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Detection of Melatonin Hormone Level in Infertile Men

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Abstract
The aim of this study is to detection of melatonin hormone in infertile men (oligozoospermia, asthenozoospermia and unexplained).
This study included the examination of 200 samples after a period of abstinence of 3-5 days, where samples were collected from patients with oligozoospermia (50 samples), patients with asthenozoospermia (50 samples) and patients with unexplained infertility (50 samples) in comparison with control (50 samples) a control sample are between (21-45) years, in the laboratory of the Fertility Center / Al-Sadr Medical City / Najaf Governorate from 20/1/2021 to 1/1/2022.
The results of the current study showed a significant decrease ($p<0.05$) in the concentration of melatonin hormone for oligozoospermia, asthenozoospermia and unexplained infertility compared to the control group
The results of the current study indicated a positive relationship between the melatonin hormone with the sperm concentration for patients with oligozoospermia asthenozoospermia and unexplained infertility patients.
Keywords: melatonin hormone, oligozoospermia, asthenozoospermia unexplained infertility

Introduction

Infertility is defined as the inability to conceive after one year of unprotected intercourse and has been considered as a major public health issue by world health organization. Male- factor infertility which is known as abnormal sperm parameters affects about 7% of males in the general population . It has also been reported that 20%-30% of infertility cases are the result of male factor alone, systemic diseases infections genetic and lifestyle factors (Derakhshan et al., 2020). Within the first year of attempting, a couple should only be diagnosed as infertile after one year of regular sexual activity without using a contraceptive method Investigation is initiated earlier when risk factors are present, including genital infections (Esteves et al., 2011).

Melatonin is biosynthesized in the pineal gland, primarily at night. It has been previously documented, that it interacts with various cellular proteins and enzymes resulting in multiple biological effects The physiological actions of melatonin are exerted via G-protein coupled seven transmembrane cell membrane receptors (subtypes MT1 and MT2) and nonreceptor dependent mechanisms. The MT1 receptor has been associated with mammalian brain function, whilst the MT2 receptor is to be involved in the body's circadian rhythms (Vlachou et al., 2021).

Melatonin an indolamine mainly released from the pineal gland, is associated with many biological functions, namely, the modulation of circadian and seasonal rhythms sleep inducer, regulator of energy metabolism, antioxidant, and anticarcinogenic. the influence of melatonin in the reproductive physiology, the role of melatonin in gonadal steroidogenesis brought about by research that shows that melatonin affects multiple transduction pathways that modulate Sertoli cell physiology and consequently spermatogenesis (Cipolla-Neto et al., 2021).

Materials and Methods

Subjects

The practical part of the research was completed at laboratory of the Fertility Centers in AL-Saadr Medical City in the Province of Najaf, AL- Najaf Health Directorate / Ministry of Health / Iraq during the period from 20/1/2021 to 1/1/2022. Semen and serum specimens were collected from Oligozoospermia, Asthenozoospermia Unexplain infertility in infertile men and control group (Fertile Normozoospermia) that attended to fertility center. and collected of semen fluid samples were for healthy people and infertile patients aged (21-45) years.

Study Design

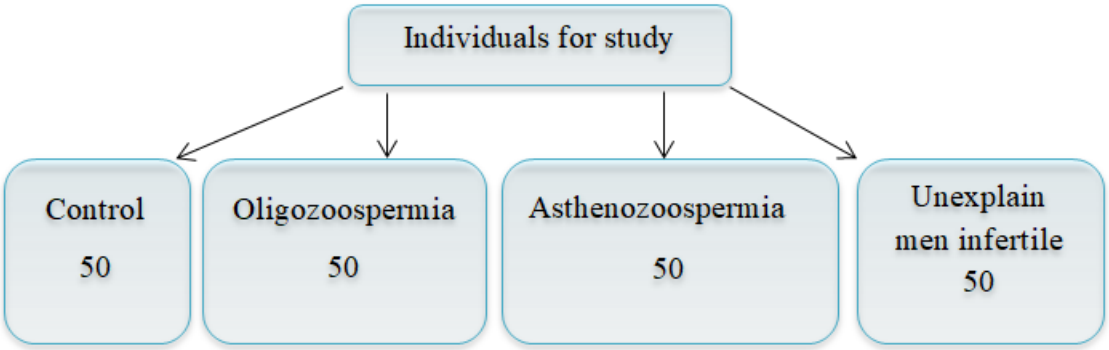

Figure 1 Schematic diagram of the study

Semen collection and analysis

Semen specimens were collected from patients and control after 3 – 5 days of sexual abstinence directly in a dry, clean and sterile disposable container by masturbation in a quiet room adjacent to the laboratory of seminal fluid analysis.

The container was marked with the following information patients ; name, age, sexual abstinence of the sample collection.

