

***M.M. Moazenzadeh, S.S. Shojaeirad***  
**EFFICIENCY OF HYPERBARIC OXYGEN THERAPY IN THE  
TREATMENT OF PATIENTS WITH CHRONIC PANCREATITIS**

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**Резюме.** Изучена эффективность гипербарической кислородной терапии при лечении пациентов с хроническим панкреатитом. Использование гипербарической кислородной терапии позволяет оказывать корректирующее воздействие на биохимические параметры крови, а также на систему свертывания крови. Использование гипербарической кислородной терапии для лечения пациентов с хроническим панкреатитом является высокоэффективным методом лечения.

**Ключевые слова:** хронический панкреатит, гипербарическая кислородная терапия.

**Resume.** Efficiency of hyperbaric oxygen therapy in the treatment of patients with chronic pancreatitis was studied. The use of hyperbaric oxygen therapy makes it possible to have a corrective effect on the blood biochemical parameters, as well as on the blood coagulation system. The use of hyperbaric oxygen therapy for the treatment of patients with chronic pancreatitis is a highly effective method of treatment was established.

**Keywords:** chronic pancreatitis, hyperbaric oxygen therapy.

**Actuality.** By nowadays, a sufficient number of facts indicating the effectiveness of hyperbaric oxygen therapy for the treatment of various diseases have accumulated [1, 2, 3]. Treatment with oxygen is indicated in many diseases, which are characterized by a violation of peripheral blood supply. The goal of hyperbaric oxygen therapy is to stop arterial hypoxemia and correct the disturbances of the antioxidant system. It has been established that arterial hypoxemia occurs in this disease in 45 to 75% of cases. The developing arterial hypoxemia promotes the destructive process progression in pancreas. Possibility of hyperbaric oxygen therapy (HBO) is to eliminate virtually any form of oxygen deficiency, were the basis for using it in the complex therapy of pancreatitis.

However, the use of this method in patients with chronic pancreatitis is studied not enough.

**Purpose:** to study the effectiveness of hyperbaric oxygen therapy for treatment of the patients with chronic pancreatitis.

**Tasks:**

1. To study the clinical effectiveness of hyperbaric oxygen therapy in the treatment of chronic pancreatitis.

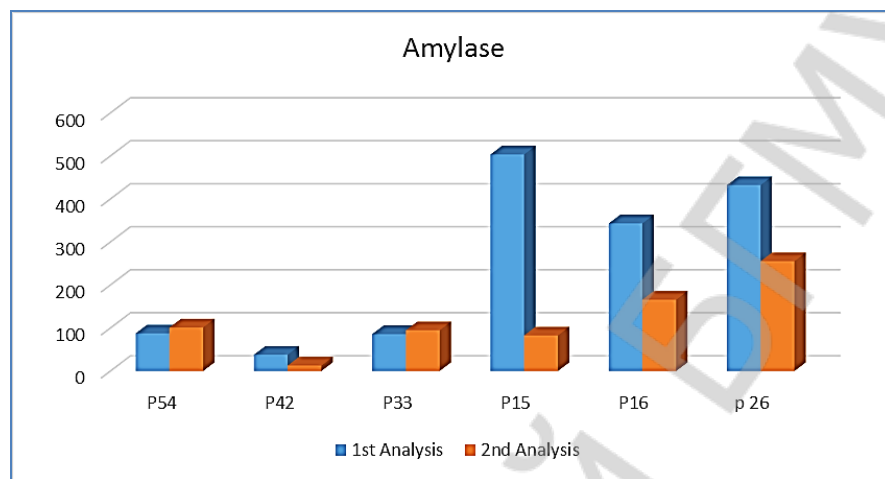
2. To study the biochemical changes of blood in patients with chronic pancreatitis and to determine the effectiveness of hyperbaric oxygenation.

3. To study the changes in blood coagulation system in patients with chronic pancreatitis and to assess its state after using of hyperbaric oxygenation.

