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Section name - Medicine

CLINICAL EFFECTS OF LIGATION OF LEFT GASTRIC ARTERY AND VEIN, SPLENIC ARTERY IN PATIENTS WITH LIVER CIRRHOSIS AND SECONDARY HYPERSPLENISM

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Background. Liver cirrhosis (LC) is widely prevalent worldwide and can be a consequence of different causes, such as obesity, non-alcoholic fatty liver disease, high alcohol consumption, hepatitis B or C infection, autoimmune diseases, cholestatic diseases, and iron or copper overload. Cirrhosis develops after a long period of inflammation that results in replacement of the healthy liver parenchyma with fibrotic tissue and regenerative nodules, leading to portal hypertension (PH) [1]. Patients with cirrhosis often develop PH-associated splenomegaly and hypersplenism, potentially causing severe cytopenia [2].

The aim of this study is to define the efficacy and clinical effects of ligation of the left gastric artery and vein, splenic artery (LLGAV,SA) in liver cirrhotic patients with secondary hypersplenism.

Methods and results. The work was performed on the basis of examination and treatment of 38 patients with LC. By gender, the patients were distributed as follows: 28 (73.7%) males and 10 (26.3%) females. The age of the patients ranged from 19 to 64 years. The average age of the patients was 42.5 years. LC commonly affects patients of working age from 31 to 60 years - 34 (89, 4%) patients.

In 18 (47.4%) patients, a viral etiology of LC was established, in 17 (44.7%) patients - alcohol abuse for 2 to 15 years, in 3 (7.9%) patient it was not possible to reveal the causative agent of the disease: there were no indications in the anamnesis about acute viral hepatitis, chronic alcoholism, malaria, contact with hepatotropic poisons in the past. The diagnosis of LC in all 38 (100%) patients was done, based on the detection of splenomegaly on the background of dyspeptic disorders, weight loss, jaundice. The indication for LLGAV,SA was II-III grade of gastroesophageal varices in combination with splenomegaly and PH-related hypersplenism.

Clinical and laboratory, biochemical, and instrumental methods of examination were used for patients upon admission to the hospital and in the postoperative period. Esophagogastroduodenoscopy was performed to examine the upper parts of the gastrointestinal tract for the detection of gastro-esophageal varices. The degree of gastroesophageal varices was assessed according to the classification, endorsed by a Baveno I (1992) consensus meeting [3]. To assess the state of vessels and organs of the hepatobiliary system, along with ultrasonography of abdominal organs, portal blood flow was determined by ultrasound doppler flowmetry of the portal and splenic veins. The linear portal vein blood velocity (LPVVBV), linear splenic vein blood velocity (LSVVBV), portal vein volumic blood flow (PVVBF), splenic vein volumic blood flow (SVVBF), and the portal congestion index (PCI) were determined according to the method of Moriyasu et al. [4].

Statistical analysis of the material was done using parametric and non-parametric criteria (Student, Pearson - Chi-square), multivariate correlation - regression analysis on a personal computer using Microsoft Excel 2000 and SPSS 10.0 for Windows.

The functional state of the liver in the early postoperative period and in the remote (from 1 to 10 years) terms after the operation was studied in 34 (89.4%) patients with LC. In the early postoperative period 4 (10.6%) patients died as a result of acute-on-chronic liver failure (ACLF).

During the first five years after surgery, 33 (86.8%) of patients survive, and over 5 years – 29 (76.3%) of patients. In the remote period 8 (23.7%) patients died because of complications of the disease - 4 patients from the gastroesophageal bleeding, 2 patients - from ACLF.

Analysis of blood biochemistry in the early postoperative period and in the remote terms after surgery, demonstrated that the level of total protein in the remote terms increases in comparison with the data, obtained in the early postoperative period, and was in borders of normal value, but lower than preoperatively.

The albumin level in the remote terms, in comparison with the preoperative and early postoperative values, significantly increased and was in borders of normal value. Albumin-globulin ratio remained stable on normal values, but in the remote terms there was its significant increase compared to the data obtained in patients in preoperative and in the early postoperative period. Hyperbilirubinemia persisted in the early postoperative and remote periods. Moreover, in the early postoperative period there was an increase in the serum bilirubin level compared to the preoperative values, whereas in the remote terms this index was lower than preoperative and early postoperative values, but still increased above normal value. In the early postoperative and remote periods, the activity of aminotransferases and alkaline phosphatase, compared to preoperative values, decreases.

