

Hormonal Association between Hyperprolactinemia and Hypothyroidism In Iraqi Infertile Males

Dr. Zeinab M. M. Al-Rubaei , Assist Prof.*, Afaf Theyab ,Lecturer*, Layla Karim Ali ,Lecturer**

Hormonal Association between Hyperprolactinemia and Hypothyroidism In Iraqi Infertile Males

Dr. Zeinab M. M. Al-Rubaei , Assist Prof.*

Afaf Theyab ,Lecturer*

Layla Karim Ali ,Lecturer**

*Chemistry Department/College of Education-Ibn Al-Haitham/Baghdad University

**Nursing Department/Koya Technical Institute

Abstract

The objective of this study is to clarified at least in part the association between hypothyroidism and hyperprolactinemia in Iraqi males which contribute to infertility .Sixty male subjects enrolled in this study.Thirty infertile males as patients group which attended Al-Kindey Hospital during (2010-2011).The other group consist thirty healthy individuals as control group.The levels of serum thyroid stimulating hormone(TSH),thyroxine(T₄),prolactin(PRL),testosterone(Tes),luteinizing hormone(LH) and follicle stimulating hormone (FSH) were estimated utilizing ELISA technique.The results revealed a significant increase in TSH ,PRL,Tes levels ,while a significant decrease in T₄,LH,and FSH levels in infertile males comparing to control group was found.A conclusion could be drawn that elevated levels of TSH stimulates prolactin secretion ,which eventually tends to induce infertility in males by influencing spermatogenesis and steriodgenesis .

Keywords: Hyperprolactinemia, Hypothyroidism, and Males Infertility.

مصاحبة ارتفاع البرولاكتين لضمور الغدة الدرقية في الرجال الغير قادرين على الانجاب في العراق

د.زينب منيب مالك الربيعي ،استاد مساعد * م . عفاف دياب ،مدرس * م.ليلي كريم علي ،مدرس**

*قسم الكيمياء /كلية التربية -بن الهيثم للعلوم الصرفة /جامعة بغداد

**قسم التمريض /المعهد التكنيكي /كوية

الملخص

الهدف من البحث هو دراسة تأثير ضمور الغدة الدرقية على ارتفاع البرولاكتين المؤدي الى عدم الانجاب .شملت الدراسة ستون شخصا من الذكور، ثلاثون من الذكور الغير قادرين على الانجاب ومصابين بضمور الغدة الدرقية وثلاثون اخرين من الاصحاء كمجموعة سيطرة. تم استخدام مصل الدم في تقدير الهرمون المحفز للدرقية والثايروكسين والبرولاكتين والتستوستيرون وهرمون الجسم الاصفر والهرمون المحفز للجريبات. اظهرت النتائج وجود زيادة معنوية في مستويات كل من الهرمون المحفز للدرقية والبرولاكتين والتستوستيرون في حين اظهرت النتائج وجود انخفاض معنوي في مستويات كل من الثايروكسين وهرمون الجسم الاصفر والهرمون المحفز للجريبات في مجموعة المرضى مقارنة بمجموعة السيطرة. تم الاستنتاج من هذه الدراسة ان ارتفاع مستوى الهرمون المحفز للدرقية يحفز افراز البرولاكتين والذي يؤدي الى عدم الانجاب وذلك بالتاثير على تخليق المني والهرمونات الستيرويدية.

كلمات مفتاحية: ارتفاع البرولاكتين ، ضمور الغدة الدرقية ، عدم الانجاب عند الرجال

Hormonal Association between Hyperprolactinemia and Hypothyroidism In Iraqi Infertile Males

Dr. Zeinab M. M. Al-Rubaei , Assist Prof.*, Afaf Theyab ,Lecturer*, Layla Karim Ali ,Lecturer**

Introduction:

The only validated test to the diagnosis of primary hypothyroidism ,is to measure TSH and T₄. Hypothyroidism occurs when the thyroid gland is not producing thyroid hormones , thyroxine (T₄) and triiodothyronin (T₃) as it should .Also there are higher elevation in thyroid stimulating hormone (TSH).The only validated test to the diagnosis of primary hypothyroidism ,is to measure TSH and T₄ [1,2].

A common cause of hypothyroidism is the presence of elevated levels of antithyroid antibodies ,failure of the pituitary gland to secrete TSH to stimulate the thyroid gland ,in addition to other causes include congenital defects ,surgical removal of the thyroid gland , irradiation of the gland ,or inflammatory conditions[3].

Prolactin (PRL) is a glycoprotein hormone with a molecular weight of 23000 daltons secreted by the pituitary gland, which plays a divers role in men's reproduction and health. Prolactin secretion is controlled by prolactin releasing hormone ,prolactin-inhibitory factors secreted by hypothalamus. In addition thyroid releasing hormone (TRH) can also stimulate prolactin secretion [4,5].

