

# PROLAKTİN, GONADOTROPİNLER, TESTOSTERON ve SEMİNAL PARAMETRELER

PROLACTIN, GONADOTROPINS, TESTOSTERONE AND SEMEN PARAMETERS

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## ÖZET

Hiperprolaktineminin erkek infertilitesindeki rolünü kısmen aydınlatmak için 50 infertil erkek serum prolaktin (PRL), luteinizan (LH), folikül stimulan hormon (FSH), testosteron (T) ve semen parametreleri açısından incelendi. Oligospermiklerde PRL ile LH arasında kuvvetli pozitif korelasyon gözlemlendi. Hiperprolaktinemi düşük sperm sayılı olgularda saptandı. Bu bulgularımız empotans olguları dışında ümitsiz azoove oligospermiklerde de antihiperprolaktinematik tedavinin değerini kanıtlamada yardımcı oldu.

## SUMMARY

50 infertile men were investigated as for serum prolactin (PRL), luteinizing (LH), follicle stimulating hormone (FSH), testosterone (T) levels and semen parameters in order to clarify to some extent the role of hyperprolactinemia in male infertility. A strongly positive significant correlation was observed between PRL and LH in oligospermics. Hyperprolactinemia was found to be correlated with low sperm counts. These findings lead us to the fact that apart from impotent cases, antihyperprolactinemic therapy should be tried for desperate azoo and oligospermic patients.

## INTRODUCTION

The introduction of radioimmunoassay (RIA) has facilitated the measurement of plasma hormones<sup>(1, 2, 3, 6)</sup> and clarified the part played by gonadotropins and testosterone in male infertility. Hyperprolactinemia is a well known cause of impotence<sup>(4, 5, 7, 12)</sup>. Besides hyperprolactinemia has been reported in some cases of azoo - and oligospermia<sup>(8, 12, 13)</sup>. Our present study was under-

taken to demonstrate the relationships among hyperprolactinemia, serum gonadotropins, testosterone and semen parameters.

## MATERIALS and METHODS

50 randomly chosen infertile man attending Outpatient Clinics of Urology, Ondokuzmayıs University School of Medicine were investigated as for serum follicle stimulating hormone (FSH), luteinizing hormone (LH), testosterone (T), prolactin (PRL) and semen parameters i.e. sperm count, motility and morphology. Patients were undergone complete physical, biochemical and brain tomographic examinations in order to rule out urogenital infections, anomalies, sella turcica tumors etc.

The principle of RIA methods is based upon the competition between the patient's serum and  $I^{125}$  labeled hormones for the limited number of receptor sites on a specific antibody<sup>(1, 2, 3, 6)</sup>.

Antibody hormone was then entered into reaction with Amerlex antibody solution. The quantity of  $I^{125}$  labeled hormone was measured using standard reference solution. From the standard curve measurements were interpolated.

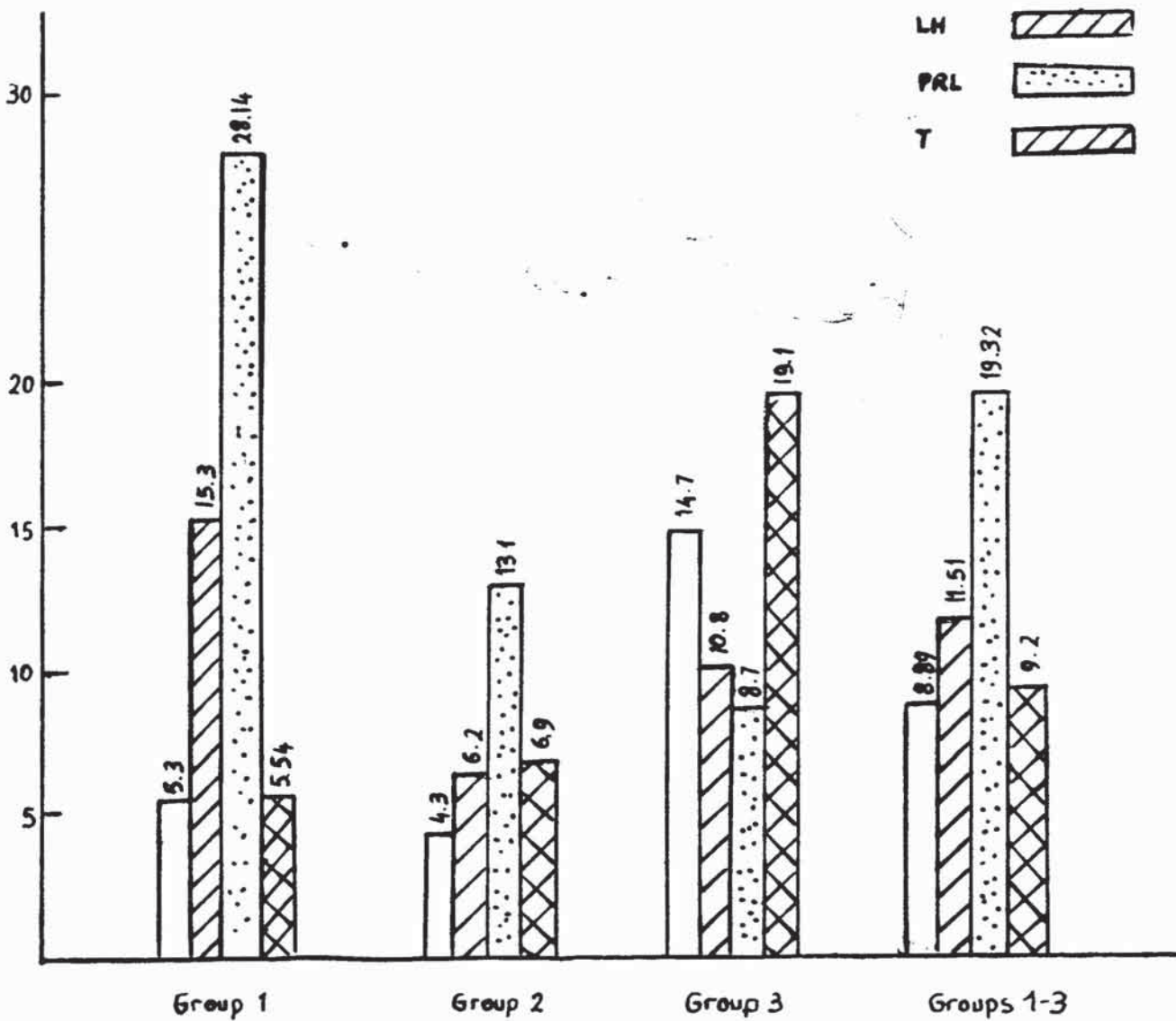
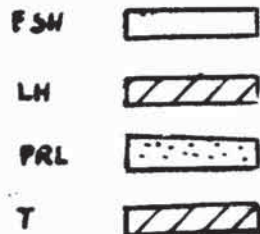
Normal ranges for FSH, LH, testosterone and prolactin were 2-8ng/ml, 2-10 ng/ml, 2-12 ng/ml and 3-12 ng/ml respectively<sup>(1, 2, 3, 6)</sup>. Average of 3 monthly microscopic examinations of semen after 4 days of sexual abstinence were evaluated as for sperm motility, and density. Infertiles were classified as follows.

