

# Analysis of Angiographic Examination and Endovascular Intervention Methods in Patients with Varicose Veins of the Esophagus and Stomach

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**Abstract** In 2017-2023, examination and treatment data of 264 patients with bleeding from varicose veins of the esophagus and stomach, who underwent endovascular and endoscopic interventions at the clinic of the Tashkent Medical Academy, were analyzed. All patients were divided into 2 groups according to treatment method: control group I (n=128) and main group II (n=136). Unlike the control group, the main group included 74 patients who underwent endovascular and endoscopic interventions after scheduled angiographic examination along with conservative treatment. Including 63.3% men, 36.3% women from 26 to 75 years old. For the objective distribution of patients by age groups, the classification of age groups adopted at the special symposium held in Kiev in 2002 and at the workshop of the Regional Bureau of the World Health Organization (163) was used, and is presented in Table 2.1. **The purpose of the study:** to improve results by angiographic examination and endovascular interventions in the complex treatment of patients with complications of portal hypertension and rebleeding from varicose veins of the esophagus and stomach.

**Keywords** Esophageal and gastric varicose veins, Angiography, Minimally invasive, Staged, Liver cirrhosis, Portal hypertension and liver failure

## 1. Introduction

The most serious and often fatal complications of portal hypertension (PH) in the world are bleeding from varicose veins of the esophagus and stomach, "... it was determined that 60% of patients with varicose veins experience major bleeding..." [1,2,3]. Although modern methods of treatment of patients with portal hypertension have been discovered, the mortality rate after bleeding from varicose veins of the esophagus and stomach (VVES) is more than 25% in the first two months [4,5,6]. These indicators should encourage us to conduct new research and improve results.

**The purpose of the study:** to improve results by angiographic examination and endovascular interventions in the complex treatment of patients with complications of PH and rebleeding from VVES.

### Tasks of the research:

1. Retrospective analysis of PH patients with bleeding complications from VVES.
2. To determine the causes of rebleeding in the near and long term.

3. Study of liver-spleen angioarchitectonics with angiographic examination and endovascular interventions.

## 2. Material and Methods

In 2017-2023, examination and treatment data of 264 patients with bleeding from VVES, who underwent endovascular and endoscopic interventions at the clinic of the Tashkent Medical Academy, were analyzed.

All patients were divided into 2 groups according to treatment method: control group I (n=128) and main group II (n=136). Unlike the control group, the main group included 74 patients who underwent endovascular and endoscopic interventions after scheduled angiographic examination along with conservative treatment.

**Table 2.1.** Distribution of examined patients by gender and age

| Age               | Male | Female | Total | %    |
|-------------------|------|--------|-------|------|
| 18-2              | 13   | 8      | 21    | 7,   |
| 30-44             | 42   | 22     | 68    | 25,7 |
| 45-5              | 81   | 41     | 122   | 46,2 |
| 60-74             | 17   | 13     | 30    | 11,3 |
| Over 75 years old | 15   | 8      | 23    | 8,7  |
| Total             | 168  | 6      | 264   | 100  |

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The total number of patients was 264, including 63.3% male and 36.3% female aged 26 to 75 years. For the objective distribution of patients by age groups, the classification of age groups adopted at the special symposium held in Kiev in 2002 and at the workshop of the Regional Bureau of the World Health Organization (163) was used, and is presented in Table 2.1.

As can be seen from Table 2.1, the number of patients aged 18-5 with working capacity was 8.2%.

The most common etiological factor of liver cirrhosis (LC) was viral hepatitis (B, C, D) in 65% of the total number of patients, chronic alcoholism in 18% of patients, contact with toxic chemicals in 13% of patients, Cryptogenic cirrhosis of the liver was observed in 4% (Fig. 2.1).

