

Azygoportal Total Dissociative Procedures for Portal Hypertension Treatment; Evolution of Surgical Techniques

Feruz Gafurovich NAZIROV, Andrey Vasilyevich DEVYATOV, Azam Khasanovich BABADJANOV, Umid Ravshanovich SALIMOV , and Dilshodbek Mamadaliyevich KHAKIMOV

Republican Specialized Center of Surgery named after acad.V.Vakhidov. Tashkent. Uzbekistan.

✉ Corresponding author's Email: ussalimov@gmail.com

ABSTRACT

The aim of the study was to determine the efficiency of azygoportal collector total dissociation in patients with portal hypertension. Depending on the procedure, the patients were divided into two groups. An original method of azygoportal dissociation was performed in 63 patients (the first group). In the second group a modified version of azygoportal dissociation was performed. Patients were comparable in the main pathology and course of the disease. Edematous ascites syndrome; liver failure; insufficiency of gasto-gastral anastomosis and haemorrhagic syndrome, were observed in 28.6%; 23.8%; 11.1%; and 14.3 % of patients operated by the original method vs. 16.5%; 7.7%; 0%; and 4.4% for patients operated in the modified technique, respectively. From the results it can be concluded that, proposed modified method of azygoportal collector dissociation on a prosthesis is more effective method for hemorrhagic syndrome control, and also allows to significantly reduce the incidence of severe complications in the immediate postoperative period.

Original Article

PII: S225199391800005-8

Rec.	16 Dec.	2017
Acc.	18 Feb.	2018
Pub.	25 Mar.	2018

Keywords

Liver Cirrhosis,
Portal Hypertension,
Dissociative
Operations,
Ligature Transection
Method,
Bleeding from
Esophageal Varices.

INTRODUCTION

Hemorrhagic syndrome is one of the most severe and unpredictable complication of liver cirrhosis (LC) with portal hypertension (PH). The bleeding from esophago-gastric varicose (EV), is observed in 20-50% of patients with LC and clinically significant PH [1-10]. Endoscopic interventions used to control varices bleeding, due to their low invasiveness and ease of execution, are the first-line methods in treatment and prophylactics of hemorrhage. However, they remain unsuccessful in 17-37% of patients [11]. Nowadays many different surgical procedures are known and are frequently used as a second line method in the bleeding control and prophylactics. Among such methods, liver transplantation (LT), a surgical portosystemic shunting (PSS), transjugular intrahepatic portosystemic shunting (TIPS) and dissociative interventions are the most frequently used. It is known that LT is the only curative option for patients suffering from LC. At the same time deficit of donor organs is still a quite acute problem and many patients in the waiting list will not have a donor organ in time [12].

From the other hand traditional surgical PSS give a good long time results in bleeding control, but due to its complexity, its application is limited. Besides in the last decade one can observe significant decreases of surgical PSS application in contrast to TIPS. But by the opinion of many investigators and with the accordance to last studies wide popularization of the TIPS is not often reasonable due to some significant lacks of the method [6, 13, 14]. At the same time, surgical PSS which are more effective in prevention of hemorrhagic syndrome cannot be performed in all patients. A wide group of patients is out of the possibility for PSS application due to the liver decomposition or not-typical angioarchitectonics of the portal pool. In such circumstances dissociation procedures still remain as the only method choice.

Therefore aim of study was to determine the efficiency of azygoportal collector total dissociation in patients with portal hypertension.

MATERIAL AND METHODS

A comparative investigation of two azygoportal collector dissociation methods in patients with PH syndrome has been carried out. Treatment results of 155 patients who were operated at the Republican Specialized Centre of Surgery (RSCS) named after academician V.Vakhidov from 1997 to 2017 were analyzed.

With the accordance of the total dissociative method, 2 groups of patients were formed. For the patients of the 1st group, original disconnection method of azygoportal collector was performed. Dissociation of the gastroesophageal collector in the modified type was performed in patients of the 2nd group. There were 63 patients with PH syndrome in the 1st group: 40 (63.5%) of them had liver cirrhosis and 23 (36.5%) patients were suffered from extrahepatic form of PH. In 19 (30.2%) cases, the surgery was performed at the peak of the hemorrhage. Dissociation of the azygoportal collector in combination with splenectomy was carried out in 19 (11.9%) patients. The 2nd group contained 92 patients with portal hypertension. Liver cirrhosis was observed in 57 (62.6%) of patients, 33 (36.3%) – had extra hepatic form of PH. One patient (1.1%) was admitted with Budd-Chiari syndrome. In 28 (30.7%) cases, the surgery was performed at the peak of the hemorrhage. Dissociation of the azygoportal collector in combination with splenectomy was carried out in 12 (13.2%) cases. In the other 7 (7.7%) patients, the azygoportal disconnection was supplemented with the ligation of a splenic artery.