Group 1-Azoospermic 23 cases.

Group 2-Sperm counts less than 20 millions/ml, oligospermic 15 cases

Group 3-Sperm counts more than or equal to 20 millions/ml. normospermic infertile 12 cases.

Group 4- Hyperprolactinemic 16 cases.



Measurements are expressed in ng/ml

### RESULTS

50 infertile men, ages and duration of marriages ranging 15-39 and 2-11 years respectively were studied. LH and PRL reached maximal mean concentrations in azoospermic group 15.31 ng/ml and 28.14 ng/ml whereas FSH and testosterone were found highest in normospermic group 14.7 ng/ml and 19.1 ng/ml respectively (Table 1). In correlation-regression analysis a statistically significant positive correlation existed between FSH and LH, PRL and LH in groups 1 and 2.

( $p < 0.05$ ). In group 3 a statistically significant correlation between FSH and T was also noticed ( $P < 0.05$ ). In groups 1 and 2 differences between means were significant for LH and FSH.

### DISCUSSION

Prolactin produced from acidophilic and basophilic cells of hypophysis under the control of hypothalamus<sup>(5, 7, 14)</sup> was reported to be related

with growth retardation, galactorrhea, erection failure and impotence<sup>(7, 11)</sup>.

Hyperprolactinemia were reported in some cases of azoo and oligospermia<sup>(8, 11)</sup>. In our azoospermics in accordance with Segal et al. mean serum prolactin concentration reached maximum (28.14 ng/ml). In other terms 53.3 % of group 1 had hyperprolactinemia. A negative correlation between prolactin levels and sperm counts in groups 1-4 confirms our observations. Serum prolactin levels were inversely proportional to sperm counts (13.13 and 10.13 ng/ml in groups 2 and 3 respectively).

Various explanations for negative effects of hyperprolactinemia on sperm counts have been proposed<sup>(10, 11)</sup>. Prolactin is known to inhibit the production of hypothalamic gonadotropin hormone releasing hormone (GnRH) which stimulates the synthesis of FSH an initiator of spermatogenic maturation<sup>(9, 14)</sup>. In addition, PRL directly effects Leydig cells and decreases number of binding sites for LH receptors<sup>(8, 14)</sup>. Besides PRL causes functional 5-alpha reductase (a catalyser of dihydrotestosterone (testosterone precursor synthesis) defect.<sup>(8)</sup> This lowering effect of PRL on testosterone was manifested in negative correlation between PRL and testosterone ( $p < 0.05$ ). In support of this finding mean concentration of testosterone was found lower in hyperprolactinemics i.e. 6.82 ng/ml vs. 10.34 ng/ml in groups 1-3. Unless is reserved with therapy hypotestosteronemia doesn't improve<sup>(4, 7, 14)</sup>.

A positive correlation was noted between LH and PRL especially in oligo and azoospermic cases ( $p < 0.05$ ). In fact PRL potentiates the stimulatory effects of LH on testicular steroidogenesis<sup>(10)</sup>. Prolactin also activates Leydig cells by increasing their responsiveness to LH<sup>(5)</sup>. Under the influence of the same regulatory neurosecretory mechanism, namely hypothalamo-hypophyso-testicular axis<sup>(7, 14)</sup>, both LH and PRL respond to exogenous GnRh stimulation synchronously<sup>(7)</sup>. In addition antihyperprolactinemic therapy was reported to prevent partial LH receptor loss<sup>(8)</sup>. Therefore the maintenance of testicular LH receptors is at least partially dependent on PRL<sup>(8)</sup>.

In infertiles and oligospermic cases another significant positive correlation was found between FSH and PRL ( $p < 0.05$ ). This finding of ours seems to be a contradiction to the inhibitory effects of PRL on GnRh. Because of decreased number of Leydig cells and degenerative seminiferous tubular alternations<sup>(8, 14)</sup> due to diminished feedback inhibition of FSH by PRL, high levels of FSH are expected in hyperprolactinemic patients<sup>(8, 14)</sup>. In other words inhibitory effects of PRL on gonadotropins become invalid owing to the lack of target organ (testicular) response<sup>(8, 14)</sup>.

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