The collected specimens were placed at 37C for 30 minutes in an incubator to allow liquefaction.

The liquefied specimens were mixed carefully for a few seconds and then the specimens were examined under a microscope.

Analysis and classification of infertile patients were performed according to WHO (2010) utilized to estimate the results of seminal fluid analysis see appendix A.

Where blood samples were collected for the purpose of Melatonin hormone examination.

Results

The Level of Melatonin hormone in infertile men

The results showed a significant decrease at the level of significance ($p<0.05$) at the level of the melatonin hormone in the Oligozoospermia, Asthenozoospermia and Unexplain men infertile patients Compared with the Control Group.

There is also a significant difference between Oligozoospermia with Asthenozoospermia and Unexplain men infertile at the level of significance ($p<0.05$) at the level of the melatonin hormone. but between Asthenozoospermia and Unexplain men infertile There is not a significant difference at the level of significance ($p<0.05$).

Table 1 The Level of Melatonin hormone in infertile men

Groups		Melatonin (Pg/ml)
		Mean±S.E
Control		79.39±4.07[a]
Patient	Oligozoospermia	55.82±4.17[b]
	Asthenozoospermia	31.77±3.82[c]
	Unexplain men infertile	39.22±4.28[c]

The correlation between Melatonin hormone with Sperm concentration in infertile men

The study showed the presence of a positive correlation between Melatonin hormone with Sperm concentration.

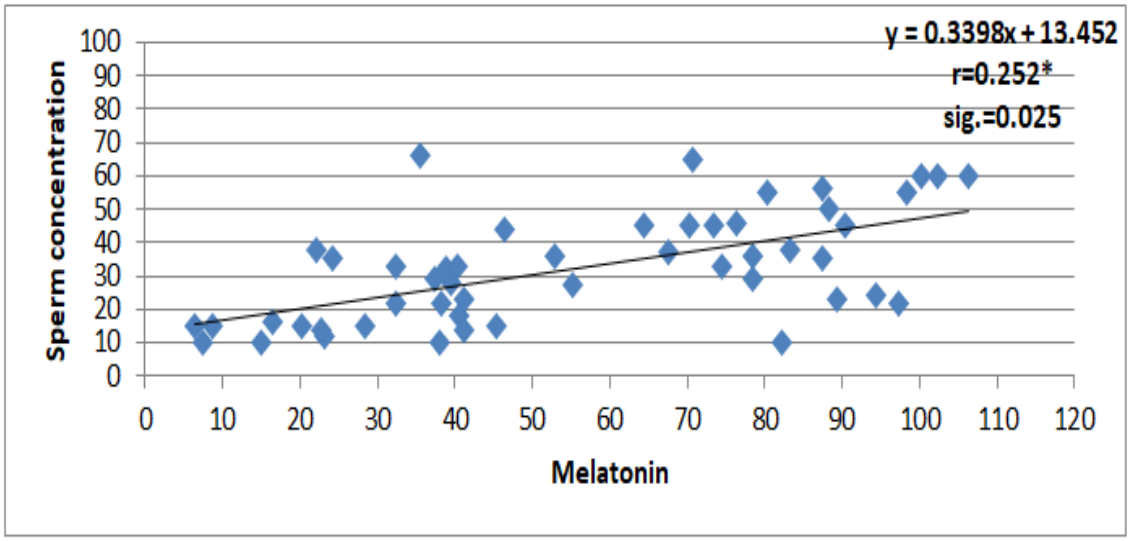

Figure 2 The correlation between Melatonin hormone with sperm concentration in the Oligozoospermia infertile men

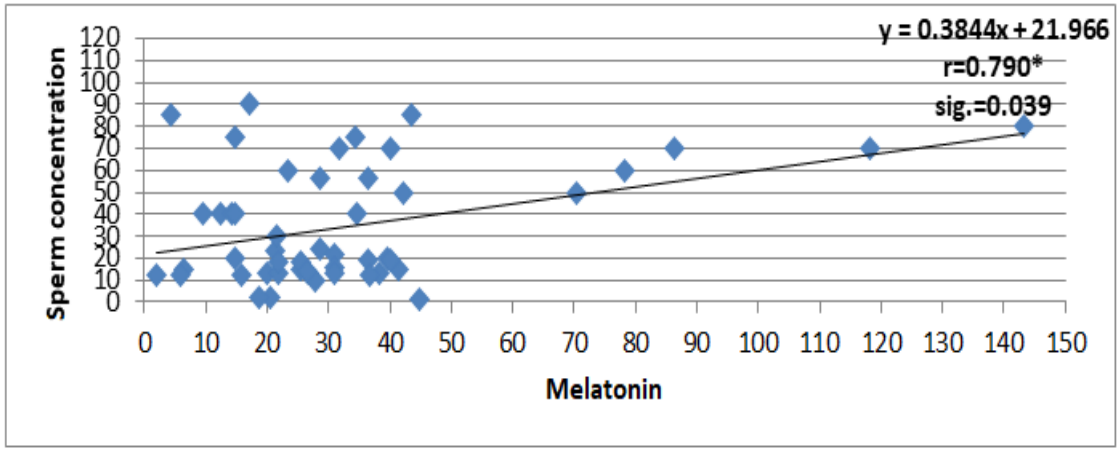

Figure 3 The correlation between Melatonin hormone with sperm concentration in the Asthenozoospermia infertile men

