

Study the effect of Sex hormones in patients with stomach ulcers in Anbar Governorate

Karam Rasheed Majeed¹, Wajeeh Y. Al-Ani¹, Monem Makki AlShock²

¹Department of Chemistry, College of Science, University of Anbar, Iraq

²Department of Medicine, College of Medicine, University of Babylon, Iraq

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Abstract

Background: Stomach ulcer disease (SUD) is common in most parts of the world, where ulcers are caused by inflammation of the stomach lining. SUD affects more than 10% of the world's population. It is one of the most common digestive problems. SUD may occur as a result of endothelial damage when there is an imbalance between defensive factors (gastric mucosal barrier, bicarbonate secretion, and elevated blood flow). Aggressive infectious agents (acid, pepsin, H. pylori, and refluxing bile salts).

Testosterone neutralizes stomach acidity, and testosterone has been shown to have a role in protecting stomach ulcers, as testosterone stimulates gastric PGs that suppress stomach acidity. Progesterone thickens gastric mucus and prevents mucosal ulceration. Progesterone also acts as an antioxidant to remove free radicals, by promoting gastric mucosal formation, reducing acidic mucosal secretion, inhibiting pepsinogen production, and reducing lesions. SUD are relatively rare during pregnancy, and estrogen exhibits a protective effect against the incidence and severity of SUD, and the risk of ulcers is lower in women compared with men.

Methods: We enrolled 60 patients divided into thirty males and thirty females with SUD and 60 healthy controls divided into thirty males and thirty females individuals who did not have the disease and had no history of smoking or drinking alcohol. We measure serum (Testosterone, Progesterone, and Estrogen).

Results: Serum (Testosterone, Progesterone, and Estrogen) levels were significantly decreased in SUD patients compared to controls.

Keywords: Stomach ulcer disease (SUD), Testosterone, Progesterone, and Estrogen.

INTRODUCTION

Stomach ulcers are a common digestive disease that, if not treated quickly in a short time, can progress to more serious conditions such as stomach cancer (1),(2) and it is one of the most common disorders in the world..(3) and it SUD affect more than 10% of the world's population. (4)(5) The Symptoms of stomach ulcers include weight loss (6), abdominal pain, nausea, Anorexia, vomiting, stools containing blood,(7) bloating, gas and fever. (8)

The main causes of stomach ulcers are Nonsteroidal anti-inflammatory medicines (NSAIDs) (9), Diet (2)(10), Smoking (11), Alcohol drinking (12), Zollinger-Ellison syndrome (ZES), (13) Helicobacter pylori (H.pylori)(14)(15), and Oxidative stress. (16)(17).

Testosterone is a steroid hormone that is involved in a variety of biological activities. It is essential for survival and reproduction. When testosterone levels grow sufficiently during puberty, the effects of testosterone become apparent.(18) . It is also a necessary sex hormone for the body. In humans, it controls sexual desire, fat distribution, muscle mass, bone mass, body hair, and red blood cells. It is also necessary for sperm production and the development of male reproductive organs such as the testicles and prostate. Through a series of stages, it is biosynthesized from cholesterol, and a small amount of circulating testosterone is converted to estradiol, (19).Testosterone neutralizes stomach acidity, and testosterone has been shown to have a role in protecting stomach ulcers, as testosterone stimulates gastric PGs that suppress stomach acidity (20). Progesterone is a 21-carbon steroid that has traditionally been associated with female reproductive activities such as sexual activity, preparing the uterus for implantation of an embryo, and maintaining pregnancy(21) . The corpus luteum produces progesterone. Progesterone by the corpus luteum is continuously stimulated by luteinizing hormone (LH).(22) it is also produced by the

placenta, adrenal cortex, and the male and female central nervous systems, (23)

