ASSESSMENT LEVELS OF SOME REPRODUCTIVE HORMONES FOR IRAQI INFERTILE WOMEN CLASSIFIED ACCORDING TO TYPE AND DURATION OF INFERTILITY

Hind Mahmood Jumaah AL-Mafraji¹ and Muhammad-Baqir M.R. Fakhridin²

¹Department of Biology, College of Science, University of Baghdad, Baghdad.
²Department of Physiology, College of Medicin, Jabir Ibn Hayyan Medical University, Al-Najaf Al-Ashraf, Iraq.

ABSTRACT

The present study aims to identifying the changes in the levels of some reproductive hormones including follicle stimulating hormone (FSH), luteinizing hormone (LH), prolactin (PRL), estradiol (E₂), testosterone and thyroid stimulating hormone (TSH) according to type and duration of infertility. Two hundred fifty Iraqi infertile women were involved in the current study during their attendance to the High Institute for Infertility Diagnosis and Assisted Reproductive Technologies/Al-Nahrain University. A full history has been obtained from each women including: personal history, menstruation history and infertility status. Blood samples were collected to determine the levels of serum FSH, LH, PRL, E₂, testosterone and TSH. The crude data were statistically analyzed. The mean age of subjects was 29.992±0.505 with a range from 16 to 53 years. The mean duration of infertility was 6.604±0.236 years with a range from 1 to 18 years. Levels of serum FSH, LH, prolactin, estradiol, testosterone and TSH showed no significant differences (P>0.05) between two types of infertility. Highest level of S.FSH was recorded in the duration infertility of (6-10 years), while lowest level of S.FSH was appeared in the duration infertility of (1-5 years). The levels of serum LH, prolactin, estradiol, testosterone and TSH, no significant differences (P>0.05) were appeared among infertility durations (1-5 years, 6-10 years and ≥11 years). The current study provide a precise investigation for infertile women which is very important for diagnosis and treatment. Also, an advance age has real impact on fertility of women through hormonal imbalance. An increasing duration of infertility related to abnormalities in the levels of reproductive hormones and increasing number of abortions.
KEYWORDS: Women, Infertility, Hormone, Thyroid, Menstrual cycle.

INTRODUCTION

Infertility is defined as the inability to conceive after at least 1 full year of unprotected sexual intercourse.\(^1\) It is estimated that worldwide, more than 70 million couple suffers from infertility\(^2\) and most of these are residents of developing countries, including the Middle East.\(^3\) Infertility is basically classified into two primary infertility and secondary infertility. Primary infertility is infertility in a couple who have never had a pregnant or child. Secondary infertility is failure to conceive following a previous pregnancy. The risk factors for infertility can be classified into: genital, endocrinal, developmental and general factors.\(^4\)

Clinically, infertility seems to be a multidimensional health issue which occurs not only due to health problems, but it may also be a result ovulation problems, tubal blockage, age-related factors, uterine problems, hormone imbalance and the choices imposed by the modern lifestyle, like the higher average age of people who get married, stress, non-conducive legal framework for assisted reproduction, etc.\(^5\) Female reproductive hormones rarely operate alone, functioning in harmony to either synergise, or antagonize outcomes throughout the female reproductive tract.\(^6,7\) Fluctuating hormones regulate both the ovarian and endometrial cycles, with dysfunction causing irregular cycling.\(^8\) Therefore, the present study aims to identifying the changes in the levels of some reproductive hormones including FSH, LH, PRL, E\(_2\), testosterone and TSH according to type and duration of infertility.

MATERIALS AND METHODS

Subjects

Two hundreds and fifty infertile women were participated in the current study. From all infertile women, information were taken using special questionnaire. Then, general characteristics and hormonal assay. All infertile women were classified into either primary or secondary infertility. Also, according to duration of infertility, infertile women were classified into three groups including 1-5, 6-10 and ≥ 11 years.

Blood Collection

Blood sampling has performed during the early follicular phase (cycle day 2 or 3); venous blood sample (5 mL) has been collected from unselected infertile women, the blood has then been transferred to a clean dry plain plastic tube and allowed to clot at 37°C for 10 minutes.
The tubes have been centrifuged at 2500 rpm for 5 minutes, and then the serum has been collected and kept at -20°C until used.

**Hormonal assay**

Hormonal analysis of infertile women has been done in second or third day of menstrual cycle by using hormone analyzer (Minividas –France), through an enzyme linked fluorescent assay (ELFA) technique. Reproductive hormones involving FSH, LH, PRL, E₂, Testosterone and TSH levels of the serum have been determined for the women of all groups according to manufacture recommended procedure by using specific kit for each hormone.

**Statistical Analysis**

The statistical analysis has been done using statistical analysis system (SPSS, 2010) program to study the differences of data between groups.[9] All results have been expressed as mean ± standard error (M±SE). Differences between groups have analyzed using least significant difference (LSD). Also and t-test has been used to test the significant difference between two groups. P<0.05 has been regarded as statistically significant.

**RESULTS**

In regard to levels of serum hormones were presented in the table (1). Levels of serum FSH, LH, prolactin, estradiol, testosterone and TSH showed no significant differences (P>0.05) between two types of infertility.