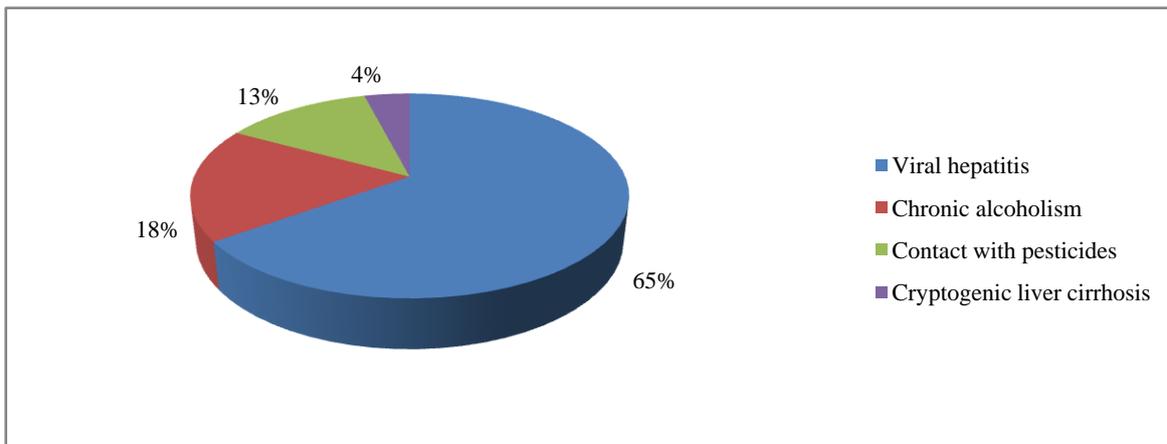


Figure 2.1. Distribution of patients with the most common etiological factor of LC

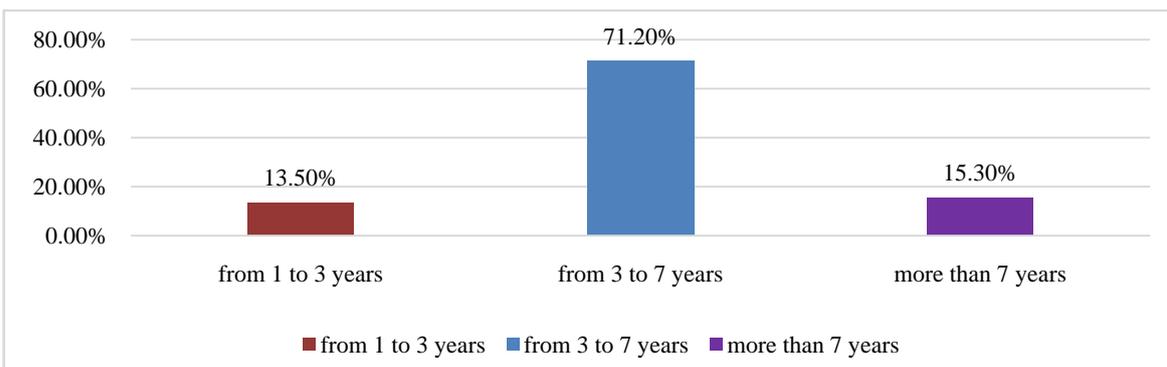


Figure 2.2. Duration of LC

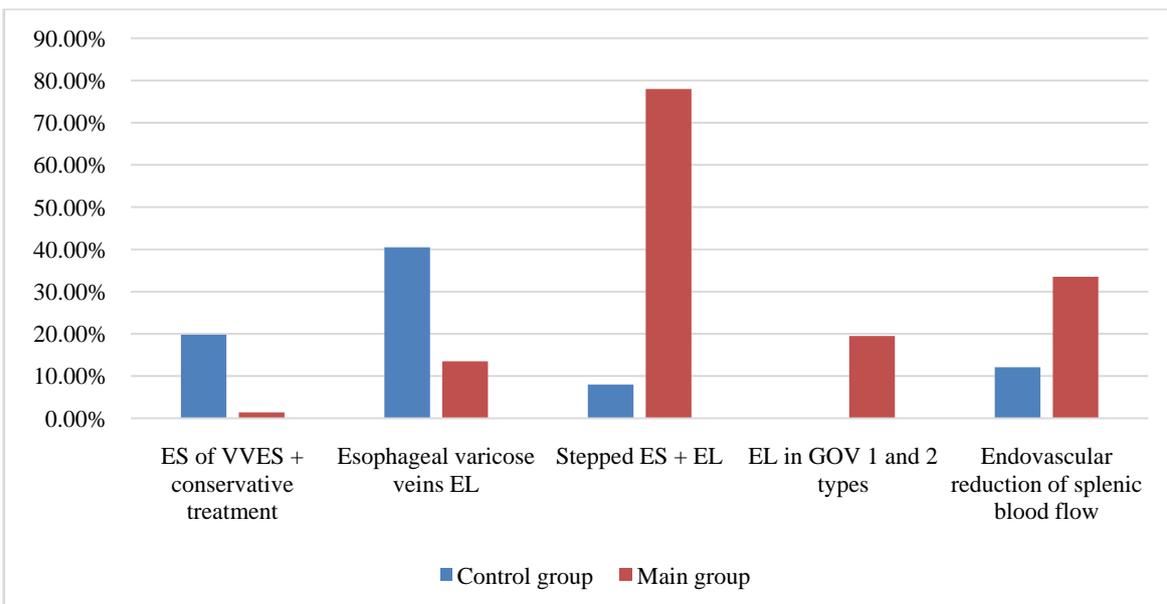


Figure 2.3. Description of miniinvasive interventions in the control and main groups of patients