Estrogen is a multi-functional and multi-target hormone that affects glucose/lipid balance, brain function, bone metabolism, skeletal development, and also follicular growth and ovulation (24). In addition to the ovaries of females, estrogen is released from adipose tissues in males. (25) Estrogen has a variety of effects on GI organs and diseases. and it has been shown to have pathogenic roles in GERD disease, PUD, esophageal cancer, stomach cancer, irritable bowel syndrome, colon cancer, and inflammatory bowel disease. (26)

The present study aimed to determine the serum levels of some hormones and their adoption as pathological indicators of SUD in the environment of Anbar Governorate

Materials and Methods

This study has been conducted at the laboratories of Fallujah maternity and children hospital during the period between November 2021 to May 2022. The study included 60 cases and 60 control. The study includes 30 healthy males. The age of this group ranged from (30-56) years, and 30 healthy females. The age of this group ranged from (31-51) years. individuals who did not have the disease and had no history of smoking or drinking alcohol. Also the study included 30 male patients. Their ages ranged from (33 - 73) years. And 30 female patients. Their ages ranged from (30 - 70) years. The patients were diagnosed to have stomach ulcers by physicians based on a positive diagnosis in the endoscopy device. They were collected from the AL-Anbar governorate. All patients completed a detailed questionnaire that included their name, age, gender, weight, height, smoking, alcohol consumption, and previous medical history. All of the patients gave their verbal agreement to participate in this study. Five ml of the subjects' blood were drawn from their veins and slowly placed into simple disposable tubes. Gel tubes were used to collect venous blood samples. Samples in gel tubes were allowed to coagulate at 37°C for 10-15 min before centrifugation at 3000 rpm for 10-15 min to produce serum samples, which were then separated into four parts and kept at -20°C until analysis Biochemistry. The following parameters were measured using ELISA technique serum levels of (Testosterone and Progesterone) Elabscience (USA) while serum levels of Estrogen Sun Long Biotech Co.LT (China).

Statistics

The data were evaluated using linear regression analysis and the findings were expressed as mean \pm SD. SPSS version 23.0 was used to conduct statistical analysis.

Statistical significance was defined as a $p < 0.05$.

Result

- Testosterone (ng/ml): the results showed a significant decrease in male group ($p < 0.001$) patients (0.569 ± 0.08) than in the control group (2.017 ± 0.7).

Also in the female group, the results showed a significant decrease ($p < 0.001$) in patients (0.29 ± 0.12) than in the control group (0.64 ± 0.21).

- Progesterone (ng/ml): the results showed a significant decrease in male group ($p < 0.001$) patients (0.569 ± 0.08) than in the control group (2.017 ± 0.7).

Also in the female group, the results showed a significant decrease ($p < 0.001$) in patients (7.5 ± 3.2) than in the control group (50.2 ± 20.4).

- Estrogen (pg/ml): the results showed a significant decrease in male group ($p < 0.001$) patients (25.1 ± 10.7) than in the control group (33.1 ± 11.6).

Also in the female group, the results showed a significant decrease ($p < 0.001$) in patients (45.4 ± 17) than in the control group (102.7 ± 35.5). The result as shown in Table (1) and Figure (1, 2, and 3)

Table (1) Mean \pm Standard Deviation (Testosterone, Progesterone, and Estrogen) Concentration in Sera of Stomach Ulcer Patients and Control Group

Parameters		Control	Patient	P-value
		Mean \pm SD	Mean \pm SD	
Testosterone (ng/ml)	M	2.017 \pm 0.7	0.569 \pm 0.08	0.001
	F	0.64 \pm 0.21	0.29 \pm 0.12	0.001
Progesterone (ng/ml)	M	1.2 \pm 0.48	0.8 \pm 0.37	0.001
	F	50.2 \pm 20.4	7.5 \pm 3.2	0.001
Estrogen (pg/ml)	M	33.1 \pm 11.6	25.1 \pm 10.7	0.001
	F	102 \pm 35.5	45.4 \pm 17	0.001

