

## The Effect of Chronic Hepatitis B on Male Sex Hormones in Northern State Sudan

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### Abstract

Chronic hepatitis B affected male reproductive hormones. This study was conducted in Northern State in Dongola Military Hospital came as donation at blood bank aimed to determine the change in reproductive hormones (FSH, LH and Testosterone) in Sudanese male with chronic hepatitis B. Eighty male subjects were studied, divided into two equal groups. All hepatitis B subjects were confirmed by hepatitis B test. The reproductive hormone (FSH, LH and Testosterone), age, body mass index was determined. Blood collected from medial cubital vein using vacutainer syringe. Hepatitis B was measured by using immunochromatography test screening method. Reproductive hormones follicle stimulating hormone (FSH), luteinizing hormone (LH) and testosterone were measured by using immune assay (TOSOH) kit. Reproductive hormones values presented high significantly level in patient compared to control ( $p.value < 0.05$ ). Also, there was clear correlation between BMI and its impact on LH for patient groups appeared significant for only LH ( $p.value < 0.05$ ). The age appeared no significant correlation on its impact on

reproductive hormones ( $p.value > 0.05$ ), and also there was no correlation in impact of age and reproductive hormones. We concluded that chronic hepatitis B significantly increased the level of FSH, LH and testosterone, also there was correlation of BMI group ((16-18)  $kg/m^2$  and group two which BMI (18-25)  $kg/m^2$ ) in LH hormone value.

**Keywords:** Chronic hepatitis B, reproductive hormones. Testosterone, luteinizing hormone

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## Introduction

Hepatitis B virus (HBV) infection is a serious public health problem affecting more than 400 million people worldwide and is at risk of developing liver cirrhosis and hepatocellular carcinoma. Each year more than one million people die from HBV-related liver diseases,<sup>[1]</sup>. Trials have been performed on changes in gonadal hormones in chronic liver disease and cirrhosis. Most of these trials refer to alcohol-related chronic liver diseases and cirrhosis,<sup>[2]</sup>. There were only a few similar studies for patients with chronic liver disease and cirrhosis associated with viral hepatitis,<sup>[3]</sup>. It is known that testosterone biosynthesis and secretion in testes are reduced, abnormalities in Leydig cell morphology were demonstrated and germ cell loss in seminiferous tubules was observed in patients with alcohol-related chronic liver disease and cirrhosis. As a result of these changes, testicular atrophy and decreased testosterone levels are observed. Feminization occurs due to increased estrogen biosynthesis<sup>[4]</sup>. Additionally, disturbances in gonad hormones were detected during the course of other chronic diseases like chronic renal failure except cirrhosis. It was also demonstrated that stress led to a long-term decrease in LH (luteinizing hormone) in males after a transient increase and consequently to a decrease in

testosterone levels, <sup>[5]</sup>. In cirrhosis, excess production of SHBG in liver and increased prolactin levels were detected while exploring the cause of gynecomastia and high level of liver estrogen receptors was added to the direct suppressing effect of estrogen on Leydig cell functions <sup>[6]</sup>. Findings of testicular atrophy and feminization were observed in patients with advanced cirrhosis. In histological studies exploring testicular tissues of patients with hemochromatosis, atrophy of seminiferous tubules and absence of spermatozoa and spermatid were demonstrated, while similar findings were observed in patients with alcohol-related liver cirrhosis, <sup>[7,8]</sup>. Positivity rate for liver estrogen receptors was found to be high in patients with chronic hepatitis B and C, with the highest rate found in the patients with HCC <sup>[9]</sup>. High estrogen levels were also detected in patients with alcohol-related liver cirrhosis <sup>[10]</sup>.

## **Materials and method**

### **Study design:**

Cross-section study.

### **Study area:**

This study was conducted in Dongola Military Hospital period 2016 up to 2017.

### **Study population:**

This study was conducted in Sudanese's patients diagnosed as chronic hepatitis B and normal control group.

### **Inclusion and exclusion criteria:**

Selected reproductive age group male that attend of the outpatient department enrolled. Subjects were diagnosed with any sexual transmitted diseases except hepatitis B, urogenital problems or any other serious chronic disease that might have an impact on reproductive system are included.

### **Sample size:**

The present study conducted among the male comes to the hospital as donation in blood bank. A total of (80) subjects enrolled from the 20-45 years of age group. They were divided into two groups (40) were chronic hepatitis B and the rest were control group

**Ethical clearance:**

The research is a part of major study for males. The ethical clearance obtained from the Dongola Military Hospital Northern state, Sudan.

**Informed consent:**

A written consent is obtained from each subject to participate in the study. The information such as name, age, weight, were recorded for each subject.

**Blood samples**

Blood collected from medial cubital vein using vacutainer syringe. Blood sample will be transfer in to anticoagulant free tube. After allowing for about 60) min for spontaneous blood clotting, the serum was separated by centrifugation at (3000) rpm for 10 min at room temperature. Hepatitis B was measured by using immunochromatography test screening method. Reproductive hormones such as follicle stimulating hormone (FSH), luteinizing hormone (LH) and testosterone were measure by using immune assay (TOSOH) kits.

**Statistical analysis:**

Statistical analysis was conducted using (SPSS) version (16.0) soft-ware USA for windows. Descriptive statistics will be reported as Mean  $\pm$  SE. A significant *P* value of less than 0.5 will be considered statistically significant.

