass index have focused on women’s health. Those reporting public health have found that lower, or higher body mass index are significantly associated with infertility (29) . As may be through an indirect regulation by sex hormone binding globulin (SHBG). As SHBG declines, free estradiol should increase. Therefore, in response to decreased SHBG, follicle-stimulating hormone levels may decrease to lower total estradiol production by the ovaries (30). Low estrogen levels that occur with menopause are associated with loss of subcutaneous fat and gain of visceral fat. As women approach menopause, their estradiol levels decrease. They then no longer have protection from abdominal weight gain (31), the present data revealed an inverse correlation between serum estradiol level and BMI (32).

Our study shows a significant relation between estrogen , magnesium levels and body mass index in premature Ovarian Failure Women .Amor studies may be needed involved many sites in our country with wide sample is necessary to provide basic answers for POF patient's question.

References.
تقييم الاستروجين ومغنيسيوم المصل ومعامل الكتلة الحيوية في النساء المصابات بفشل المبيض المبكر في مدينة التكريت / العراق

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الخلاصة

تضمنت الدراسة تقييم مستوى الاستروجين ومغنيسيوم المصل في مصل 30 إمرأة مصابات بفشل المبيض المبكر و 30 إمرأة كمجموعة ضابطة من راجعهن قسم الطوارئ / مستشفى تكريت التعليمي في مدينة تكريت، تراوحت أعمارهن ما بين 40-45 سنة، ولذلك تضمنت الدراسة تقييم معامل الكتلة الحيوية للجسم. تم جمع عينات الدم من كلا المجموعتين للفترة مارس - يوني من عام 2012. أشارت النتائج الدراسة الحالية إلى أن مستوى الاستروجين في مصل النساء المصابات بفشل المبيض المبكر أخفض مقارنة مع النساء المصابات بفشل المبيض المبكر مقارنة مع مجموعة السلمة (P ≤ 0.01). أيضًا أشارت النتائج إلى انخفاض معدل قيم المغنيسيوم معنوي في مصل النساء المصابات بمشكلة (P ≤ 0.05). أُجري اختبار التباين في النتائج بطريقة ANOVA وتم تحديد التباين في القيم معنوي. بالإضافة إلى ذلك، تمت تقييم عواقب الاستروجين والمنغنيسيوم المصل في النساء المصابات بفشل المبيض المبكر عن طريق القياسات البدنية والزمنية. كما تم فحص علاقة الاستروجين والمغنيسيوم ببعض العوامل البيئية والبيئية. النتائج تظهر أن الاستروجين والمنغنيسيوم المصل في النساء المصابات بفشل المبيض المبكر أخفق مقارنة مع النساء المصابات بفشل المبيض المبكر. كما تظهر أن استمرار الاستضافة من خلال الاستروجين والمنغنيسيوم المصل في النساء المصابات بفشل المبيض المبكر أخفق مقارنة مع النساء المصابات بفشل المبيض المبكر. كما تظهر أن استمرار الاستروجين والمنغنيسيوم المصل في النساء المصابات بفشل المبيض المبكر أخفق مقارنة مع النساء المصابات بفشل المبيض المبكر.