

## Prevalence and pattern of endocrinological abnormalities in oligospermic and azospermic patients.

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### Summary:

**Background:** Hormones have very important role in spermatogenesis and production capacity of testis. Disturbances in their levels can be very crucial in dysfunction of testis which results in men infertility. This study carried out to evaluate the hormonal disturbances in men infertility and its correlation with semen parameters and types of infertility.

**Patients and Methods:** Blood and semen samples were collected from 91 infertile men and 20 healthy and fertile control who attended Al-Kadymiah hospital and some private clinics in Baghdad from January to December 2009. Semen and serum samples were analysed for semen parameter and FSH, LH, Testosterone and prolactin levels.

**Results:** Fifty one (56%) of infertile men were found with azospermia, 22(24%) were with mildoligospermia and 18(20%) were with severoligospermia. Semen analysis of infertile men showed very low quality parameters with a non homogenized hormonal results. Elevation of FSH and LH with low level of testosterone were detected in azospermic and Severoligospermic groups, while elevation of FSH with hyperprolactinaemia were detected in mildoligospermia.

**Conclusion:** FSH and LH elevated levels were found to have a major role in azospermia and severoligospermia, while prolactin and FSH elevations were correlated with mildoligospermia. Also these hormonal disturbances were found to associate with the quality of the semen where the low semen quality parameters detected in those with FSH, LH elevation and low level of testosterone. We concluded that hormonal disturbances can be considered as a reliable indicator to distinguish between non obstructive (over levels of FSH, LH and decrease level of testosterone) and obstructive (over levels of FSH, prolactin) types of infertility which is very important in therapy.

**Keywords:** FSH, LH, Testosterone, Prolactin, Azospermia, Oligospermia

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### Introduction:

Male spermatogenesis depends on the proper function of a complex action of hormones and certain testicular cells (1). These actions provide the reproductive system with all substances that are necessary for sperms production. Disturbances among hormones could lead to spermatogenesis failure (2). About 15% of married couples not producing any progeny have hormonal disturbances and 50% of that is due to male reproductive responsibility (3). Follicle stimulating hormone (FSH) and luteinizing hormone (LH) are known as gonadotropins. They are secreted from the anterior pituitary in response to releasing hormones – GnRH- secreted by the basal part of the hypothalamus (4). These two hormones are very crucial to stimulate the Leydig cells to produce the testosterone and to regulate spermatogenesis in Sertoli cells of the seminiferous tubules of the testes (5). Prolactin is another hormone which is secreted from pituitary and has a major role in male spermatogenesis (6). Prolactin controlled both FSH and LH production via the regulation of GnRH (7). The increasing level of prolactin will reduce the GnRH secretion by slowing the frequency of GnRH pulses thereby reducing FSH and LH pulsatility (8).

It also altered the positive feedback mechanism of the hypothalamus. Oligospermia and azospermia (caused by what ever reason) are two types of male infertility. Up to 20% of these cases can be attributable to endocrinopathy which indicates the importance of the endocrine disorders to be considered in the etiology of male infertility because they can be amenable to treatment (9). The objective of this study is to determine the prevalence and pattern of hormones disturbances in patients investigated for male infertility.

### Material and methods:

**Subjects:** Ninety one infertile men with mean age 34 years were included in this study. They were attended the Alkadymyah Hospital and infertility private clinics between January 2008 to December 2009. Semen samples were collected from each one and analysis was according to the World Health Organization Guidelines (10). Semen samples were obtained after a 3- to 7-day period of sexual abstinence. Azospermia was verified in at least two ejaculates by pellet analysis after semen centrifugation (1 000 × g for 20 min) and patients with zero sperm count were classified as azospermic while those with less count per milliliter compared to control were classified as

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oligospermic. In addition, blood samples were also obtained for hormonal evaluations.

Hormonal evaluations: Follicle stimulating hormone (FSH), luteinizing hormone (LH), prolactin (PRL) and testosterone were measured by ELISA using Enanthos 2020 system and hormones detection kits according to the manufacturer's instructions. Normal reference ranges for men were: FSH 1.7-12mIU/L, LH 4.6-10mIU/L, PRL 1.5-7.5 ng/mL and Testosterone 3-9 ng/mL.

**Results:**

The results were shown in table 1 and 2. A total of 51 (56%) men were azoospermic (no sperms), 22 (24%) mildoligospermic (more than 2 million/ml) and 18 (20%) Severoligospermic (less than 2 million/ml sperms). A statistically significant reduction in the percentage of sperm counts, motility, normal sperms, sluggish sperms, seminal volume of mildoligospermic and severoligospermic was noted comparing to the normal parameters. This reduction was also noted in the severoligospermia comparing to mildoligospermia (Table 1).