F.G. Nazirov's original method (the 1st group) [Invention №IAP 20080375]

Devascularization of the stomach is carried out after upper laparotomy up to the abdominal part of the esophagus along both parts of the stomach. The organ blood supply is kept due to right gastric and two gastroepiploic arteries. Left gastric artery is ligated and dissected out of the organ. Double circular suture is formed at the subcardial level and the ligature is tightened. Thereby two gastric cameras are formed. The next stage is the formation of anterior gastro-gastral anastomosis between the upper and the lower parts of the stomach (were formed by the ligature and transection).

The size of anastomosis camera is up to 3 cm. The important advantage of the surgery is in keeping the cardioesophageal connection and in the prevention of reflux esophagitis in the postoperative period (Figure 1). The pointed method allows achieving an effective hemostasis in patients with bleeding from EV. But this method had the number of complications associated, as a rule, with an imposition of gastro-gastral anastomosis (GGA). The complications of the nearest postoperative period are presented in the Table 1.

The most dangerous complication of the nearest postoperative period was insufficiency of GGA which had led to the development of peritonitis. Hepatic failure progresses proportionally to the level of a surgical injury and its combination with GGA insufficiency was registered in all 11 patients with those complications. Hereby, the modification of the offered method was developed at the RSCS to eliminate the most frequent and dangerous complication such as GGA insufficiency.

F.G. Nazirov's modified method (the 2nd group) [Second invention].

Surgical approach and stomach devascularization are carried out in the same extent as in the original method. Then a transversal gastrotomy up to 3 cm is carried out in the medium part of the stomach along the anterior wall. A synthetic polyvinyl prosthesis in the form of corrugated tube with the length of 2,5-3 cm and 2,5 in diameter is introduced through the formed hole to the gastric lumen. That prosthesis is set up in the lumen of the stomach's cardial part. Sewing of the stomach both parts through all the layers with capron thread № 5 is carried out from the anterior wall of the stomach and by medial wall of the intraorgan prosthesis, ligature divides the stomach to the upper 1/3 and the lower 2/3 parts. The next ligature is imposed in the same way but

it is tighten directly over the prosthesis in the direction of lesser curvature and at the same time the prosthesis is fixed with surgeon's finger which is placed in the lumen. In such way we can control the location of the prosthesis and the tension of the ligature. Then a repeated ligature is imposed near the first one. Thereby we perform a cross-clamping of intramural venous vessels. A corrugated prosthesis provides the fixing of the ligatures and blocks their displacement. A nasogastric tube is conducted through the prosthesis with the aim of decompression in the postoperative period.

Gastrotomic hole is sutured by double-row stitch. A number of sero-serous stitches are also imposed over the stomach ligature. A Heineke-Mikulicz pyloroplasty is carried out to prevent gastrostasis. The endoscopic investigation with a removal of the prosthesis is performed after 1-1.5 months and the imposed ligatures are also removed.

Ethical approval

The review board and ethics committee of Republican Specialized Center of Surgery named after acad.V.Vakhidov. Tashkent. Uzbekistan approved the study protocol and gave permission.

Table 1. The frequency of postoperative complications in patients operated by the original method

Complication	Abs. frequency	% frequency
Hepatic failure	15	23.8%
Insufficiency of GGA	7	11.1%
Hemorrhagic syndrome,(including erosive anastomosis of GGA	9	14.3%
Insufficiency of pylorotomic hole	2	3.2%
Suppuration of the spleen bed	2	3.2%
Arrosive hemorrhage	2	3.2%
Splenic infarction	2	3.2%
Gastrostasis	1	1.6%

