

Estimation of CPK, LDH, GOT and GPT Enzymes Activity in Serum of Abortion Women

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Abstract

The current project was designed to study the biochemical aspects of serum of Abortion women for enzymes activities and to compare the recorded values with the standard values. The study group comprised of thirty abortion women and thirty normal women as control. Laboratory investigations including creatine phosphokinase (CPK), Lactate Dehydrogenase (LDH), glutamicoxaloacetic transaminase (GOT) and glutamic pyruvic transaminase (GPT) had been measured in abortion women and control. There were significant difference in CPK, LDH, GOT, and GPT, ($P < 0.01$) in the abortion women when compared to control group. In this study, was observed a significantly positive association between GPT [U/L] with GOT[U/L] ($R = 0.63$, $p < 0.01$), and negative association was observed between GOT/GPT with CPK [U/L] ($r = 0.36$, $p < 0.05$), LDH [U/L] ($r = 0.40$, $p < 0.05$) in Abortion women while there was no significant correlation was observe in the control.

Keywords: Abortion, CPK, LDH, GPT, GOT.

Introduction

The enzyme creatine phosphokinase (CPK) is to be found mainly in muscle cells. It participates in the energy supply by means of phosphate transfer, (CPK) is a key enzyme for energy metabolism of contraction and in both striated muscles (such as skeletal and cardiac) and smooth muscle. The CPK has been found in all smooth muscles studied to date including the fallopian tube [1]. One theory is that damage to the fallopian tube in EP is sufficient to cause an increase in serum CPK [2]. Although some studies have demonstrated that maternal serum CPK levels can be an important biochemical marker for the diagnosis of EP [3,4]. Other diagnostic markers are also described for diagnosis as progesterone CPK, CA¹²⁵ and pregnancy specific β glycoprotein (PSBS) [5,6]. Measurement of serum levels of creatinekinase, an intracellular metabolic enzyme with high concentrations in the brain, the myocardium and skeletal and smooth muscle, have first been supported by lavie et al in ectopic pregnancy[7]. So far its measurement only been used in the evaluation of acute myocardial infarction [8].

Lactate Dehydrogenase (LDH) is mainly an intracellular enzyme. It is responsible for interconversion of pyruvate and lactate in the

cells. Its levels are several times greater inside the cells than in the plasma. So its levels are increased in the scenario of increased cell leakiness, hemolysis and cell death [9]. Lactate dehydrogenase is a safety valve in our pipeline of energy production. Most of the time, our cells breakdown glucose completely, releasing the carbon atoms as carbon dioxide and the hydrogen atoms as water. This requires alot of oxygen. If the flow of oxygen is not sufficient, however, the pipeline of energy production gets stopped up at the end of glycolysis. Lactate dehydrogenase is the way that cells solve this problem, at least temporarily[10].

Aspartate aminotransferase (AST, EC 2.6.1.1) and alanine aminotransferase (ALT, EC 2.6.1.2) are enzymes found mainly in the liver, but also found in red blood cells, heart cells, muscle tissue and other organs, such as the pancreas and kidneys. AST and ALT formerly are called serum glutamicoxaloacetic transaminase (GOT) and serum glutamic pyruvic transaminase (GPT), respectively. AST or ALT levels are a valuable aid primarily in the diagnosis of liver disease. Although not specific for liver disease, it can be used in combination with other enzymes to monitor the course of various liver disorders. The normal concentrations in the blood are

from 0 to 4. U/L for AST and from 0 to 30 U/L for ALT. However, when body tissue or an organ such as the liver or heart is diseased or damaged, additional AST and ALT are released into the bloodstream, causing levels of the enzyme to rise. Therefore, the amount of AST and ALT in the blood is directly related to the extent of the tissue damage. After severe damage, AST levels rise 1.5 to 2.5 times and greater than normal, whereas ALT can reach higher levels (up to 10 times greater than normal). On the other hand, the ratio of AST to ALT (AST/ALT) sometimes can help determine whether the liver or another organ has been damaged [11,12]. The current project was designed to study the biochemical aspects of serum of Abortion women for enzymes and to compare the recorded values with the standard values.

Materials and Methods

A total of 70 serum samples from cases of normal and Abortion women were collected at random from AL-Yarmok Hospital, All the relevant information were recorded on Performa regularly. Under aseptic measures, 5 ml of blood was with drawn by vein-puncture with the help of disposable syringes and was transferred to a screw capped sterile clean test tube slowly to avoid haemolysis [13]. All the blood samples were labeled with the species, outdoor registered number and the date of collection. The samples were left for

about an hour for blood clotting to occur and were further processed for analysis [14]. Reported freezing and thawing was avoided.

Surem creatine kinase activity (CPK) was measured by a standard method using a commercial CK-NAC reagent kit (Boehringer-Mannheim) on a Hitachi 717 analyser [Szasz et al, 1976 15]. The activities of LDH, GOT and GPT were determined spectrophotometrically by measuring the oxidation rate of NADH (nicotinamide adenine dinucleotide, reduced) in a thermostated cuvette at 340 nm after incubation of samples with Na-pyruvate, L-aspartate and L-alanine, respectively [16,17].

