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THE SIGNIFICANCE OF THE STUDY OF THE LIVER FUNCTION TEST
WITHIN POST-TRANSPLANT PATIENTS

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ღვიძლის ფუნქციის ტესტის შესწავლის მნიშვნელობა პოსტ-ტრანსპლანტაციის
პაციენტებში

ბათუმის შოთა რუსთაველის სახელმწიფო უნივერსიტეტი, ბათუმი, საქართველო

რეზიუმე

უკანასკნელ წლებში, ღვიძლის ტრანსპლანტაციის (LT) შემდგომ, პაციენტის გადარჩენის შესაძლებლობა მნიშვნელოვნად გაუმჯობესდა. წარმატებული ტრანსპლანტაცია პირდაპირ უკავშირდება ოპერაციის შემდგომ პაციენტის მკურნალობის სწორად წარმართვას, მათ შორის საყურადღებოა ლაბორატორიული გამოკვლევების შედეგების საფუძველზე მნიშვნელოვანი ასპექტების გათვალისწინება, რომელთა შორის ღვიძლის ფუნქციური მდგომარეობის შემოწმების თვალსაზრისით მნიშვნელოვანია ლაბორატორიული მახასიათებლების შესწავლა. წარმოდგენილ ნაშრომში, გამოვიკვლიეთ პოსტოპერაციულ პაციენტებში ღვიძლის ფუნქციის მაჩვენებლები: ალანინამინოტრანსფერაზა (ALT), ასპარტატამინოტრანსფერაზა (AST), ტუტე ფოსფატაზა (ALP), ალბუმინი, საერთო ბილირუბინი, გამაგლუტამილ ტრანსპეპტიდაზა (GGT), ბილირუბინის დრენაჟი. გამოსაკვლევად გამოყენებული იქნა ვენური სისხლის ნიმუშები. სულ შესწავლილ იქნა 10 პოსტ-ტრანსპლანტაციური პაციენტი. გამოყენებული იქნა შესაბამისი კვლევის მეთოდები. $P < 0,05$ ითვლებოდა სტატისტიკურად მნიშვნელოვნად. მთლიანობაში, ჩვენმა შედეგებმა გვაჩვენა, რომ ღვიძლის პანელის ინტენსიური გამოკვლევები ოპერაციის შემდგომ პაციენტებში მნიშვნელოვნად უწყობს ხელს გართულებული პაციენტის სწორ მართვას, რაც პირდაპირ აისახება საბოლოო შედეგებზე. განსაკუთრებით აღსანიშნავია, GGT და ALP ცვალებადობა, რაც შეიძლება პირდაპირ კავშირში იყოს გადაწვრთვით ღვიძლის ქრონიკულ იმუნურ პასუხთან და შეიძლება გამოვიყენოთ, როგორც ადრეული მარკერი ბილიარული გართულების დიაგნოსტიკისთვის.

Introduction. The liver is one of the essential organs in the human body, participating in many vital processes. Thus, despite significant improvements in liver transplantation (the first transplant was performed in Denver in 1963 by Dr. Thomas Starzl), successful transplantation or post-transplantation aspects are still relevant (STARZL et al. 1963). The first liver transplant in Georgia was successfully performed at the Batumi Referral Hospital on December 14, 2014. As already known, there are numerous aspects of liver transplantation, including the study of liver function tests in post-transplant patients, that remain an issue because the postoperative outcome of each patient depends on the preoperative status of the patient, the quality of the transplanted liver, and the technique of surgery. Through functional tests of the liver, it is possible to assess its functional state. The following assays are used: ALT (alanine aminotransferase), AST (aspartate aminotransferase), ALP (alkaline phosphatase), GGT (gamma-glutamyl transferase), total protein, albumin, total bilirubin, and direct bilirubin. Thus, in the present study, we aimed to study the functional characteristics of the liver in post-transplant patients.

Material and Methods. We investigated a total of 10 postoperative patients. Venous blood was used as the study material. In particular, the following liver function parameters

were determined: alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), albumin, total bilirubin, gamma-glutamyl transpeptidase (GGT), bilirubin. Appropriate research methods were used. $P < 0.05$ was considered statistically significant.

Results and Discussion. The study according to ALT showed that its rate is particularly high after the 3rd and 4th day, after that it starts to decrease; it is relatively stable on the 10th and 11th day (Table 1). Alanine aminotransferase is known to be an enzyme found primarily in the liver and kidneys. As serum glutamine pyruvate transaminase (SGPT). As is well known, the determination of ALT with AST is significant in terms of assessing liver function (McPherson and Pincus 2011).