**Table 1: Semen profiles of infertile men and control.**

Profile	Azoospermia	Severoligo-spermia	Mildoligo-spermia	Control
No. \mean%± SD	51	18	22	20
No. of sperms X10 <sup>6</sup>	00	1.1±0.9	13±2.3	60±8.2
Motility%	---	15 ±3.3	28±4.2	80±7.2
Normal sperm%	---	10 ±4.6	25±5.1	91±5.6
Sluggish %	---	20±3.2	28±4.9	00
Abnormal sperm %	---	72±5.9	45±6.3	00
Volume-ml	3.06±1.2	2.46±1.7	3.2±1.3	3.1±1.4
PH	7.01	7.3	7.2	7.2
Time of liquefaction-minute	30	30	32	30

\*P < 0.05

Hormone analysis: None of subgroups included in the study showed a homogenized hormonal results. Most of azoospermic and severoligospermic showed a significant over levels of FSH and LH (17.0 ± 2.04 , 14.4±2.9 and 12.2 ± 2.1 ,9.48 ± 4.8 respectively, P <0.05 ) and significantly decreased levels of testosterone ( 5.62± 2.8 and 5.9± 1.75 respectively, P <0.05). Mildoligospermic were showed significant over levels of FSH and prolactin (10.2 ± 3.2 and 9.1±2.9 respectively, P <0.05) with normal levels of LH and testosterone (8.6± 2.1,6. 6± 1.8 respectively, P <0.05). Hormonal normal levels were also detected in all subgroups (Table-2).

**Table-2: Hormonal profiles of the azoospermic, Severoligospermic, mildoligospermic men and control.**

Subgroups	FSH	LH	prolactin	Testosterone
Azo				
Ospermic				
Normal level -%	18	14	67	77
Over level- %	71	70	22	10
Less than normal level-%	11	16	11	13
Mean ± SD	17.0 ± 2.04	14.4±2.9	6.3 ± 1.5	5.62± 2.8
Severoligospermic				
Normal level -%	17	16	86	87
Over level- %	73	69	7	7
Less than normal level-%	10	15	7	6
Mean ± SD	12.2 ± 2.1	9.48 ± 4.8	6.2 ± 1.2	5.91± 1.75
Mildoligospermic				
Normal level -%	23	12	76	83
Over level- %	59	66	12	6
Less than normal level-%	18	22	12	11
Mean ±SD	10.2 ± 2.3	8.6±2.1	9.1± 2.9	6. 6± 1.8
Control mean ± SD	8.45± 3.21	8.18 ± 1.82	6.0 ± 1.5	7.9± 1.32

\* P <0.05

**Discussion:**

About equal incidence of azoospermia and oligospermia was recorded in this study. Among oligospermia group, 20% had severoligospermia with sperm count about 2 x 10<sup>6</sup>cells/ml and very low semen quality parameters. Severoligospermic low semen quality parameters shown to be associated with the elevation of FSH and LH and decreased level of testosterone. Similar levels of these hormones were also detected in azoospermic group. These hormonal disturbances are considered as a reliable indicator for non obstructive azoospermia and for severoligospermia (11). The elevation of FSH indicated abnormalities in initial sperm production. When testis sperms production capacity is diminished the pituitary FSH production will be increased to stimulate the testis to increase their sperms production (12). Such disturbances were also found to associate with decrease in the means of testicular volume and semen parameters (13, 14, and 15). The increased level of FSH and decreased level of testosterone detected in azoospermia and severoligospermia support the notion that inverse relationships is existed between FSH elevation and spermatogenesis reduction (9). Such a correlation is not always correct because some infertile patients in all studied groups were with maturation arrest without elevation in FSH. This in agreement with others data (16, 17, 18). Dysfunction of spermatogenesis and sperm maturation which are not correlated to FSH elevation may be due to the local balance between androgen and estrogen (19). This appeared in infertile men with elevated estradiol and

low testosterone level and low ratio of testosterone/estradiol (20). In mild oligospermia hyperprolactinaemia and FSH elevation were found to associate with the low semen quality. This might indicate some disturbance in the spermatogenesis process, since LH is essential in promoting spermatogenesis and has a role in spermatogenesis maintenance (4, 5). Hyperprolactinaemia was also found to reduce the pulsatility of FSH and LH (8) and to alter the feedback mechanism on the hypothalamus (11, 19). In addition to infertile men with normal hormone levels was also detected in this study in all infertile studied groups which reflected the complexity of the spermatogenesis process. Based on the current results, infertility of men can be classified as having primary or secondary hypogonadism, germinal epithelial failure, hyperprolactinaemia, normal testicular function and may be thyroid disorders.

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