The Prevalence of Autoimmune Thyroiditis in A sample of Infertile Iraqi Women

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Abstract

In the present study, the aim was made to identify the relationship between thyroid autoimmunity (TAI) and female infertility. The study was performed on 30 infertile women and 22 age-matched healthy fertile control age (33 ± 5 years). Overall, serum prolactin (PRL), thyroid stimulating hormone (TSH) assay is the key test for the diagnosis and management of hypo and hyperthyroidism. Anti-TPO Ab and anti-TG Ab were measured. The mean ± SE of serum PRL (31.080 ± 3.06) ng/ml was significantly (P<0.05) higher in infertile group compared with control (16.191±1.36) ng/ml. Serum TSH was significantly (P<0.05) higher in infertile group (5.689 ± 1.12) µIU/ml compared to control group (2.282 ± 0.18) µIU/ml. The prevalence of positive thyroid peroxidase antibody (TPO-Ab) was higher infertile women (248.439 ± 88.77) IU/ml than that of the control (15.118 ± 2.75) IU/ml. Also there was significant differences (P<0.05) in Anti-TG Ab titration in infertile women (360.139 ± 210.32) IU/ml compared to control (31.636±4.69) IU/ml. However, when thyroid antibodies were positive, hypothyroidism was more frequent in infertile women as compared to the control group. In the other hand, a significant (P<0.01) positive correlation between TSH hormone and Anti TPO Ab r = 0.37, while non-significant correlation was found between Anti- TG Ab and TSH. The present study demonstrated that autoimmune thyroiditis in infertile women is higher than that in healthy fertile controls.

Keywords: Autoimmune Anti TPO Ab, anti-TG Ab, Hypothyroidism and Infertility.

تكرار حالات التهاب الدرقية المناعي الذاتي في عينه من النساء العراقيات غير الخصيبات

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الخلاصة

اجريت هذه الدراسة للتعرف على العلاقة بين حالات العقم غير المشخصة والتهاب الغدة الدرقية المناعي الذاتي شملت الدراسة ثلاثون امرأه عراقية غير خصيبة واثنان وعشرون امرأة سليمة الخصوبة كمجموعة سيطرة بمعدل اعمار (33 ± 5 سنه). جمعت عينات الدم من النساء المريضات والسليمات . لغرض الدراسات الهرمونية والمناعية التضمنة قياس مستوى هرمون البرولاكتين (PRL)، هرمون المحفز للدرقية (TSH) الذي يعد مفتاح تشخيص لاضطرابات الغدة الدرقية و تراكيز الاجسام المضاده المسببة لاضطرابات الدرقية المناعي

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Anti–TPO–Ab and Anti–TG–Ab و اوضحت النتائج مايلي وجود زيادة معنويه ($P < 0.05$) في تركيز هرمون البرولاكتين (PRL) لمجموعة النساء غير الخصيبات (31.080 ± 3.06) ng/ml بالمقارنة مع مجموعة السيطرة (16.191±1.36) ng/ml، كمالوحظ وجود ارتفاع م عنوي ($P < 0.05$) في تركيز الهرمون المحفز للدرقية (TSH) في مجموعة النساء غير الخصيبات (5.689 ± 1.12) µIU/ml بالمقارنة مع مجموعة السيطرة ،(2.282 ± 0.18) µIU/ml واما في حالة الاجسام المضادة فكان هناك ارتفاع معنوي ($P < 0.05$) في تركيز Anti–TPO–Ab في النساء غير الخصيبات (248,439 ± 88.77) IU/ml بالمقارنة مع مجموعة السيطرة (15,118± 2,75) IU/ml، ايضا و هنالك ارتفاعا معنويا ($P < 0.05$) في تركيز Anti–TG–Ab ضمن المجموعة النساء غير الخص يات (360,439 ± 210,32) بالمقارنة مع مجموعة السيطرة (31,636 ±4.69). وقد بينت النتائج ان هنالك تكرار في حالات التهاب الدرقية المناعية ذاتية ضمن النساء غير الخصيبات بالمقارنة مع مجموعة السيطرة.