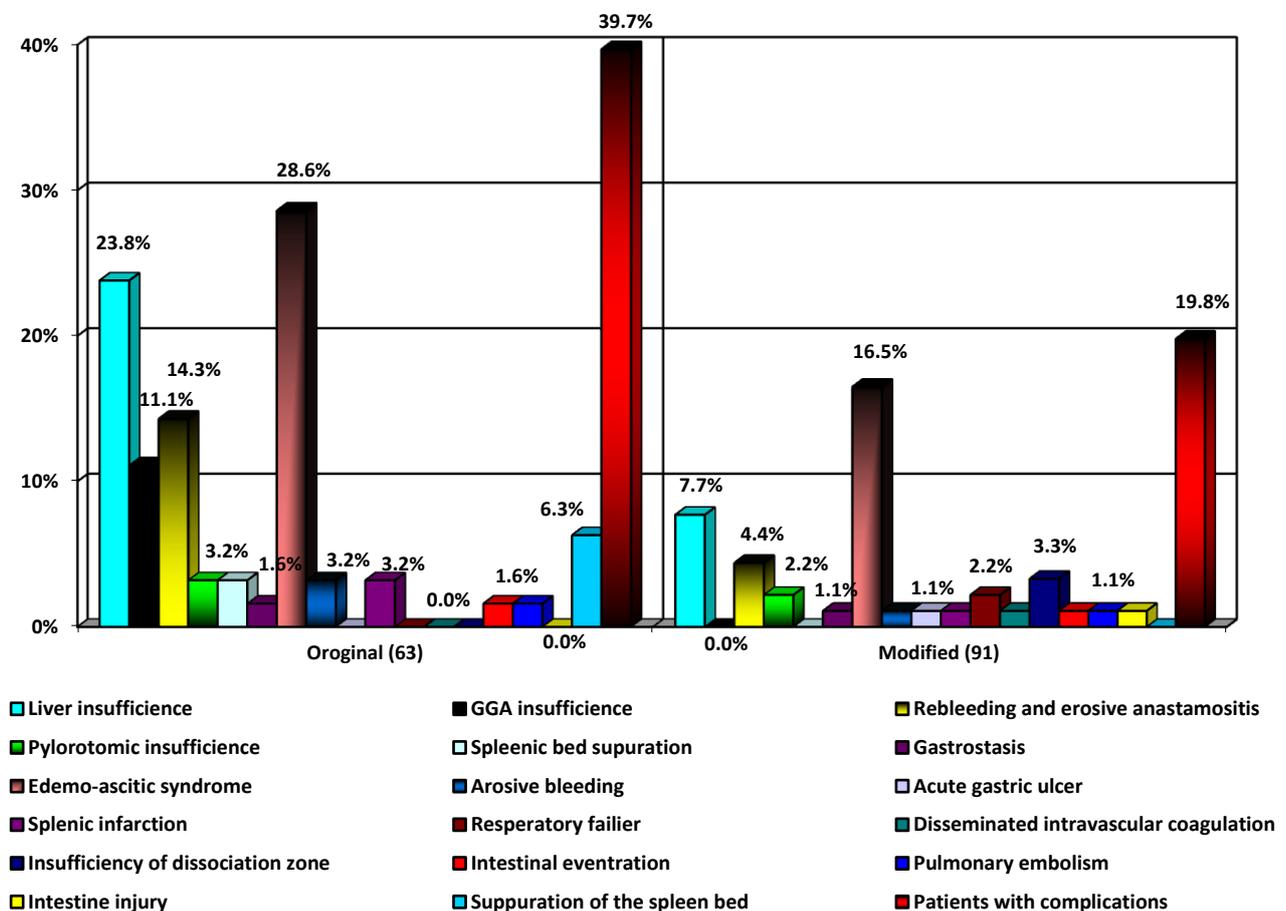


Figure 1. Comparative characteristics of postoperative complications

RESULTS

From 63 patients of the 1st group and 91 patients of the 2nd we observed a complicated nearest postoperative period in 25 (39,7 %) and 18 (19,8%) patients respectively. The structure of complications was as follows: the edematous ascites syndrome; hepatic failure; insufficiency of GGA and hemorrhagic syndrome the frequency of which made up 28.6%; 23.8%; 11.1%; and 14.3% versus 16.5%; 7.7%; 0%; and 4.4% for the 1st and the 2nd groups respectively.

Already as a result of a comparative analysis of the nearest postoperative period, it is possible to judge the degree of effectiveness of bleeding control is higher in the modified technique. Thus, the frequency of recurrence of hemorrhagic syndrome in the immediate postoperative period was 3 times higher in patients operated by the original method and amounted to 14.3% compared with 4.4% of patients operated by a modified procedure. The overall incidence of complications of the immediate postoperative period is shown in [Figure 1](#).