**Materials and methods:** An analysis of 45 case histories of patients with chronic pancreatitis which treated in the gastroenterology department of the Minsk Emergency Hospital was analyzed. The dynamics of changes in biochemical parameters and coagulation system of blood during complex treatment of chronic pancreatitis with application of hyperbaric oxygen therapy was studied and evaluated. Analysis of the following factors of patients history cases: biochemical analysis (serum amylase, ALT,

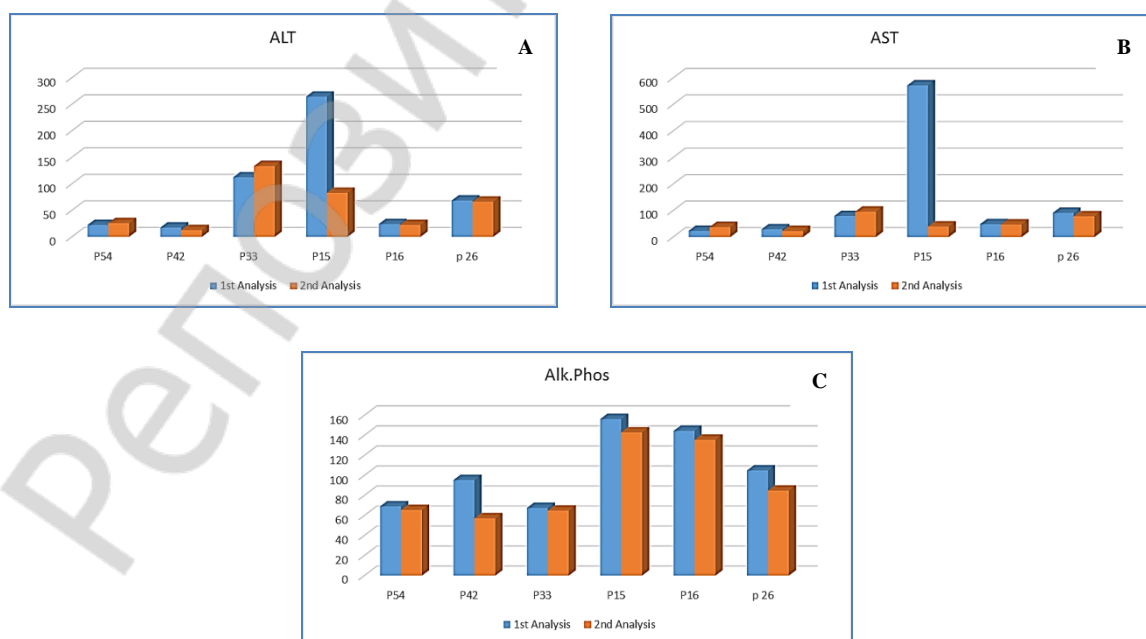
AST, alkaline phosphatase, bilirubin level, glucose level); coagulation test (APPT); ultrasound results was conducted.

**Результаты и их обсуждение.** The experiments showed that using the hyperbaric chamber therapy leads to decrease of amylase enzyme level in almost in all patients (*picture 1*).



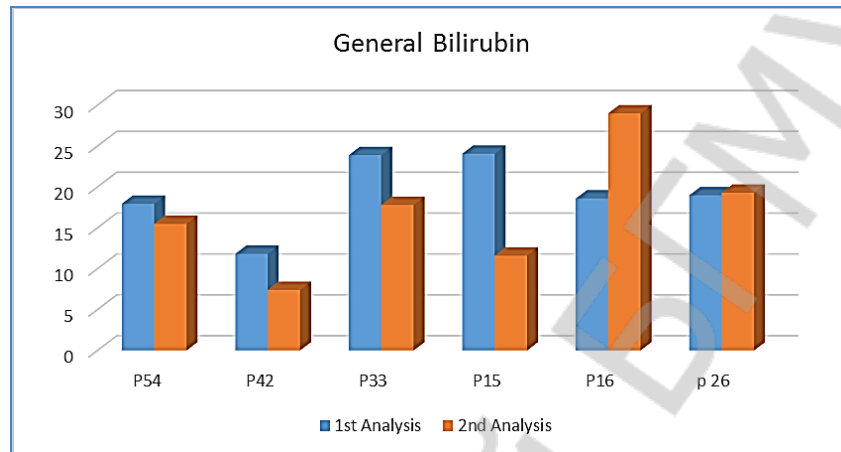
**Picture 1** – Changes of amylase enzyme in patients. The blue colored graphs are before HBO treatment and the orange graphs are after HBO treatment

It is known that increase of liver enzymes, specially alanine aminotransferase (ALT), aspartate transaminase (AST) and alkaline phosphatase can be a sign of pancreatitis. As for evaluation of ALT, results showed that in almost all the patients the level of ALT will be decreased after being treated by HBO. The same situation was with AST and alkaline phosphatase (*picture 2 A,B,C*).