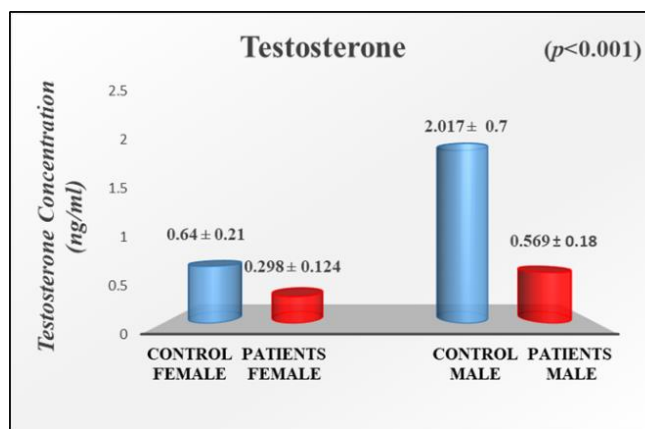


Figure 1. Mean \pm S.D. for Testosterone in control and patients

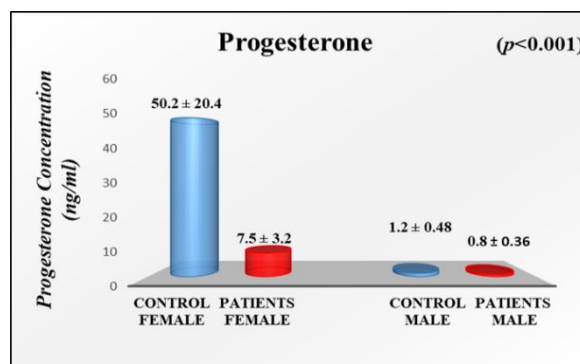


Figure 2. Mean \pm S.D. for Progesterone in control and patients

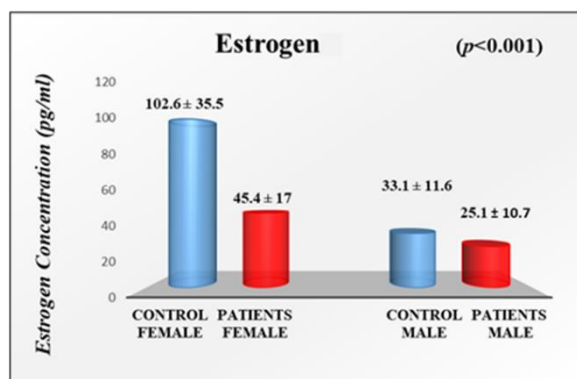


Figure 3. Mean \pm S.D. for Estrogen in control and patients

According to Pearson's male analysis.

The findings of linear regression analysis demonstrate that there is a strong positive association $p < 0.05$, $r = (0.398, 0.395)$ of serum progesterone, estrogen, concentration with Testosterone respectively in the SUD patient male group. These correlations are shown in Table (2).and fig. (4 and 5).

Table (2): Correlation between Testosterone with (progesterone, and estrogen) in the SUD patient male group

Parameters	Correlation coefficient r	P-value
Progesterone (ng/ml)	0.398	0.002
Estrogen (pg/ml)	0.395	0.002

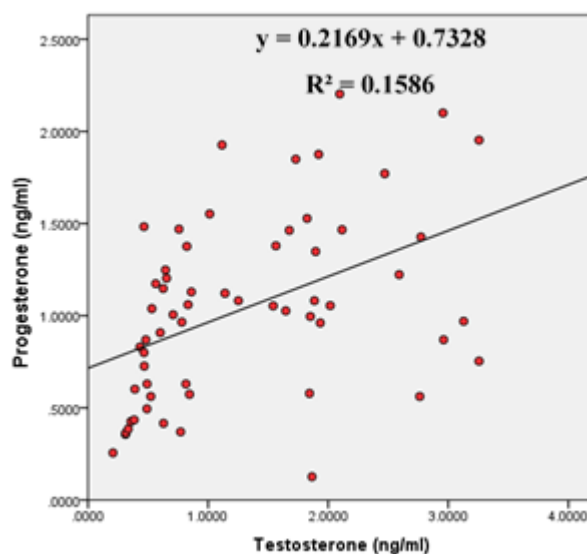


Figure (4) Correlation between Testosterone with progesterone in the SUD patient male group.