In addition, an important prediction factor in the effectiveness of surgical treatment is the liver parenchymal decompensation degree. Thus, the incidence of complications in patients operated in an emergency was 2-3 times higher, the fact is explained by a higher operational risk in patients with severe parenchymal decompensation on the background of bleeding. This fact is also confirmed by the incidence of liver failure in patients hospitalized in urgent order in comparison with those who were operated in a planned manner.

Thus, among patients hospitalized on an emergency basis in the 1st and 2nd comparison group, hepatic insufficiency in the postoperative period was observed in 42.1% (in 8 of 19 patients) against 10.7% (in 3 of 28 patients operated urgently) of patients respectively.

Liver cirrhosis

In consideration of the severity of PH syndrome course in patients with LC we have analyzed the frequency of complications development in this group of patients who were performed the original and modified methods. In the nearest postoperative period the frequency of the hepatic failure predominated in both groups and it complicated a restorative period course in 15 (38.5%) patients of the 1st group and in 7 (12.3%) patients of the 2nd group. The recurrence of hemorrhagic syndrome was in 7 (17.9%) patients (the 1st group) and in 4 (7.0%) patients of the 2nd group. The edematous ascitic syndrome rarely occurred in the group of patients who were performed the original method of surgery – 35.9% vs. 21.1%. The mentioned results are explained by the direct correlation of edematous ascitic syndrome with the rate of hepatic dysfunction. In connection with the reduction of the liver protein-synthetic function, both volume and adiphoria of ascitic syndrome are risen.

The frequency and resistance of the edematous ascitic syndrome is decreased due to significantly less traumatism of the original method of the surgery and the less rate of hepatocellular failure. In 2 (3.5%) cases of the 2nd group we registered the development of dissociative zone's failure. In 1 case the mentioned complication was developed in the patient who was performed the surgery having an active hemorrhage and a severe form of diabetes mellitus. In the second case that complication was developed in the patient with a total thrombosis of the portal vein and massive collateral circulation of cardioesophageal transition and retroperitoneal space (that case required a total devascularization of the stomach). In both cases the complication was solved by conservative procedures. There were 18 (46.2%) patients with different complications (the 1st group) and 15 (26.3%) patients in the 2nd group.

Extra hepatic form of portal hypertension

It is known that the prognosis of the disease in patients with extrahepatic portal hypertension (APH) is more favorable than in patients with a compromised liver. But according to some literary data, only in 12% of patients recanalization of the portal vein is observed in the rest of cases a clinically significant PH syndrome is formed and it is required an operative correction. The operative treatment results of the patients with the safe live function who were performed original and modified surgeries were studied. We did not observe the laboratory manifestations of hepatic failure in patients of both groups. But an occurrence of the edematous ascitic syndrome was observed in 4 (16.7%) cases of the 1st and in 3 (9.1%) patients of the 2nd groups. The recurrence of hemorrhagic syndrome was registered in 2 (8.3%) patients of the 1st group. There was no hemorrhage recurrence in the 2nd group. The postoperative period was complicated in 7 (29,2%) and 3 (9.1%) patients with APH.

The lethality of patients who undergone original and modified methods of the surgery

The patient's lethality also differed in both groups - it proves that a modified method is more effective. The lethality of the 1st group (original method) made up 10 (15.9%) cases, and in the 2nd group it was 10 (11%) patients. At the same time, even a lethality rate reaching 15.9% significantly differs from the stated rate which is typical for many other methods used in the world today. For example, by different authors data, a hospital lethality of the nearest postoperative period is observed in (35-75%) cases after a surgery offered by Boerema et al. [4] and in 20-55% - after the Sugiura's surgery [1, 2, 4, 14]. The hospital lethality after the M.D. Patsiora's surgery does not exceed 15% vs. 11% for the patients who were performed F.G.Nazirov's modified surgery. According to a comparatively low postoperative lethality which is typical for M.D.Patsiora's surgery the frequency of the hemorrhagic syndrome recurrence in the nearest postoperative period reaches 20% vs. 4.4% of F.G.Nazirov's modified surgery.

In our investigation the causes of the hospital lethality in the 1st group were: the hemorrhagic syndrome; hepatic failure; insufficiency of pylorotomic hole, corrosion hemorrhage which made up 4 (6%), 4 (6%), 1 (2%) and 1 (2%). In the 2nd group the causes of the hospital lethality were the hemorrhagic syndrome; hepatic failure; insufficiency of pylorotomic hole; corrosion hemorrhage and intestinal perforation which were observed in 3 (3.3%); 3 (3.3%); 2 (2.2%); 1 (1.1%); and 1 (1.1%) patients.