**Table (1): Levels of serum reproductive hormones for females classified according to type of infertility.**

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Type of infertility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary infertility</td>
</tr>
<tr>
<td>S.FSH (mIU/ml)</td>
<td>7.334± 0.461</td>
</tr>
<tr>
<td>S.LH (mIU/ml)</td>
<td>4.375± 0.308</td>
</tr>
<tr>
<td>S.Prolactin (ng/ml)</td>
<td>21.007± 1.087</td>
</tr>
<tr>
<td>S.Estradiol (Pg/ml)</td>
<td>76.176± 10.696</td>
</tr>
<tr>
<td>S.Testosterone (ng/ml)</td>
<td>0.822± 0.113</td>
</tr>
<tr>
<td>S.TSH (mlU/ml)</td>
<td>1.977± 0.243</td>
</tr>
</tbody>
</table>

*Values are (Mean±S.E).
*Means with different superscripts within each row are significantly different (P<0.05).
*Means with similar superscripts within each row are non significantly different (P>0.05).
In regard to levels of serum hormones for women classified according to duration of infertility were presented in the table (2). Highest level of S.FSH was recorded in the duration infertility of (6-10 years), while lowest level of S.FSH was appeared in the duration infertility of (<1-5 years). Also, no significant difference (P>0.05) was assessed in the level of serum FSH for female group with duration infertility of (≥11 years) as compared to other two groups. Regarding levels of serum LH, prolactin, estradiol, testosterone and TSH, no significant differences (P>0.05) were appeared among infertility durations (<1-5 years, 6-10 years and ≥11 years).

Table (2): Levels of serum reproductive hormones for females classified according to duration of infertility.

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Duration of infertility (years)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;1-5</td>
<td>6-10</td>
<td>&gt; 11</td>
<td></td>
</tr>
<tr>
<td>S.FSH (mIU/ml)</td>
<td>6.558±0.031</td>
<td>8.316±0.078</td>
<td>6.898±0.122</td>
<td></td>
</tr>
<tr>
<td>S.LH (mIU/ml)</td>
<td>4.166±0.032</td>
<td>5.056±0.052</td>
<td>3.794±0.065</td>
<td></td>
</tr>
<tr>
<td>S.Prolactin (ng/ml)</td>
<td>22.204±0.145</td>
<td>19.297±0.126</td>
<td>19.072±0.582</td>
<td></td>
</tr>
<tr>
<td>S.Estradiol (Pg/ml)</td>
<td>65.323±0.780</td>
<td>87.599±1.728</td>
<td>76.496±3.463</td>
<td></td>
</tr>
<tr>
<td>S.Testosterone (ng/ml)</td>
<td>0.867±0.019</td>
<td>0.695±0.012</td>
<td>0.513±0.016</td>
<td></td>
</tr>
<tr>
<td>S.TSH (mIU/ml)</td>
<td>2.177±0.127</td>
<td>1.917±0.054</td>
<td>1.615±0.143</td>
<td></td>
</tr>
</tbody>
</table>

*Values are (Mean±S.E).

*Means with different superscripts within each row are significantly different (P<0.05).
*Means with similar superscripts within each row are non significantly different (P>0.05).

No. females of duration of infertility (<1-5 years) are (110; 44%).
No. females of duration of infertility (6-10 years) are (102; 40.8%).
No. females of duration of infertility (≥11 years) are (38; 15.2%).

DISCUSSION

In the present study, the percent of primary infertility was 61.6% while secondary infertility was 38.4%. This result agrees with Jebri[10] who found that primary infertility more than secondary infertility in female infertility cases in Iraq. Also, this result agrees with Mosher.[11] in the United States who reported that 65% of the infertile females had primary infertility and 35% had secondary infertility. While it disagrees with the results obtained by Chigumadzi et al.[12] who found that the increase in the rate of secondary infertility is due to the increase in the rate of pelvic infection.
According to levels of serum FSH, LH, Prolactin and TSH, in the present study levels of serum FSH, LH, prolactin and TSH appeared no significant differences (P>0.05) among all types of infertility. These result agreed partly with study done by Seth et al. They found that the women with primary infertility had slightly higher mean levels of LH as compared to women with secondary infertility. However, this difference was not statistically significant. FSH levels were slightly higher in secondary infertility than in primary infertility, however the difference was insignificant statistically. Also, no significant difference was observed in serum TSH and prolactin levels between primary and secondary infertility.

Regarding the duration of infertility in the current study, the main cause for increment mean duration of infertility was increased weight gradually or as represented scientifically as BMI. Ozekinci et al. found that the duration of infertility was significantly higher in the obese women, when compared to the normal weight women, although the mean age of the women between the BMI categories was similar. However, this might indicated as a possible delay in the infertility diagnosis or the lack of a woman’s desire to seek treatment. Further factors including the concomitant health consequences of psychological factors that are attributable to obesity, might play a role in this issue. Fertility can be adversely affected by obesity. In women, the early onset of obesity promotes the development of menses irregularities. Obesity in women may also increase the risk of miscarriage and impair the outcomes of assisted reproduction procedures and pregnancy, when the body mass index greater than 30 kg/m².

In the current work, the fluctuation in the level of S. PRL in infertile women causes several physiological, endocrinological and fertility problems. Physiologically, PRL is mainly involved in many different biological functions including behavior, immunology, endocrinology, metabolism and reproduction (Freeman et al., 2000). More than 300 different biological functions have been attributed to PRL. The clinical manifestations of hyperprolactinemia are variable and differ between women and men. In women, clinical signs of hyperprolactinemia are primarily related to reproduction and include: anovulatory cycles, oligo- and amenorrhoea, infertility, galactorrhoea, dyspareunia, premenstrual syndrome, hirsutism (dependent on increased adrenocortical androgens releasing), tendency to anxiety and depression. Osteoporosis or osteopenia occurs due to an indirect decrease in estrogens secretion and as a consequence of hypogonadism, progressive atherosclerosis also appears.
CONCLUSION

From results of the present study it was concluded that the current study provide a precise investigation for infertile women which is very important for diagnosis and treatment. Also, an advance age has real impact on fertility of women through hormonal imbalance. An increasing duration of infertility related to abnormalities in the levels of reproductive hormones and increasing number of abortions.

REFERENCES