The level of aspartate aminotransferase normalized in the remote period, alanine aminotransferase - significantly increased, compared to the early postoperative period, but was higher than normal level. Alkaline phosphatase level decreased more than 3 times in comparison with preoperative values. Comparison of alkaline phosphatase indices before discharge from the hospital and in the remote period revealed their significant difference.

Analysis of blood coagulation tests revealed only a significant decrease in fibrinogen concentration in the early postoperative period, compared to preoperative values, and its significant increase in the remote period, compared to the pre- and early postoperative periods.

Analysis of the peripheral blood parameters revealed a significant increase of the red blood cell count, white blood cell count and blood platelet count in the early postoperative and remote periods. Moreover, in the remote period the white blood cell count and blood platelet count were on the normal values, demonstrating the efficacy of the LLGAV,SA. The percentage of lymphocytes in the remote postoperative period decreases, compared to the preoperative values, but was within the normal range; the white blood cell count in the remote period was also below the postoperative values, but was within the normal range.

During the analysis of ultrasound data, it was established that in the postoperative period signs of PH remain, which was manifested by an increase in the size of the spleen, as well as the diameter of the portal and splenic veins. Despite the fact that the diameter of the vessels of the portal system did not normalize in the postoperative period, its decrease was noted, compared to the preoperative values, but the differences were not statistically significant. The LPBV in the postoperative period increases significantly up to 16.16 ± 0.6 cm/s. According the increase of LPBV in the postoperative period, the PVVBF also increased reliably. The increase in this indicator occurred only at the expense of an increase in the LPBV, since the diameter of the portal vein did not increase postoperatively, but even had tendency to decrease. In the postoperative period PCI in patients was significantly lower, compared to preoperative values, which indicated an improvement in portal blood flow. LSVBV, as well as SVVBF, in the early preoperative period and in the remote terms significantly decreased in comparison with preoperative parameters, but did not reach normal values. Moreover, the decrease of the SVVBF was due to the decrease of LSVBV, as the diameter of the splenic vein did not significantly change.

Spleen size both in early postoperative and in remote periods significantly decreased, which is explained by the effect of the operation, however, did not reach normal values, which can be associated with the presence of pronounced collateral blood supply of the spleen.

Thus, it was found that LLGAV,SA was effective in 76.3% of liver cirrhotic patients with splenomegaly and hypersplenism. This type of surgical intervention helps to reduce the severity of PH and correction of hypersplenism. This is evidenced by normalization in the remote period of the main liver function tests, peripheral blood parameters, reduction of spleen size, diameter of portal and splenic veins, increase of blood flow in portal vein, decrease of blood flow in splenic vein, absence of ascites and bleeding from gastro-esophageal varices in the remote period after the operation.

Conclusion. 1. LLGAV,SA surgery is an effective method for prevention of gastroesophageal variceal bleeding and correction of secondary hypersplenism in 76.3% of liver cirrhotic patients.

2. In the remote terms after this operation the functional state of the liver improves, which is manifested by normalization of functional liver tests, decrease of portal vein diameter, increase of LPBV and PVVBF, decrease of PCI.

3. Clinical efficacy of LLGAV,SA is evident by normalization of peripheral blood count, reduction of spleen size, splenic vein diameter, LSVBV and SVVBF, which are signs of decreased severity of secondary hypersplenism.

References

1. Ginès P, Krag A, Abraldes JG, Solà E, et al. Liver cirrhosis. *Lancet*. 2021 Oct 9;398(10308):1359-1376. doi: 10.1016/S0140-6736(21)01374-X. Epub 2021 Sep 17. PMID: 34543610.
2. Gu W, Hortlik H, Erasmus H-P, et al. Trends and the course of liver cirrhosis and its complications in Germany: Nationwide population-based study (2005 to 2018) *The Lancet Regional Health – Europe* 2022;12: 100240 Published online 4 November Available from: <https://reader.elsevier.com/reader/sd/pii/S266677622100226X?token=5BF87D5E949222931B690339EF20DF492D77C293E773908E861F266659EF43A74D487128B8491420E495C49617D3302F&originRegion=eu-west-1&originCreation=20220221091738DOI:https://doi.org/10.1016/j.lanepe.2021.10024>
3. Fateen W, Ragunath K, White J, et al. Validation of the AASLD recommendations for classification of oesophageal varices in clinical practice. *Liver Int*. 2020 Apr;40(4):905-912. doi: 10.1111/liv.14310. Epub 2019 Dec 8. PMID: 31762190.
4. Moriyasu F., Nishida O., Ban N., et al. Measurement of portal vascular resistance in patients with portal hypertension. *Gastroenterology* 1986; 90 (3): 710-717.