Introduction

Autoimmune diseases have a tendency for women of reproductive age, infertility and reproductive impairment can be compromised by abnormalities in both endocrine and the immune system [1]. Infertility is one of the medial, social and psychological burdens. Thyroid dysfunction can lead to menstrual disturbance, anovulatory cycle,and decreased fecundity [2]. Hypothyroidism is the most common thyroid disorder, this condition can result either primarily, from failure of the thyroid gland to produce adequate hormones, or secondary, from pituitary or hypothalamic disease, the most common cause of hypothyroidism is thyroiditis which is one of autoimmune thyroid disease (AITD). The prevalence of thyroid autoimmunity (TAI) is 5–10-fold higher in women compared with that in men, probably because of a combination of genetic factors, estrogen related effects and chromosome X abnormalities [3]. TAI is the most common, and can be associated with both hypo- and hyperthyroidism. In women of reproductive age hypothyroidism is an important cause of both primary and secondary infertility [4]. Therefore, it is important to predict hypothyroidism during infertility to prevent its occurrence later. Close interplay between thyroid hormones and normal steroid action and secretion exists, necessary for normal ovarian function and thus fertility [5]. The crude prevalence of hypothyroidism was slightly higher in the infertile group in comparison with that of the general population. There was a positive correlation between serum TSH and prolactin levels in the infertile subjects [6]. In women of reproductive age, hypothyroidism can be reversed by thyroxin therapy to improve fertility and avoid the need for use of assisted reproductive technologies [7]. Evidences suggest an association between the prevalence of anti-TPO and anti-TG with recurrent abortions and infertility [8]. Autoimmune diseases are not considered as a major cause of impaired fertility and are thus commonly overlooked despite the fact that several conditions are associated with infertility, the causes of infertility commonly encompass anovulation, endocrine dysfunctions, mechanical infertility and unexplained causes [9].The present study aims estimating the prevalence of autoimmune thyroiditis in infertile women. Because the thyroid hormones effect on growth and development, and regulates many cellular processes, their absence or disturbance has many consequences.

Materials and methods

Thirty Iraqi infertile (primary and secondary infertility) women were involved in this study during their attendance to the (High Institute for Infertility Diagnosis and Assisted Reproductive Technologies and Specialized Center of Endocrinology and Diabetes and twenty-two healthy women were taken as a control group in the same period. The subject's age were (33 ± 5). The duration of infertility ranged from 2 to 10 years. Thyroid exam was done by two trained general physicians. Blood samples were collected by aseptic technique, serum was separated from venous blood of fasting subjects. The serum separated from the sample was analyzed for following parameters. Thyroid stimulating hormone (TSH) and (PRL) by Addendum-Mini VIDAS apparatus (VIDAS) 12 mode l0, 1992, BioMerieux Company, France, through an enzyme linked fluorescent assay (ELFA) technique, USA [10]. The Anti- TPO Ab and Anti-TG were measured by ELISA method [11].

All results were expressed as mean ± SE SPSS version 17.0 was used. Differences between means were calculated. Independent sample *t* test was used to compare normally distributed data in different groups. Parameters not normally distributed were compared by Mann–Whitney test. Prevalence of

positive anti-thyroid antibodies was compared between the infertile group and the control group by Chi-square test. *P* value less than (0.05) was considered statistically significant [12].

Results

The results of hormonal analyses were presented in the table-1. Serum levels of PRL was showed significantly (P<0.05) elevated in infertile group (31.080 ± 3.06) ng/ml as compared to the control group (16.191±1.36) ng/ml. The current results showed that the TSH level significantly (P<0.05) increased in infertile group (5.689 ± 1.12) µIU/ml compared with control group (2.282 ± 0.18) µIU/ml. The mean of Anti-TPO-Ab increased significantly (P<0.05) in titration when infertile group (248.439 ± 88.77 IU/ml) as compared with control (15.118±2.75) IU/ml (figure 1). Also the Anti-TG-Ab significantly (P<0.05) increased in infertile women (360.139 ± 88.77 IU/ml) when compared with control women (31.636±2.75 IU/ml) (figure 2). The results of present the study focused on Anti –TPO Ab and Anti-TG Ab titration to investigate the correlation between the parameters. Non-significant correlation was found between Anti-TPO Ab and Anti-TG Ab and PRL, presented in the table-2. On the other hand, a significant (P<0.01) positive correlation between TSH hormone and Anti TPO Ab r = 0.530 (P<0.01) was found, also there was a significant correlation demonstrated between TSH hormone and Anti TG Ab r = 0.452 (P<0.01)

Table 1- Serum level of PRL and TSH in healthy and infertile women.

Parameters	Healthy women (control)	Infertile women
PRL (ng/ml)	16.191±1.36 b	31.080 ±3.06 a
TSH (µIU/ml)	2.282 ±0.18 b	5.689 ±1.12 a

- Values are means ± SE.
- Mean carrying similar letters indicate a non-significant difference (P>0.05).
- Mean carrying similar letters indicate a significant difference (P<0.05).
- 22 control women, 31 infertile women. Standard error +/- SE.