DISCUSSION

Azygoportal dissociation method in patients with LC is of a less risk of hepatic failure and encephalopathy. Dissociative procedures can be applied at the peak of hemorrhage and are easy to perform. But, in spite of a big quantity of such surgeries, almost all of them are followed by either early hemorrhage recurrence, or high operative trauma and low survival rates. As an example the frequency of hemorrhage recurrence following N. Tanner's surgery is 35-45% [1, 16]. After M.D. Patsiora's surgery this index can make up to 20% and more. Besides, in 8-14% of cases it is impossible to achieve bleeding control during the surgery [1, 16].

The M.A. Hassab's surgery which is widely-spread among the Asian-Pacific countries allows to reliably control the hemorrhagic syndrome. At the same time, a negative peculiarity of this method is a conservation of plethoric intramural veins of esophagus and stomach which also stipulates a high frequency of the hemorrhage recurrence (up to 25-34%) up to 5 years of observation [1, 17, 18].

One of the well-known and inconsistent methods of azygoportal total dissociation is the Sugiura's and S. Futagava's surgery. The method has been upgraded many times with the aim of saving hemorrhage control results on the background of operative trauma reductions and [1, 19]. Though more than 20 modifications of the surgery has been offered but still postoperative lethality remains high and can reach 50%.

The development and adoption of TIPS seemed to be a perspective method [15, 20]. But the recent wide investigations showed that this method also had serious disadvantages. A number of the late researches give significant defects of TIPS vs. porto-systemic shunting. Hosokawa et al. [21] states that a frequency of the hepatic encephalopathy was observed by them 1.5 times more frequent in patients performed TIPS vs. traditional interventions (39% vs. 26%) [21].

Shunt occlusion was developed in 26% of patients after TIPS and was not observed in patients after the surgical portosystemic shunting. But, as it is mentioned above, in spite of the advantages of surgical shunting interventions it is not always possible to perform them.

Thereby, nowadays there is no operative technique in the world which can be called "a golden standard" in the treatment of bleedings from esophageal varices. In this connection we have developed an original type of the operative intervention in our

Hereby, the results of this study allowed regarding the F.G.Nazirov's surgery as a competitive prevention and treatment method for hemorrhagic syndrome in patients with the PH in the conditions of impossibility to perform surgical shunting and at the ineffective endoscopic hemostasis.

CONCLUSION

In conclusion it can be said that postoperative complication rates and lethality, showed a significantly lower rates in the modified technique group than in any of known analogues. A modification of the original method of gastroesophageal collector dissociation allowed to reduce the frequency of such complications as

edematous ascitic syndrome; hepatic failure; insufficiency of GGA and hemorrhagic syndrome from 28.6%; 23.8%; 11.1%; and 14.3 in the original method up to 16.5%; 7.7%; 0%; and 4.4% for the modified method.

DECLARATIONS

Authors' Contributions

All authors contributed equally to this work.

Acknowledgements

This work was supported by Republican Specialized Center of Surgery named after acad.V.Vakhidov. Tashkent.

Competing interests

The authors declare that they have no competing interests.