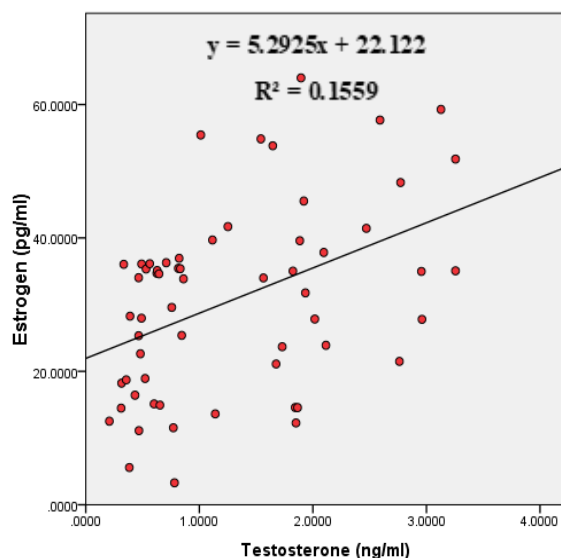


Figure (5) Correlation between Testosterone with estrogen in the SUD patient male group

Also the results of this study showed a linear regression analysis demonstrate that there is a strong positive association $p < 0.05$, $r = (0.471)$ of serum progesterone, with Estrogen in the SUD patient male group. These correlations are shown in Table (3).and fig. (6).

Table (3): Correlation between progesterone with estrogen in the SUD patient male group

Parameters	Correlation coefficient r	P-value
Estrogen (pg/ml)	0.471	0.001

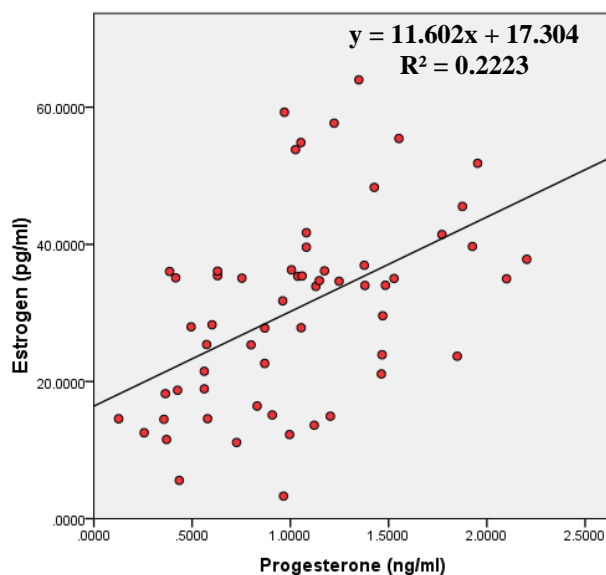


Figure (6) Correlation between progesterone with estrogen in the SUD patient male group.

Also the findings of linear regression analysis demonstrate that there is a strong positive association $p < 0.05$, $r = (0.621, 0.388)$ of serum progesterone, estrogen concentration with Testosterone respectively in the Stomach ulcer patient female group. These

correlations are shown in Table (4).and fig. (7 and 8).

