

Biochemical study on the effect of *Toxoplasma gondii* on Liver function in Women

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Summary

The aim of this study was to detect the effect of toxoplasmosis on some liver enzyme activity such as bilirubin concentration, Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), Alkaline Phosphatase (ALP) in serum. Twenty hundred and fifty women were examining by Enzyme-linked immunosorbent assay (ELISA). One hundred and thirty-four were infected with toxoplasmosis with different number of abortion (1-4) times were used in this work. All Serum ALT and AST activities were increased and ALP and total bilirubin level decreased in infected women below the normal value. The analysis of the plasma enzyme distribution pattern suggests that liver cell damage occurred during virulent and low virulent infection, leads to be inflated cells as provided and expansion in Central necrosis of hepatic veins and damage in various parts of the liver.

Keywords: Biochemical, *Toxoplasma gondii*, Liver function, Women.

Introduction

Toxoplasmosis occurs in a wide variety of carnivorous herbivorous mammals, bird and humans. The evidence of infectious has been found in all population groups investigated (1). Infection is more common in warm climate and at lower altitudes than in cold climates and mountainous regions. This distribution is probably related to conditions favoring the sporulation and survival to oocysts (2).

The outcome of infection depends on the immune status of the infected person. Active progression of infection is more likely in immune compromised individuals (3). About 40% of the pregnant women have Toxoplasmosis, the fetus is also infected during pregnancy to have Congenital Toxoplasmosis infection, and transplacental transmission usually takes in the course of an acute but in apparent or undiagnosed maternal infection. In some domestic animals Chronic Toxoplasmosis may lead to abortion (1), and it has been suggested that this may take place in women.

Human Toxoplasmosis is a zoonosis and it is ubiquitous infection increasing with age, crowding, sanitary habits, socioeconomic, undercooked meat and animal contacts including cats the final host (4). Diagnosis of Toxoplasmosis based on clinical sign and

supporting laboratory analysis including blood (5). The aim of the proposed work was to detect of the effect of Toxoplasmosis infection on the some liver function activity with the specific activities of Glutamate Pyruvate Transaminase (GPT), Glutamate Oxaloacetate Transaminase (GOT), and Alkaline Phosphatase (ALP) in serum

Materials and Methods

Five ml of blood samples were collected with 23 G needle, the blood was put in the plain tubes and allowed to form serum at room temperature and centrifuged to harvest serum. Serum was stored at -20°C until analysis by using diagnostic kits and spectrophotometer. All sera samples (250 samples) of pregnant women were analyzed by using ELISA for *Toxoplasma* specific immunoglobulin IgG, and IgM using kit from BioCheck toxoplasma IgG and IgM enzyme immunoassay (BioCheck, Inc, England).

Liver function for (134) samples positive IgM-IgG for toxoplasmosis were evaluated by estimation the activities of AST, and Globulins were estimated by subtracting the value of total Bilirubin from the serum, A/G ratio was estimated mathematically according to (6) by using diagnostic kit (Randox, United Kingdom).

Data were analyzed using correlation and Duncan Multiple Range test, P value was considered significant when it was $P < 0.001$ according to SPSS version 14 (7).

Results and Discussion

The results of Albumin, AST, ALT, ALP and Bilirubin of all positive cases to toxoplasma IgM-IgG samples in acute and chronic infection states of toxoplasmosis in aborted women were observed in (Table, 1 and 2).

Table, 1: Level of Liver function tests in infected women with *Toxoplasma gondii* in different No. of abortions

Liver Function Enzymes		Mean \pm SD
Alkaline Phosphatase (ALP)	a1	8.4517 \pm 2.42410 unit/100ml
Bilirubin	a2	1.2046 \pm 0.62017
AST	a3	14.000 \pm 13.68400 unit/ml
ALT	a4	8.3258 \pm 6.38641 unit/ml
No. of abortion		2.0152 \pm 0.83789

This table showed significant differences using ANOVA test ($P < 0.001$) in the increment of enzymes' concentrations

Table, 2: Correlations between samples number (enzymes) and No. of abortions

C	Γ	C.S ANOVA Test
a1 and No. of abortion	- 0.277	HS
a2 and No. of abortion	- 0.667	HS
a3 and No. of abortion	+ 0.553	HS
A4 and No. of abortion	+ 0.724	HS

This table indicates that there is a significant correlation between specific activities of liver enzymes ($P < 0.001$).

Toxoplasma infection affects liver functions which was clear in all women with different number of abortion. All studied parameters which included Bilirubin, Liver enzymes activities ALP, AST, and ALT increase. Our results were agreed with (8-10) who revealed an increase in level of total protein and another study showed toxoplasmosis deled to acute and chronic inflammation (11), and is not agreed with (12 and 13), but not agree with what found by (14) who recorded none significant differences in severity of liver damage between the infected and non-infected rats. Extensive and progressive damage in liver and changes of protein fractions AST, ALT, in the sera were observed by (5 and 15).

Toxoplasmosis causes extensive and progressive damage to the liver remarkable proliferations of organisms such damage in the liver metabolism (16) and toxoplasmosis Infects liver cells and leads to inflated cells as provided and expansion in Central necrosis of hepatic veins and damage in various parts of

the Liver (16 - 18). Changes of protein fractions AST, AIT varied according to the qualitative difference in the intensity of inflammation by strains of *Toxoplasma*.

Boothroyd *et al.*, (19) observed increment of AST and ALT enzymes activities in sera samples. In consequence, the degree of liver damage was much less in the acute stage of infection (20).

The accompanied titers appeared to rise almost parallel with raise in serum gamma globulins (21-23) (i.e. the reaction of the immune system of the body against Toxoplasmosis or its resistance) (22). It was found in the present work a significant increases in AST, ALT, and the plasma enzyme ALP while Bilirubin showed decrease below the normal value in all studied samples especially ALT, AST, total protein and globulin indicated that the treatment improve the immune system and slow rate of hepatocytes metabolism either by an increase the anabolism and decrease catabolism, although Azithromycin known to prevent

bacteria from growing by interfering with their protein synthesis.

Azithromycin binds to the 50 S subunit of the bacterial ribosome, and thus inhibits translation of mRNA, nucleic acid synthesis is not affected (24), but the relation between the antibiotic and hepatocyte protein metabolism is needed further examination (24 and 25). In Conclusions: Toxoplasmosis affects liver functions which were characterized by increased levels of AST, ALT activities and decrease of ALP and total Bilirubin below the normal value.

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دراسة بايوكيميائية على تأثير الإصابة بداء المقوسات على وظائف الكبد في النساء

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الخلاصة

الهدف من هذه الدراسة معرفة تأثير الكشف عن داء المقوسات على تركيز البيليروبين الكبد وقياس مستويات الانزيمات (ALP), (GOT), (GPT) في مصل الدم لمئة واربعة وثلاثين امراة مصابة بداء المقوسات وبعدها أجهزة تنراوح ما بين 4-1 مرات. اظهرت النتائج وجود زيادة في مستويات هذه الانزيمات مع انخفاض في مستوى البيليروبين الكلي في النساء المصابات دون النسبة الطبيعية وأن هذه الزيادة في معدلات انزيمات الكبد في البلازما تشير الى تلف خلايا الكبد الذي حدث اثناء الإصابة المزمنة والحادة بطفيلي المقوسة الكوندية حيث يؤدي الى تضخم خلايا كوفر وتتسع في الاوردة الكبدية وتنخر وتلف في مختلف أجزاء الكبد .

الكلمات المفتاحية:- بايوكيميائية، داء المقوسات، وظائف الكبد، النساء.