Table 1. Laboratory indicators of liver function in post-transplant patients.

	ALT	AST	GGT	ALP	Bilirubin	albumin
1	254.6 ± 52.16 P=0.0083	271.0 ± 89.85 P=0.0398	200.0 ± 67.01 P=0.0412	114.2 ± 20.54 P=0.0051	45.42 ± 14.38 P= 0.0366	31.60 ± 2.542 P= 0.0003
2	319.4 ± 52.05 P=0.0036	283.6 ± 108.0 P=0.0591	309.0 ± 180.7 P=0.1624	104.6 ± 22.60 P=0.0098	54.60 ± 20.04 P=0.0555	28.60 ± 1.166 < P=0.0001
3	465.2 ± 112.1 P=0.0143	233.4 ± 91.59 P= 0.0641	272.8 ± 155.2 P= 0.1537	119.8 ± 27.29 P=0.0118	29.72 ± 7.362 P= 0.0175	29.80 ± 1.881 P= 0.0001
4	386.2 ± 118.9 P= 0.0317	146.0 ± 61.58 P= 0.0781	126.2 ± 26.80 P= 0.0092	113.6 ± 31.82 P=0.0234	27.68 ± 8.332 P= 0.0328	29.20 ± 1.828 P= 0.0001
5	303.8 ± 86.32 P= 0.0247	91.00 ± 29.08 P= 0.0364	128.8 ± 22.02 P= 0.0043	123.4 ± 39.25 P=0.0347	25.04 ± 6.191 P= 0.0178	29.20 ± 1.114 P= < 0.0001
6	227.0 ± 67.28 P= 0.0283	73.80 ± 18.33 P= 0.0165	153.4 ± 45.02 P= 0.0271	149.6 ± 67.86 P=0.0922	25.68 ± 6.781 P= 0.0220	29.60 ± 1.887 P= 0.0001
7	197.6 ± 59.58 P=0.0299	84.80 ± 24.03 P=0.0252	212.5 ± 90.39 P=0.0794	141.2 ± 57.66 P=0.0705	27.28 ± 10.03 P=0.0588	30.20 ± 2.154 P=0.0002
8	189.0 ± 43.92 P=0.0128	100.2 ± 24.04 P=0.0145	274.6 ± 51.92 P=0.0062	224.4 ± 93.90 P=0.0752	27.50 ± 10.52 P=0.0655	27.20 ± 1.200 P= < 0.0001
9	140.6 ± 31.81 P=0.0118	82.80 ± 17.10 P=0.0087	261.4 ± 58.35 P=0.0111	207.0 ± 86.32 P=0.0745	23.74 ± 4.884 P=0.0096	27.40 ± 1.030 P= < 0.0001
10	118.2 ± 25.71 P=0.0103	73.40 ± 13.76 P=0.0062	240.4 ± 49.46 P=0.0084	193.2 ± 69.05 P=0.0489	20.62 ± 5.072 P=0.0180	28.00 ± 1.643 P= < 0.0001
11	110.6 ± 26.46 P=0.0144	63.20 ± 14.35 P=0.0123	171.6 ± 35.08 P=0.0083	132.0 ± 36.56 P=0.0225	23.24 ± 7.826 P=0.0468	29.20 ± 1.068 P= < 0.0001

As for aspartate aminotransferase-AST, its number is especially high during the first three days and then decreases. Moreover, it is almost the same on days 10 and 11. As is known to be an enzyme found in the liver and heart, although it is also found in the tissues of various organs whose damage by lesion or hemolysis releases enzymes, increasing serum AST. According to the literature, it is believed that AST is very highly associated with many diseases (acute viral hepatitis, acute fulminant hepatitis, tumor necrosis, etc.). In addition, liver damage in which AST is higher may be associated with alcohol-induced liver damage, cirrhosis, and cancer (SGOT). (Burriss CA..., 2006, 4th ed). As for ALP, it is particularly noteworthy that its high levels were detected on days 8, 9, and 10. It suggests that it may be associated with a chronic immune response.

In the study for GGT, the range indicated varies dramatically. Its level is exceptionally high on the 3rd and 7th day.