Hyperprolactinemia is condition in which too much prolactin is present in the blood of men. Hyperprolactinemia in men can lead to impotence reduce libido and infertility. Elevation in prolactin levels can be caused by many factors as medications used ,renal failure ,and hypothyroidism [6,7].

Luteinizing hormone (LH) is a hormone synthesized and secreted gonadotropes in the anterior lobe of the pituitary gland .In concert with the other pituitary gland. In concert with the other pituitary gonadotropin follicle stimulating hormone (FSH) it is necessary for proper reproductive function .LH and FSH are glycoproteins ,similer in the structure , consisting of two polypeptide units connected by two disulphide bridges [8,9] .

The change in LH and FSH levels may be one of the reasons that cause the dysfunction in spermatogenesis and sperm maturation infertile male patients .In males, both LH and FSH are inhibited via negative feed back by testosterone [10,11].

Testosterone is a major secretory product in the leyding cells of the testis and is converted to dihydrotestosterone in some , but not all ,androgen target cells before binding with high affinity to the intracellular androgen receptor. Androgen can be converted to androstenedione and then to testosterone .In males ,LH acts principally on leyding cells to stimulate synthesis of testosterone. FSH acts on sertoli cells to stimulate the conversion of testosterone secreted by the leyding cells ,into 17- β -estradiol ,which is required for spermatogenesis .FSH also stimulated sertoli cells to secrete an androgen-binding protein that binds testosterone and estradiol carrying them into the lumen of the somniferous tubules ,where they are required by the maturing sperm [12,13].

It has been well documented that a significant associations do exist between thyroid disorders and abnormalities of the reproductive system both primary hyperthyroidism and

Hormonal Association between Hyperprolactinemia and Hypothyroidism In Iraqi Infertile Males

Dr. Zeinab M. M. Al-Rubaei , Assist Prof.*, Afaf Theyab ,Lecturer*, Layla Karim Ali ,Lecturer**
hypothyroidism in males and females leading to variable degree of gonadal dysfunction [14-16].

The objective of this study is to confirmed the association between the elevation in prolactin levels in infertile men triggered by elevation in TSH levels which cause infertility.

Experimental Part:

The blood was collected from thirty infertile men and thirty healthy individuals as control group aged (30-39), which placed in plain tube and centrifuged for 10 min at 3500 rpm. The serum which obtained using in determination of PRL, T₄, TSH, Tes, LH and FSH hormones.

T₄ and TSH , PRL , Tes, LH and FSH were determined by mini vides instrument using a kit supplied by Biomerux –France .The assay principle depending on enzyme linked fluorescent assay (ELFA) techniques [17].

The results expressed as mean±SD by using statistical analysis .The result considered to be significant in $P \leq 0.05$.

Results & Discussion:

Hormonal levels of thyroid stimulating hormone (TSH) ,thyroxine (T₄) , prolactin (PRL) ,testosterone (Tes) , luteinizing hormone (LH) and follicle stimulating hormone (FSH) for infertile male and control group are shown in table (1).

Table (1).Hormonal levels for infertile males& control group

Groups Parameters	Control group n=20	Infertile males group n=20	T-test
TSH(μIU/ml)	1.15± 0.273	2.25 ± 0.353	P ≤0.05
T₄(ng/dl)	0.56± 0.084	0.48 ± 0.197	P ≤0.05
PRL(ng/ml)	15 ± 1.414	41.5 ±2.121	P ≤0.05
Tes(nmol/L)	13.4 ±2.21	7.6 ± 0.77	P ≤0.05
LH(ng/ml)	5.1±0.141	1.8 ±0.141	P ≤0.05
FSH(ng/ml)	7.15 ±0.017	4.7 ±0.848	P ≤0.05

The results showed significant elevation in TSH and PRL levels while there were a significant elevation in testosterone levels in infertile males group comparing to control group .A significant decreased was found in T₄, LH ,and FSH levels in infertile males group comparing control group.

Hormonal Association between Hyperprolactinemia and Hypothyroidism In Iraqi Infertile Males

Dr. Zeinab M. M. Al-Rubaei , Assist Prof.*, Afaf Theyab ,Lecturer*, Layla Karim Ali ,Lecturer**

In patients with primary hypothyroidism , increased levels of TSH and TRH can cause to rise prolactin levels [18].Hyperprolactinemia causes infertility in a round 11% of digospermic males ,inhibits the pulsatile secretion of the gonadotrophin releasing hormone , which cause decreased pulsatile release of follicle stimulating hormone , luteinizing hormone and testosterone , which in turn causes spermatogene arrest impaired sperm mobility and altered sperm quality .It later produces secondary hypogonadism and infertility[19].Hyperprolactinemia also directly influences spermatogenesis and steroidogenesis by acting on prolactin receptors present steroid cells and leyding cells in testes ,and produces primary hypogonadism and infertility [20] .