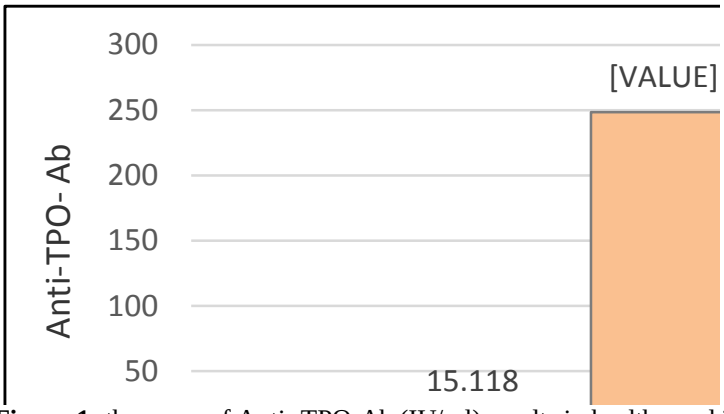

Figure 1- the mean of Anti -TPO-Ab (IU/ml) results in healthy and infertile women.

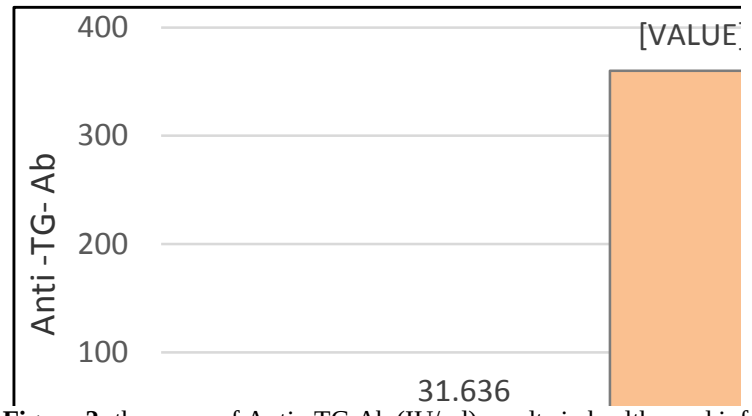

Figure 2- the mean of Anti –TG Ab (IU/ml) results in healthy and infertile women.

Table 2- Correlation coefficient (r) between Anti -TPO Ab and Anti- TG Ab titration and hormones in healthy and infertile women.

Parameters	Anti -TPO Ab		Anti- TG Ab	
	Correlation coefficient	Level of sig.	Correlation coefficient	Level of sig.
PRL	-0.02	0.79 NS	-0.04	0.82 NS
TSH	0.530	0.001 **	0.452	0.01 *

- (P<0.01) * Significant differences.
- (P<0.001) ** Highly Significant differences.

Discussion

Among negative prognostic factors influencing infertility, immunological factors may play an important role in the reproductive processes of fertilization, implantation and fetal development [1]. Different investigations support the association between reproductive failure and abnormal immunological test results, including Anti-phospholipid, anti-nuclear antibodies and organ specific autoimmunity, among which is the presence of anti-thyroid antibodies [13]. The present results showed on increase in PRL level of infertile group and this result agree with [14] who reported that the hyperprolactinemia was depicted in 41% of the infertile women, while it was only 15% in the control group. [5] Showed that serum TSH levels were a significant predictor of failure of *in vitro* fertilization, as TSH levels were significantly higher among women who produced oocytes that failed to be fertilized. [15] Which reported that the infertile women with hypothyroidism had significantly higher PRL level when compared to with hyper- or euthyroid subjects. Hypothyroidism is one of the causes of elevated PRL which causes disturbance in menstrual cycle, LH pulsatility and hyperprolactinaemia [16]. The crude prevalence of hypothyroidism was increase among the infertile group in comparison with that of the general population, menstrual disorders (mainly oligomenorrhea), were reported by about 60% of the infertile women [15]. About 46.1% of infertile patients with hypothyroidism exhibit hyperprolactinemia Thyroid dysfunction may cause short luteal phase, failure to sustain a fertilized egg, and loss of early pregnancy [6]. The high titration of Ant- TPO Ab and Anti- TPO Ab among infertile group agreed with results of [14] who reported that the prevalence of the Anti-TPO Ab in the high-normal TSH group was 18.6% versus 3% in the low-normal range in TSH, Anti-TPO Ab measurement may be appropriate for patients with high-normal TSH to help distinguish those at risk of developing true hypothyroidism. The results showed non- significant difference between PRL and (Anti-TPO Ab, Anti-TG Ab). Even in the absence of hyperprolactinemia, hypothyroidism may contribute to infertility since thyroid hormone may be necessary for maximum production of both estradiol and progesterone [17]. While there was positive correlation between TSH hormone and Anti-TPO Ab, this indicate relatively more frequent occurrence of compensated thyroid function in infertile women [1] [15]**.**

Conclusion

Thyroid function is of paramount importance in fertility and adequate screening and treatment accordingly can improve conception and delivery rates apart from overall health. Organ-specific serum autoantibodies may manifest only with reproductive failure, as in the cases of anti-thyroid, anti-ovarian, anti zona pellucida, anticorpus luteum, and anti-sperm antibodies. Based on these observations we remain convinced that a more rigorous study of the implications of autoimmune diseases and their treatments on reproductive health should be strongly encouraged through a multidisciplinary approach encompassing basic and clinical scientists.

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