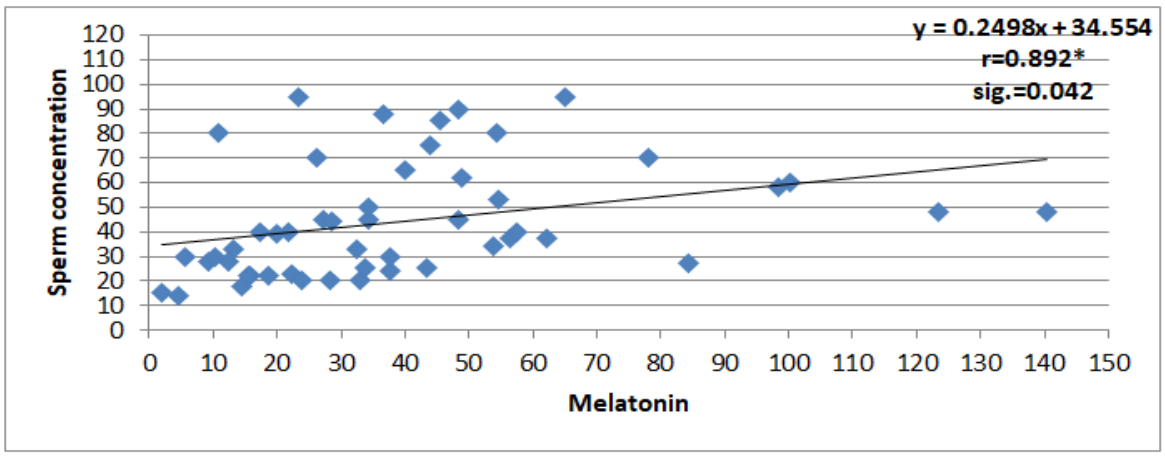

Figure 4 The correlation between Melatonin hormone with sperm concentration in the Unexplained infertile men

Discussion

The current study showed a significant decrease ($p<0.05$) of Melatonin hormone in the Oligozoospermia, Asthenozoospermia and Unexplain men infertile Compared with the Control Group.

The results of the current study indicated a positive relationship between the melatonin hormone with the kisspeptin hormone, vitamin D3, glutathione, sperm concentration, sperm motility and normal sperm Morphology for oligozoospermia asthenozoospermia and unexplained infertility.

The current study agreed with Sarhat et al., (2019) showed that melatonin was reduced significantly in infertile men as compared with healthy control.

Through the results of the current study, it may be of great importance to melatonin in the treatment of infertile men and this agrees with Gholami et al., (2017) it is indicates administration of melatonin could be effective to preserve fertilization and also they can be used in assisted reproductive technologies to improve the quality of sperms.

The results of the current study showed that melatonin may be one of causes the unexplained infertility confirmed Medrano et al., (2017) role of melatonin on sperm function as well as its use as antioxidant for . Melatonin has been included in media for the conservation of spermatozoa to improve sperm quality and fertile capacity.

The current study agrees with study showed that addition of melatonin of semen improve the quality semen (Perumal et al., 2015). Also the study showed by Sharbatoghli et al., (2015) it is the melatonin presence of in semen and the membrane melatonin receptor in spermatozoa.

Through the results of the current study, melatonin may be an antioxidant, as a study showed that in recent years the negative impact of oxidative stress on fertility has become widely recognised. Several studies have demonstrated its negative effect on the number and quality of retrieved embryos. Melatonin has been shown to exhibit unique oxygen scavenging abilities. Some studies have suggested a role for melatonin in gamete biology (Fernando and Rombauts, 2014).

A study by Kratz and Piwowar, (2017) confirmed that Melatonin is an antioxidant that reduces the incidence of oxidative stress in sperm.

Its effects seem to be due to the signalling effects on the upregulation of antioxidant enzymes. Moreover, metabolites resulting from the interaction ofmelatonin with several oxidising radicals are themselves potent antioxidants too (Leon et al. 2004). Several studies have shown that melatonin protected spermatozoa against oxidative stress (Shang et al. 2004; Jang et al. 2009).

The results of the current study are in agreement with study showed the Melatonin is an effective water soluble and fat soluble antioxidant (Acuna Castroviejo et al 2001).

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