**Results and Discussion**

Eighty subjects in the present study were divided into two equal groups. 40 were diagnosed as hepatitis B. The results of means level of three hormones FSH, LH and Testosterone in the patients presented (5.26 $\pm$ 2.83 Miu/ml, 4.13 $\pm$ 2.01 Miu/ml and 1146.85 $\pm$ 275.26 ng/ml respectively. The control means level were (3.84 $\pm$ 1.57 Miu/ml, 3.21 $\pm$ 1.49 Miu/ml and 5.26 $\pm$ 2.83 ng/ml) respectively Table (1). The results means of BMI in the present study were divided into three groups which were (16- 18.5 Kg/m<sup>2</sup> group one, 18- 25 Kg/m<sup>2</sup> group tow and > 25 18- 25 for group three Table (2). The results of age among in studded were three groups (20 – 30 years), (30 -40 years) and more than 40 years Table (3). The means level of FSH, presented high significantly level in patients compared to control

subjects p.value (0.003). This result is agreement with (Bassil *et al.*, 2013) [11]. The mean level of LH present high significantly level in patients compared to control subjects p.value (0.006). This result was agreement with (Akdoğan *et al.*, 2007) [12]. Table (1). The mean level of Testosterone presented very high significantly level in patients compared to control subjects p.value (0.000). This result is agreement with (Bassil *et al.*, 2013) [11]. Table (1). The patient's body mass index has been divided into three categories (16-18) kg/m<sup>2</sup> as group one, (18-25) kg/m<sup>2</sup> as group two and (>25) kg/m<sup>2</sup> as group three. The result of correlation between BMI groups and it impact of FSH, LH and Testosterone for patients' categories appeared significant only on LH in group one p.value (0.033) and group two p.value (0.022), but last BMI group appeared no significant correlation p.value (0.678). Table (2). The patient Ages has been divided into three groups (20-30) year, (30-40) year and (> 40) year. The study appeared no correlation significant between ages groups of patients and FSH, LH and Testosterone respectively Table (3).

**Table (1): Means±SD levels of FSH, LH testosterone in patients with chronic hepatitis B and control.**

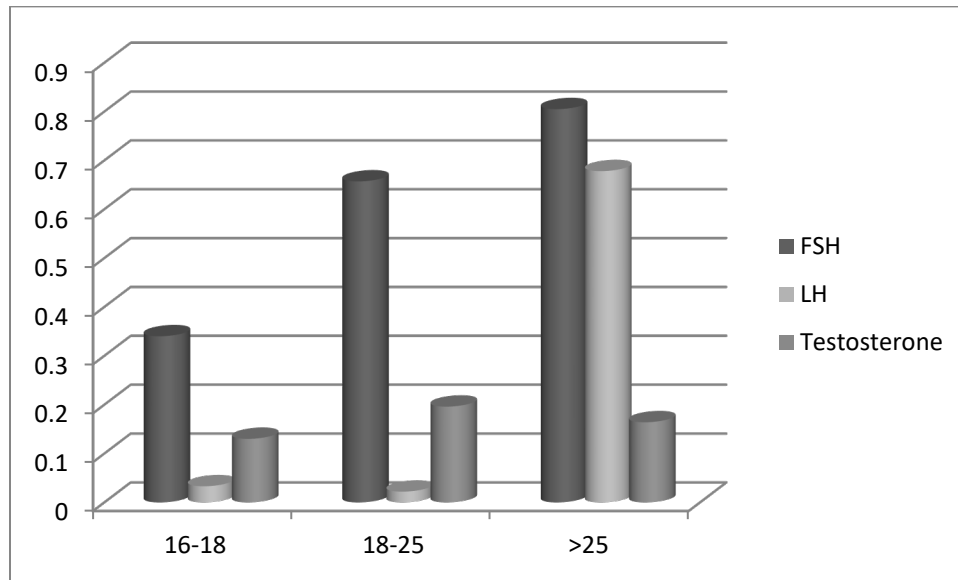
Hormone	Patients Means±SD	Control Means±SD	P. value
FSH (Miu/ml)	5.26±2.83 <sup>†</sup>	3.84±1.57 <sup>†</sup>	0.003
LH (Miu/ml)	4.13±2.01 <sup>†</sup>	3.21±1.49 <sup>†</sup>	0.006
Testosterone (ng/ml)	46.85±2.26 <sup>*</sup>	5.26±2.83 <sup>*</sup>	0.000

Values were Means±SD means with rows not sharing (†) are significantly different (*p.value* <0.05) (\*) non-Significant.

**Table (2): Means±SD of BMI and reproductive hormones**

BMI kg/m <sup>2</sup>	FSH (Miu/ml)	LH (Miu/ml)	Testosterone (ng/ml)
16- 18	0.340 <sup>†</sup>	0.033 <sup>†</sup>	0.130
18-25	0.657 <sup>*</sup>	0.022 <sup>*</sup>	0.196
> 25	0.805 <sup>*</sup>	0.678 <sup>*</sup>	0.164

Values were Means±SD means with rows not sharing (†) are significantly different (*p.value* <0.05) (\*) non-Significant.



**Figure (1) Correlation between BMI and reproductive hormones in patients.**

### **Conclusion**

We concluded that chronic hepatitis B significantly increased the level of FSH, LH and testosterone, also there was correlation of BMI group ((16-18) kg/m<sup>2</sup> and group two which BMI (18-25) kg/m<sup>2</sup>) in LH hormone value.

### **Recommendations**

We recommended that fertility hormones should be requested for patients with hepatitis B.

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