In conclusion, the effect of hypothyroidism on prolactin levels causing hypoogonadism and infertility in Iraqi males ,so the patient must be treated for hypothyroidism first and then for hyperprolactinemia.

References:

1. Papi G., Uberti ED, and Bctterle C. (2007): SubClinical hypothyroidism, Curr opin Endocrinal , Diabetes obes. ,14: 197-208.
2. Krassas G.E., Poppe K. , and Glineer D.(2010): Thyroid Function and Human Reproductive Health , Endocrine Reviews ,31:702-755.
3. Allahabadia A., Razvi S., Abraham P., and Franklyn J.(2009): Diagnosis and Treatment of primary hypothyroidism ,BMJ ,338:b725.
4. Isik S., Berker D., Tutuncu YA. ,Ozuyguz U. et al. (2012) : Clinical and radiological finding in macroprolactinemia ,Springer Link , 41(2):327-333.
5. Alexander Mann W. (2011) :Treatment for proloctinomas and hyperprolactinaemia:a lifetime approach ,European Journal of Clinical Investigation ,41(3):334-342.
- 5.
6. Andrew R., Shlomo melmed ,and Janet Suhlechte (2011) :The Hormone Foundations : Patient Guide to Hyperprolactinemia ,Diagnosis and Treatment , The Endocrine Society .
7. Bolyakov A., and Paduch DA. (2011) :Prolactin in men's health and disease, Pub med – NCBI,21(6):527-534.
8. Shivananda Nayak B.C (2008):” Manipal Manual of Clinical Biochemistry ”, 3rd ed, Medical Publishers (p) LTD by JAYPEE ,ch 9, New Delhi :81,82.
9. Alvarado J.,Del Rosario M.,Garcia M.,Juarel J.V. and Martinez R.R. (2009) :Immunodetection of LH ,FSH ,TSH and prolactin in Brachionus Calyciflovus ,Rev., Biol. trop. Journal ,57(4):1049-1058.
10. Bob Rutledge (2008):FSH and testosterone important for reproduction ,Ezine . articles ,21:816.
11. Randa F., Rodney W., Angela S.,Zacharin M.R. (2008) :LH and FSH levels in Extreme prematurely : Development of Reference Intervals ,Pediatrics ,121 (3) : e 574-e 580 .
12. Thomas M. Devlin (2011):"Textbook of Biochemistry with Clinical Correlation",7thed, John wiely & Sons ,Inc ., 918.
13. Robert K. Murray ,David A. Bender, Kathleen M. Botham ,Peter J. Kennelly, et al. (2009): Harpers Illustrated Biochemistry , 28th ed , Mc Graw Hill, Inc .

Hormonal Association between Hyperprolactinemia and Hypothyroidism In Iraqi Infertile Males

Dr. Zeinab M. M. Al-Rubaei , Assist Prof.*, Afaf Theyab ,Lecturer*, Layla Karim Ali ,Lecturer**

14. Krassas GE ., Papadopoulou F.,Tziomalos K.,Zeginiadou T.,et al. (2008): Hypothyroidism has an adverse effect on human spermatogenesis : a prospective , controlled study .Thyroid ,18: 1255-1259.
15. Bahar A.,Akha O.,Kashi Z.,and Vesgari Z.(2011) :Hyperprolactinemia in association with subclinical hypothyroidism , Caspian J. Intern. Med. ,2(2) :229-233.
16. Hekimsoy Z.,kafesciler S.,Guclu F.,and Ozmen B. (2007) :The prevalence of hyperprolactinaemia in overt and subclinical hypothyroidism .European congress of Endocrinology ,14:307.
17. Kaplan LA and Amadeo PJ(2010): "Clinical Chemistry :Theory ,Analysis , Correlation" , 5th ed., by mosby ,Inc . ,974 -985 .
18. Krasses GE ,Perros P., and kaprara A.(2008): Thyroid autoimmunity ,Infertility and miscarriage,Expert Rev. Endocrinal Metab. ,3:127-136.,
19. Masud S.,Mehbood F.,and Bappi MU(2007) :Sever hyperprolactinemia directly depresses the goonadal activity causing infertility.Esculapio J. Servies Inst. Med. Sci.,2:25-27.
20. Singh P. ,Singh M., Cugati G. ,and Singh A.(2011) : Hyperprolactinemia :An often missed cause of male infertility ,J. Hum Reprod Sci., 4(2) :102-103.