All statistical analyses in studies were performed using SPSS version 10.0 for Windows [Statistical Package for Social Science, Inc., Chicago, IL, USA]. Descriptive analysis was used to show the mean and standard deviation of variables. The significance of difference between mean values was estimated by Student T-Test. The probability $P < 0.05$ = significant, $P > 0.05$ = non-significant.

Results and Discussion

There is no significant different in age between abortion women and normal group. LDH, CPK, GOT, GPT, and (GOT/GPT) were found to be significantly increase with P value < 0.05 . when compared to control group as shown in Table (1).

Table (1)

The mean and standard deviation of Age, LDH, CPK, GOT, GPT and (GOT/GPT) in Abortion and normal women.

Characteristic	Abortion women [Mean±SD] [n=30]	Normal women [Mean±SD][n=37]	P Value
Age[year]	29±4.97	28±4.96	N.S
LDH[U/L]	300.46±60.33	92.46±6.91	<0.01
CPK[U/L]	190.42±18.97	100.66±29.43	<0.01
GOT[U/L]	40.46±19.26	13.46±1.69	<0.01
GPT[U/L]	50.00±16.30	14.80±2.42	<0.01
GOT/GPT	1.13±0.37	0.93±0.17	<0.01

In this study, a significantly negative association was observed between GOT/GPT with CPK [U/L] ($r=0.36$, $p<0.05$), LDH [U/L] ($r=0.40$, $p<0.05$), and positive association was observed GPT [U/L] with GOT [U/L]

($R=0.63$, $p<0.01$), in Abortion women while there was no significant correlation was observe in the control group as shown in Fig.(1).

Detection of rising levels of serum CPK is one such marker which has been studied widely for early diagnosis of ectopic pregnancy. Ectopic pregnancy presents a major health problem for women of child bearing age. It is a result of flaw in the human reproductive physiology that allows the conceptus to implant and mature outside the endometrial cavity, which ultimately ends in death of the fetus have hypothesised that serum CPK levels would increase in ectopic pregnancy as a result of the trophoblastic invasion and ensuing damage to the muscularis of the tube, known to lack a submucosal layer [18,19]. They found that CPK levels in all cases of ectopic pregnancy to be raised above the range of CPK values observed in patients with normal intrauterine pregnancies or missed abortions, and suggested that CPK is an additional tool in the diagnosis of ectopic pregnancy, similar in concept to its established use in the evaluation of acute myocardial infarction. The conclusions of these authors could not be corroborated by histological evaluation of the involved tubes, however, as they did not provide any information on the depth of trophoblastic invasion of the tubes [20].

The AST in so many tissues makes their serum level a good marker of soft tissue damage but precludes its use as an organ specific enzyme [Boyd, 1983 21]. Moss and Buttorworth (1974) also stated that the use of enzyme estimation in serum in the detection of acute or chronic damage to cells which cause the leakage of enzymes into extracellular fluid and then in the blood provides an extremely sensitive index of deterioration of plasma membrane. Since enzymes can be detected by their catalytic activity has in case of AST level in serum of affected women [22]. The ALT in the serum is a sensitive liver-specific indicator of damage so that it is used as an indicator of hepatopathy in toxicological studies [23]. Since elevation of these enzymes in serum is known to be produced by their leakage from injured tissues [24].

The LDH, GOT and GPT are cellular metabolic key enzymes, Therefore any detectable increase of their activity in serum can be used as a reliable indicator of changed

metabolic functions or structural damage at the tissue level [25].

The increased SGPT observed with abortion could possibly be due to the parturition hemorrhage, as this has been reported to result an increase in SGPT level, and these observations may possibly indicate an increased tendency for liver damage to occur during pregnancy.[26]. On the other hand, the ratio of AST to ALT (AST/ALT) sometimes can help determine whether the liver or another organ has been damaged [27]. elevated levels of serum LDH may signify the presence of hemolysis and hepatic cell death [28].