GGT levels are elevated in patients with liver disease (hepatitis, cirrhosis, liver metastases and carcinoma, cholestasis, alcoholic liver disease, primary biliary cirrhosis, and

sclerotic cholangitis). Its level also increases with other diseases (pancreatitis; prostate carcinoma; breast and lung carcinoma; systemic lupus erythematosus; alcoholism; congestive heart failure and chronic coronary artery disease). In addition to the above, GGT levels may also increase with the use of medications (Rutmann E, 2005).

As for the bilirubin study, its highest level was detected on day 2, then varied. As for bilirubin, which is obtained (70-90%) from the breakdown of hemoglobin and to a lesser extent from other hemoproteins (Westwood, 1991), Elevated levels of bilirubin (> 2.5-3 mg / dL) cause jaundice and are classified as prehepatic (pre-hepatic), hepatic (hepatic) and post-hepatic (Pagana KD, 2019). Furthermore, conjugated bilirubin is known to be more common in individuals who have hepatocellular damage and bile duct obstruction. On the other hand, unconjugated hyperbilirubinemia is more common in newborns and is also associated with high hematocrit. In addition, unconjugated hyperbilirubinemia increased bilirubin production during hemolysis and dyserythropoietic.

The albumin level is initially elevated in liver transplant patients and then decreases, rising again on the 7th day and returning to normal by the 11th day. Albumin is one of the major proteins circulating in the blood plasma. Its normal rate is 3.5-5.5 g / dL or 35-55 g / liter. It accounts for 60% of total protein, 35% globulin, 4% fibrinogen and 1% other proteins. (Burtis CA,1999). Observing the results and dynamics obtained is important for improving or worsening the patient's condition.

Conclusion. Intensive examinations of the liver panel in postoperative patients significantly contribute to the proper management of the complicated patient, which directly affects the final results. Notably, GGT and ALP have different variability, which may be directly related to the transplanted chronic immune response of the liver and can be used as an early marker to diagnose biliary complications.

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МЕРАБ НАКАШИДЗЕ, ЗУРАБ ЧИХЛАДЗЕ, ДАВИД КОБУЛАДЗЕ, ДАВИД БЕРИДЗЕ
**ЗНАЧЕНИЕ ИССЛЕДОВАНИЯ ФУНКЦИОНАЛЬНОГО ТЕСТА ПЕЧЕНИ У
ПАЦИЕНТОВ ПОСЛЕ ТРАНСПЛАНТАЦИИ**

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РЕЗЮМЕ

В последние годы выживаемость пациентов после трансплантации печени (ТП) значительно улучшилась. Однако успешная трансплантация напрямую связана с правильным ведением пациента после операции, в том числе с учетом результатов лабораторных исследований. Поэтому очень важно изучить лабораторные характеристики для исследования функционального состояния печени. В нашей работе, мы исследовали показатели функции печени у послеоперационных пациентов: аланин аминотрансферазу (АЛТ), аспартатаминотрансферазу (АСТ), щелочную фосфатазу (ЩФ), альбумин, общий билирубин, гамма-глутамилтрансферазу. Для исследования использовались образцы венозной крови. Обследовано 10 пациентов, перенесших живую донорскую трансплантацию. Были использованы соответствующие методы исследования. $P < 0,05$ считалось статистически значимым. В целом, наши результаты показали, что интенсивные исследования лабораторных данных панели печени у пост-операционных пациентов способствуют правильному ведению пациента с осложнениями, что напрямую влияет на конечные результаты. Примечательно, что вариабельность GGT и ALP может быть напрямую связана с трансплантированным хроническим иммунным ответом печени и может использоваться в качестве раннего маркера для диагностики хронического отторжения и осложнений со стороны желчевыводящих путей.

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SUMMARY

In recent years, the survival rate of patients after liver transplantation (LT) has improved significantly. However, successful transplantation is directly related to the proper management of the patient after surgery, including considering essential aspects based on the results of laboratory tests. Therefore, it is essential to study the laboratory characteristics to investigate the functional state of the liver. In the present study, we investigated the indicators of liver function in postoperative patients: alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), albumin, total bilirubin, gamma-glutamyl transferase (GGT). Venous blood samples were used for investigation. A total of 10 post-transplant patients were studied. Appropriate research methods were used. $P < 0.05$ was considered statistically significant. Overall, our results have shown that intensive examinations of the liver panel in postoperative patients significantly contribute to the proper management of the complicated patient, which directly impacts the final results. Notably, the variability of GGT and ALP may be directly related to the transplanted chronic immune response of the liver and may be used as an early marker for the diagnosis of biliary complications.

Key Words: Liver function test, Transplantation, Liver.