Table (4): Correlation between Testosterone with (progesterone, and estrogen) in the SUD patient female group

Parameters	Correlation coefficient r	P-value
Progesterone (ng/ml)	0.621	0.001
Estrogen (pg/ml)	0.388	0.002

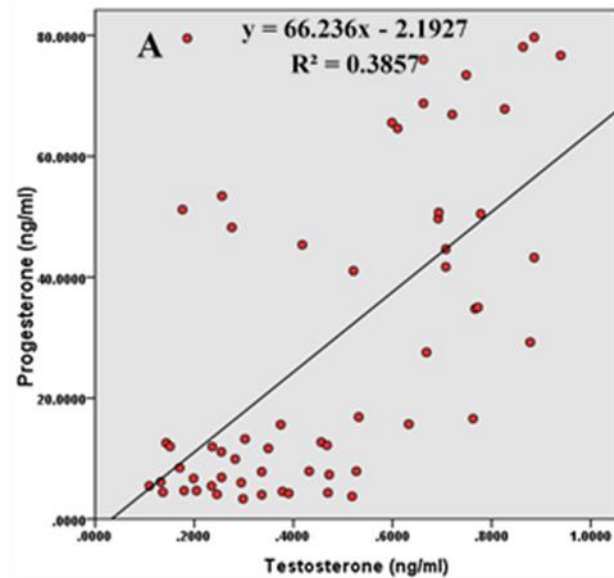


Figure (7) Correlation between testosterone with progesterone in the SUD patient male group.

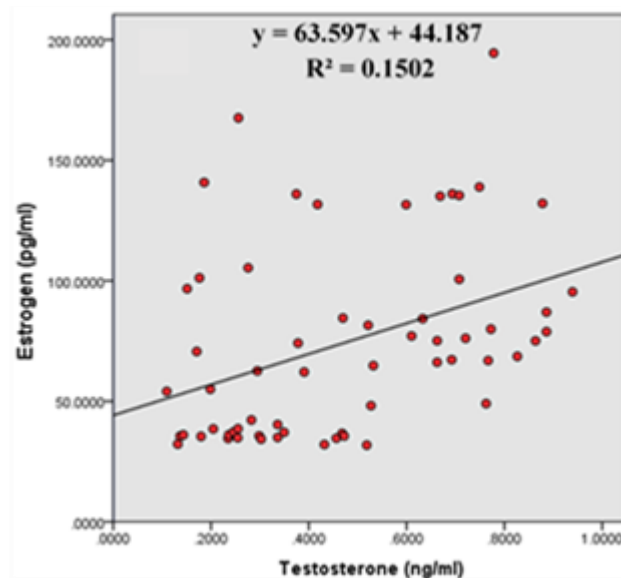


Figure (8) Correlation between testosterone with estrogen in the SUD patient male group.

Also the results of this study showed a linear regression analysis demonstrate that there is a strong positive association $p < 0.05$, $r = (0.602)$ of serum progesterone, with Estrogen in the SUD patient female group. These correlations are shown in Table (5).and fig. (9).

Table (5): Correlation between progesterone with estrogen in the SUD patient female group

Parameters	Correlation coefficient r	P-value
Estrogen (pg/ml)	0.602	0.001

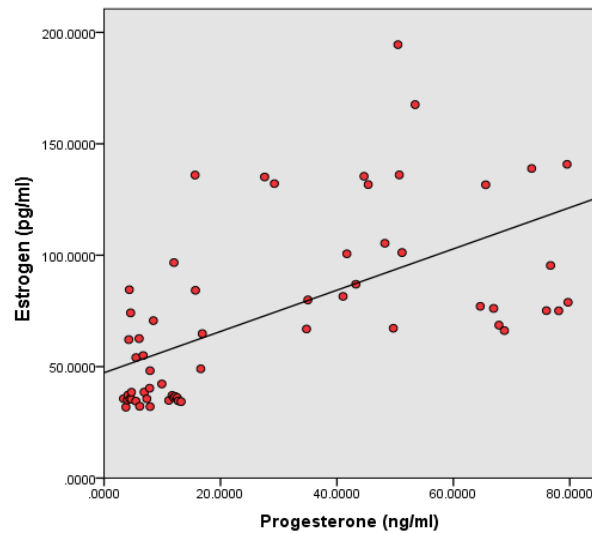


Figure (9) Correlation between progesterone with estrogen in the SUD patient female group.