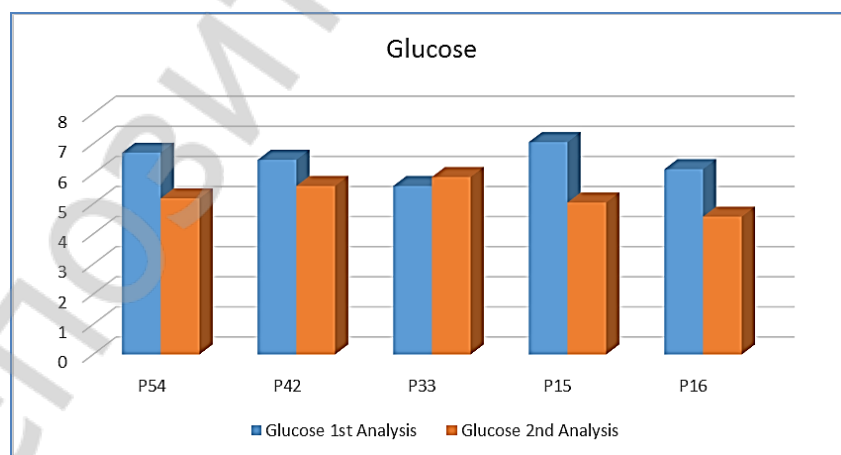
**Picture 2** – A - Changes of aspartate aminotransferase in different patients. B - Changes of alanine aminotransferase in different patients. C - Changes of alkaline phosphate in different patients. (The blue colored graphs are before HBO treatment and the orange graphs are after HBO treatment.)

Taking into account that at pancreatitis enlarged pancreas blocks the common bile duct of the liver and can lead to obstructive jaundice the bilirubin level in a blood of patients as a rule is increased. The experiments showed that using the hyperbaric oxygenation contributes to the normalization of this indicator (*picture 3*).



**Picture 3** – Changes of general bilirubin level in different patients. The blue colored graphs are before HBO treatment and the orange graphs are after HBO treatment

Glucose level is important parameter for evaluation of pancreas damage. At violation of pancreas the cells which produce insulin and glucagon which are the hormones that control the amount of sugar in blood are damaged. This as a rule leads to an increase this index. The experiments showed that glucose level in patients decreased after hyperbaric oxygen therapy (*picture 4*).



**Picture 4** – Changes of glucose level in different patients. The blue colored graphs are before HBO treatment and the orange graphs are after HBO treatment.

Coagulation is a complex process and it demands complex of proteins to be performed. The experiments showed that all patients didn't have violations of APTT.

Thus it has been established that the use of hyperbaric oxygen therapy as a treatment method of patients with chronic pancreatitis promotes an increase of oxygen diffusion in

cells, the activation of oxidative phosphorylation with an increase in toxic products utilization, and the restoration of organ function as a whole.

The use of hyperbaric oxygen therapy makes it possible to have a corrective effect on the blood biochemical parameters, as well as on the blood coagulation system and the use of hyperbaric oxygen therapy for the treatment of patients with chronic pancreatitis is a highly effective method of treatment.

#### **Conclusions:**

1. Hyperbaric oxygen therapy has a high therapeutic efficiency and a pronounced reparative effect in the treatment of patients with chronic pancreatitis.

2. The use of hyperbaric oxygen therapy makes it possible to have a corrective effect on the blood biochemical parameters, as well as on the blood coagulation system.

3. A consequence of the stabilization of the blood biochemical parameters is the normalization or a significant decrease in the deviations of them, as well as a restoration of the basic parameters of homeostasis and functional activity of the organ as a whole.

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