In most patients (71.2%), the duration of the disease included a period from 3 to 7 years (Fig. 2.2). In addition, LC was detected in 20% of patients less than a year after hepatitis, mainly among those infected with viral hepatitis [7,9].

Based on the results of the analysis of the control group of 128 patients who underwent traditional endoscopic surgery with conservative therapy, the course of the disease was studied, the frequency and development time of complications were determined, the life expectancy and causes of death were determined.

The main group (136 patients) included patients who underwent staged endoscopic and endovascular procedures according to both urgent and delayed instructions based on the developed methods and treatment algorithm.

When assessing the manifestation of PH and the localization of portohepatic circulation block, the generally accepted classification of M.D. Patsiora was followed [7,8] (Table 2.2). It was found that the majority of patients (37%) were in the stage of subcompensation of PH.

The main cause of PH in patients in both the main and control groups was LC with intrahepatic block, in mixed cases, that is, partial thrombosis of the portal vein (PV) and LC occurred only in 6 patients (1.1%) of the main group [8].

**Table 2.2.** Distribution of patients according to the stage of PH syndrome

| Stage of PH          | Control group | Main group |
|----------------------|---------------|------------|
| Compensated stage    | 15 (11,7%)    | 14 (10,2%) |
| Subcompensated stage | 35 (27,3%)    | 51 (37,5%) |
| Decompensated stage  | 78 (60,%)     | 71 (52,2%) |
| Total                | 128 (100%)    | 136 (100%) |

From the analysis of the obtained research results, it should be noted that all examined patients had previously observed bleeding from the esophagus and stomach, including 14% of patients, it was observed multiple times.

Endovascular interventions for the purpose of diagnosis and treatment of the patients included in our study were performed in x-ray operating rooms equipped with Siemens Arteo Zee and Triplex Angiomatic angiographic equipment and appropriate recording devices. The advantage is that it made it possible to process the computer image in the digital subtraction mode and perform the necessary measurements. Pressure registration was carried out on the "Mingograph -62" device of the "Elema" company. A set of necessary special tools and devices, means of embolization of vessels, and filling materials were used for this.

Angiographic diagnosis of portal-hepatic blood circulation disorders in PH includes celiacography and mesentericography based on standard methods, along with the study of the PV and its branches. The diameters of the spleen (SA), left stomach (LSA), common liver (CLA), private liver (PLA), gastro-duodenal (GDA) and gastrointestinal arteries (GIA) were measured in the celiacograms. The character of intrahepatic angioarchitectonics and the characteristics of arterial collateral blood circulation were noted. The size of the spleen was determined in the parenchymatous phase.

Reduction of splenic blood flow After selective catheterization of the proximal part of the splenic artery, an angiographic catheter was passed through the conduit behind the arch of the large branch of the SA (Fig. 2.4).

Gianturko-type spirals with a diameter of 3-8 mm and a length of 1-2.5 cm were used to reduce the splenic blood flow, depending on the characteristics of the angioarchitectonics of the SA.



**Figure 2.4.** Catheterization of the SA before ESA followed by arterio-graphy

Percutaneous puncture of the branches of the PV, through the liver (lateral access) was performed under local anesthesia with 0.5% novocaine solution, holding the breath along the right middle axillary line between the 7-8- ribs, liver topography data and in each concrete case it was deviated from it dorsally or ventrally according to individual characteristics. Lunderquist stylet catheters or a 22 J needle were used. It is less traumatic and makes maneuvers easier. In most cases, it was possible to puncture the branches of the portal vein after 1-3 attempts, but in some cases 8-10 punctures were performed.

A catheter with a J-bend was inserted into the portal vein through the needle. An introducer with a diameter of 6F is inserted into the liver parenchyma through the conduit. Hard catheters with a soft tip were used in cases where deformation of the introducer was observed in the liver parenchyma or between the liver and the chest wall.

The PV, splenic vein (SV), left gastric vein (LGV), short gastric veins (SGV), and VVES were measured in direct and repeated partograms (Figure 2.5). The state of intrahepatic and hepatic angioarchitectonics was studied, the dimensions of the liver in the sinusoidal phase were determined, and the features of porto-systemic anastomosis were studied.