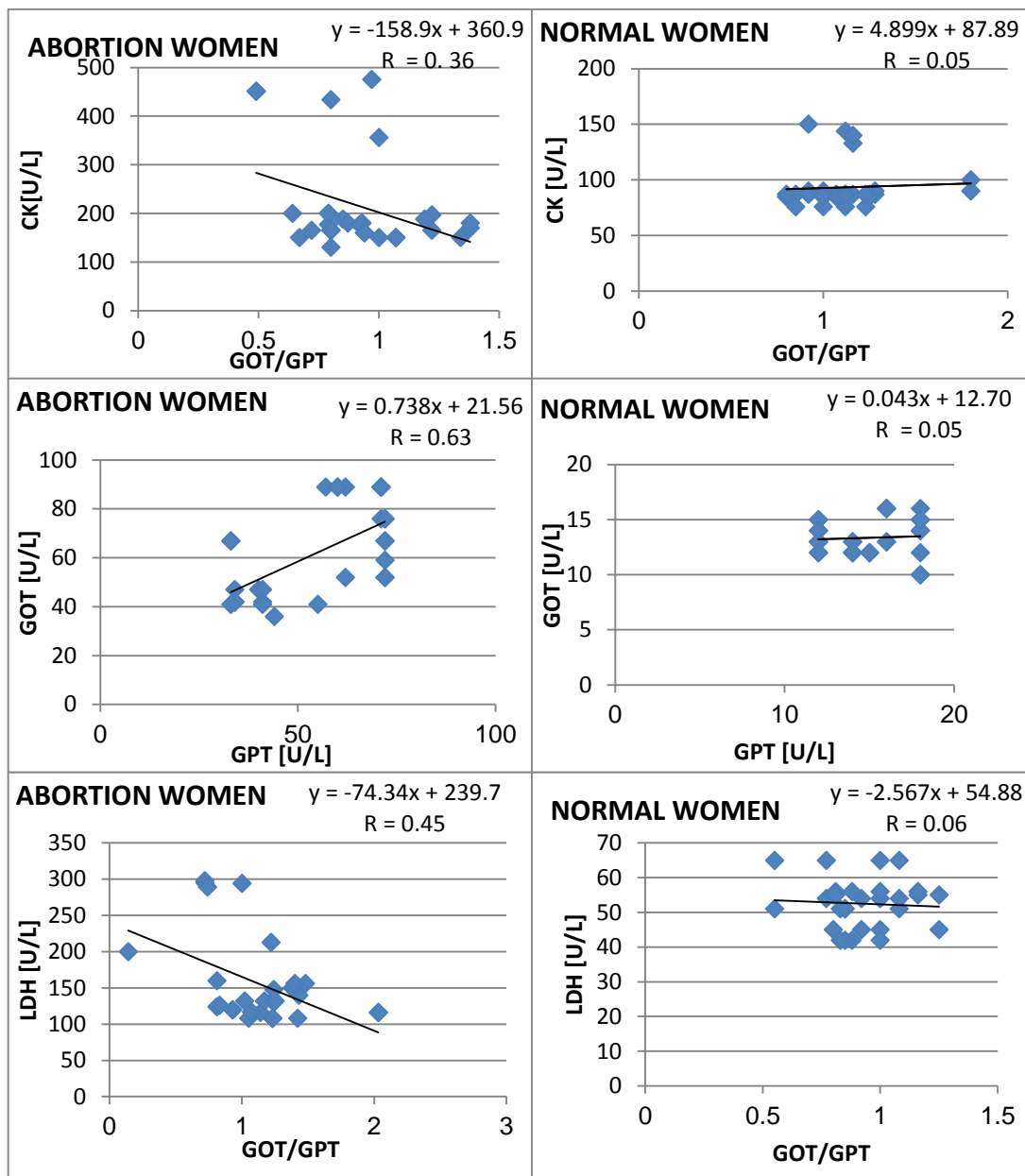


Fig.(1) Correlation between GOT /GPT with CPK, LDH and GOT with GPT in normal and Abortion women.

Conclusion

The present study suggest that maternal CPK, LDH, GPT and GOT level sare significantly higher in women with abortion, large-scale prospective studies are needed for better evaluation and to determine a cut-off point for CPK. also The current study propose to evaluation the level of these enzymes throw first trimester to use it as indicator for abortion.

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($r=٠,٤٥$, $p<٠,٠٥$) في النساء المجهضات في حين لم يكن هناك ارتباط ملاحظ في مجموعة السيطرة.

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الخلاصة

هدفت الدراسة الحالية تقدير بعض الجوانب الحيوية (الانزيمات) في امصال النساء المجهضات ومقارنة القيم المسجلة مع القيم القياسية، مجموعة الدراسة تتألف من ثلاثين امرأة مجهزة و ثلاثين امرأة سليمة كمجموعة ضابطة. تم قياس الفحوص المختبرية بما في ذلك فسفوكاينيز الكرياتين (CPK)، اللاكتات، هيدروجينيز glutamicoxaloacetic transaminase (LDH)، (GOT) و glutamic pyruvic transaminase (GPT) في النساء الحوامل والمجموعة الضابطة. لوحظ وجود زيادة مقبولة احصائيا في مستوى CPK و LDH و GOT و GPT عند النساء المجهضات عند مقارنتها بالمجموعة الضابطة.

لوحظ وجود علاقة خطية ايجابية بين GPT [U/L] مع GOT[U/L] ($R= [٠,٦٣]$ ، $P(P<٠,٠١)$ ، ولوحظ ايضا وجود علاقة خطية سلبية بين GOT/GPT مع CPK [U/L] وكان ($r=٠,٣٦$, $p<٠,٠٥$) و LDH [U/L]