REFERENCES

1. Vorobey A.V., Klimovich V.V., Zhura A.V. 2007. Disconnection surgeries in the treatment of bleeding esophageal varices at the portal hypertension (literary review). *Medical Panorama*, 2: 29-34.
2. Savel'ev V. S., Kirienko A.I. 2009. Clinical surgery: National manual. In 3 volume. Vol. 2. Moscow: GEOTAR-Media. P. 627-641. In Russian.
3. Nazyrova F.G., Akilov H.A., Devyatov A.V. 2002. Surgery of portal hypertension complications. Moscow: GeOTAR Medicine, P.8-40. In Russian.
4. Boerema I., Klopper P.J., Holscher A.A. 1970. Transabdominal ligation-resection of the esophagus in cases of bleeding esophageal varices. *Surgery*. Mar; 67(3):409-413.
5. Brunner F., Berzigotti A., Bosch J. 2017. Prevention and treatment of variceal haemorrhage in 2017. *Liver Int.*; 37(1): 104-115. DOI: 10.1111/liv.13277.
6. Carbonell N., Pauwels A., Serfaty L., Fourdan O., Lévy V.G., Poupon R. 2004. Improved survival after variceal bleeding in patients with cirrhosis over the past two decades. *Hepatology*. 40(3): 652-659. DOI: 10.1002/hep.20339
7. Cordon J.P., Torres C.F., García A.B., Rodriguez F.G., de Parga J.M.S. 2012. Endoscopic management of esophageal varices. *World J. Gastrointest. Endosc.* 4(7): 312-322. DOI: 10.4253/wjge.v4.i7.312
8. de Franchis R. 2015. Expanding consensus in portal hypertension. Report of the Baveno VI Consensus Workshop: Stratifying risk and individualizing care for portal hypertension. *J. Hepatol.*; 63(3): 743-752. (European Association for the Study of the Liver). DOI: 10.1016/j.jhep.2015.05.022.
9. Garcia-Pagan J.C.G., Barrufet M., Cardenas A., Escorsell A. 2010. Management of gastric varices. *Clin. Gastroenterol. Hepatol.*, 12(6): 919-928. DOI: 10.1097/PMID.0000000000001725
10. Yachha S.K., Chetri K., Lal R. 2002. Management of portal hypertension. *Indian J Pediatr.* 69(9):809-13. DOI: 10.1007/BF02723696. PMID: 12420915
11. Villanueva C., Colomo A., Aracil C., Guarner C. 2008. Current endoscopic therapy of variceal bleeding. *Best Pract. Res. Clin. Gastroenterol.*, 22(2):261-278. DOI: 10.1016/j.bpg.2007.11.012.
12. Cowgill SM, Thometz D, Clark W, Villadolid D, Carey E, Pinnkas D et al. 2007. Conventional predictors of survival poorly predict and significantly underpredict survival after H-graft portacaval shunts. *J Gastrointest Surg*; 11: 89-94.
13. Marshall J. Orloff, Jon I. Isenberg, Henry O. Wheeler, Haynes K.S., Jinich-Brook H, Rapier R, Vaida F, and Hye R.J. 2010. Emergency Portacaval Shunt Versus Rescue Portacaval Shunt in a Randomized Controlled Trial of Emergency Treatment of Acutely Bleeding Esophageal Varices in Cirrhosis—Part. *J Gastrointest Surg*, 14(11): 1782-1795. Published online 2010 Jul 24. doi: 10.1007/s11605-010-1279-7
14. Rosemurgy AS, Frohman HA, Teta AF, Luberice K, Ross SB. 2012. Prosthetic H-graft portacaval shunts vs transjugular intrahepatic portosystemic stent shunts: 18-year follow-up of a randomized trial. *J Am Coll Surg.*, 214(4):445-53; discussion 453-5. doi: 10.1016/j.jamcollsurg.2011.12.042. PMID: 22463885
15. Jarnagin W.R. 2012. Blumgart's Surgery of the Liver, Pancreas and Biliary Tract: Expert Consultation. 5th edition. 2 Vol. Set. Vol 1. Philadelphia PA. Elsevier Saunders. P. 1140-1150.
16. Tanner N.C. 1958. Operative management of haematemesis and melaena; with special reference to bleeding from esophageal varices. *Ann. R. Coll. Surg. Engl.*, 22(1): 30-42.

17. Hassab M.A. 1967. Gastroesophageal decongestion and splenectomy in the treatment of esophageal varices in billiar cirrhosis: further studies with a report on 355 operations. *Surgery.*, 61(2): 169-176.
18. Schiff E.R., Maddrey W.C., Sorrell M.F. 2014. Schiff's Diseases of the Liver. 11th Edition. In 3 vol. Vol 2. Lippincot Williams and Wilkins. P. 68-111.
19. Voros D., Polydorou A., Polymeneas G. et al. 2012. Long term results of modified Sugiura procedure for the management of variceal bleeding: standing the test of time in the treatment of bleeding esophageal variceas. *World J. Surg.*, 36930:659-66. Doi:10.1007/s00268-011-1418-7.
20. Wright A. S. Ridders L.F. 2005. Current Management of Portal Hypertension. *J Gastrointest Surg.*, 9(7):992-1005. PMID: 16137597. DOI: 10.1016/j.gassur.2004.09.028
21. Hosokawa I., Adam R., Allard M.A., Pittau G., Vibert E., Cherqui D., Sa Cunha A., Bismuth H., Miyazaki M., Castaing D. 2017. Outcomes of surgical shunts and transjugular intrahepatic portasystemic stent shunts for complicated portal hypertension. *Br J Surg.*, 104(4):443-451. doi: 10.1002/bjs.10431.