As a result of the conducted research (portography and tensiometry), it was possible to study the angioarchitectonics of the PV system and the dynamics of portal pressure using the Waldmann phlebotonometer.



**Figure 2.5.** Percutaneous transhepatic portography of esophageal and gastric varices with contrast conglomerate

Sequential catheterization of the LGV and SGVs followed by selective phlebography of these veins was performed to embolize the VVES. Each of these vessels was then occluded by inserting metal coils as embolizing devices.

The obtained data were analyzed using the Microsoft Excel program on a Pentium IV personal computer. In addition, traditional variational parametric and nonparametric statistical methods were used. Student's *t* coefficient was used to ensure the reliability of the obtained results. Differences were considered reliable when the frequency of the studied sign did not exceed 5% ( $R < 0.05$ ).

### 3. Results of Our Research

The main reason for urgent surgical procedures in the control group patients of our study is the duration of bleeding. The use of staged endovascular and endoscopic treatment methods and CVP of 80 mm. A decrease from  $(53 \pm 7.7$  mm

Hg) helped stop bleeding in high-risk patients (7.3%), and conservative measures were effective only in 78.5% of patients in the control group ( $p < 0.05$ ). In the control group, 7% of patients died of bleeding during the first days of admission, while in our main group of patients, the cause of death was progressive LF (2.4%,  $r < 0.05$ ).

In the control group, long-term placement of the obturator-probe to stop bleeding caused supralaryngeal edema in .5% of patients, inflammation of the mucous membrane in 27 (47.4%), and the development of bedsores in the cardioesophageal zone in 5.2%. This not only complicated the performance of endoscopic hemostasis methods, but also caused excessive bleeding from the hemostasis areas in 16 (17.0%) patients of the control group. This condition required long-term pressure with the distal end of the device in the field of hemostasis and reinsertion of the obturator-probe in 8.8% of patients, as well as repeated endoscopic hemostasis methods in 7.0%, which also negatively affected the results of hemostasis. In the main group of patients, due to submucosal infiltration along the varicose veins of the cardiac department with a low CVP, it was possible to slightly reduce the expression of the tension of the esophageal varices, and it was easier to carry out sclerotherapy, which reduced the frequency of bleeding at the needle injection site by 6.7%.

In the main group of patients, immediate hemostasis was achieved in 7.3% of cases; The main reason for the appearance of ulcers after ES is the presence of sclerosant outside the veins. This happens when there is active bleeding from the puncture site of the vessel and sclerosant is injected paravasally or additionally into the vascular bed. In the main group, the formation of ulcers was observed in 10.3% due to aseptic inflammation and tissue necrosis in the area of the gastric cardia, and in the control group, it was observed in 30.8%.

In all cases, the use of endoscopy was accompanied by obvious inflammatory events in the cardioesophageal region and caused temporary dysphagia and pain during feeding. Dysphagia was observed in 64.2% of the control group and 55% of the main group.

In the main group, a comprehensive approach to the use of endoscopy combined with additional endovascular intervention and selection of patients for conservative treatment reduced the incidence of LF from 18.5-22.3% to 13.6-17.2%. All patients with LF corresponded to Child-Pugh classes B and C, had ascites syndrome and high bilirubin levels.

### 4. Conclusions

1. Optimizing the selection of endovascular and endoscopic methods for the treatment and prevention of bleeding from VVES, combined with the developed step-by-step tactics of mini-invasive and traditional interventions, the percentage of long-term good and satisfactory results from 31% to 54% and reduction of bleeding allowed to reduce the frequency of total

mortality from 56.0% to 28.5% ( $R < 0.001$ ).

2. The hyperdynamic state of the SA and the increase in arterial perfusion of the spleen are directly related to the degree of PH and VVES. Thus, in patients with II-degree VVES, the diameter of the SA was  $0.72 \pm 0.11$  cm, the blood flow velocity was  $127 \pm 14.1$  cm/s, the VVES were In the III degree, it was  $0.1 \pm 1.73$  cm and  $144 \pm 15.7$  cm/s.
3. Implementation of a tactical algorithm for the treatment and prevention of bleeding from VVES in patients with LC increased the two-year survival rate from  $35.4 \pm 8.0\%$  to  $68.5 \pm 8.1\%$  (median survival) improved from 13 months to 22 months ( $r < 0.001$ ).

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