Discussion

Testosterone is a steroid hormone and anabolic-androgenic that is synthesized from cholesterol and is primarily produced in men's Lending cells and women's ovary and adrenal zona fasciculata via conversion from progesterone. [133] Our findings are consistent with those of Ahmed S. Al-Azouni et al., who found a significant decrease in testosterone levels in the blood of albino rats treated with H2-blockers, [135] According to Posada et al., investigated the effect of testosterone on preventing gastritis. These investigations found that male sex hormones help reduce pathogenic gastritis. [104]. While Kang, Jie, et al. found that testosterone alters oxidative stress variables and mitochondria. [136]

Progesterone is a steroid hormone produced by the female ovaries and placenta, as well as the male and female adrenal glands.(27) Progesterone possesses anti-inflammatory effects.(28) High levels of the hormone progesterone appear to reduce damage by FRs. According to previous studies, progesterone enhances the expression of antioxidant enzymes such as SOD. Progesterone reduces lipid peroxidation and oxidative stress by decreasing the production of FRs and enhancing the body's natural systems to neutralize these radicals, and several studies have also shown that progesterone can lower MDA levels.(29) There are previous studies such as that by Milena S-Salces et al. Evaluation of the effect of progesterone as one of the female sex steroid hormones on H.pylori infection and its effect on SUD.(30) according to Machowska et al., who discovered that progesterone had a preventive impact on stomach mucosa against ulcers in rats after ovariectomy (31). Progesterone's protective function is also dependent on an increase in mucus formation by the stomach mucosa C. Montoneri et al.(32) As a result, progesterone replacement therapy may be effective in the treatment of SUD (33) notwithstanding the fact that T.Sangma et al. discovered that providing dosages of the progesterone hormone worked to suppress stomach ulcers in a prior investigation on female rats The current findings are consistent with those of Z. Keshavarzi et al., progesterone has a significant influence on the activities of all antioxidants and exhibits its protective effect through in this function. According to their findings, the progesterone hormone dramatically reduced stomach acid levels. Because bicarbonate production from mucous membranes protects the gastrointestinal from stomach acid infection (34) Our findings are consistent with those of Al-badry et al.

Progesterone levels in the ulcerated group were lower. The cause of the decrease in reproductive hormones was revealed to be the effect of indomethacin ulceration in the DNA of the pituitary gland responsible for hormone secretion.(35)

Estrogen, a pleiotropic hormone, is one of the key ovarian hormones. It is a steroid hormone that is predominantly found in the ovary and testis.(36) Estrogen hormones regulate mucosal secretion, protect the mucosa from acid-induced damage, and regulate the growth and expression of gastric cells, thereby reducing the risk of gastric inflammation. Estrogen regulates human duodenal bicarbonate secretion and reduces the risk of ulcers and gastric disease in females, and a decrease in the level of estrogen induces a depletion in the mucosal defense function.(37) Previous research indicated that females experience lower oxidative stress than males.(38) according to C. Kerksick et al. Animal experiments had shown that female sex hormones have a strong anti-ulcer effect and to promote ulcer healing associated with medications (indomethacin, aspirin) that may protect female sex hormones from mucosal damage as an estrogen has been shown to reduce its occurrence.(39) Our findings agree with Okada et al. that older men with peptic ulcers had lower levels of estrogen in their blood, decreasing the stomach mucosa's defenses as a result.(40) Additionally, in another study by Zu-Xi Yu et al. Reported that estrogen has been shown to have an antioxidant effect, which directly eliminates free oxygen radicals, stimulates antioxidant enzymes, suppresses superoxide generation, and lowers the development of peptic ulcers.(41)

Conclusions

According to this study, sex hormones and SUD have a negative relationship. Low levels of these hormones may lead to the risk of stomach ulcers. As a result, serum sex hormones may be a useful biomarker for predicting the onset and course of SUD.

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