

THE INFLUENCE OF COMPLICATED DUODENAL ULTRA AND DIFFERENT METHODS OF SURGICAL TREATMENT ON THE FUNCTIONAL STATE OF HYDROLYSIS AND TRANSPORT

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Abstract: Peptic ulcer and duodenal ulcer (PUD) is one of the main problems of modern gastroenterology, due to its frequency, chronic course, damage to people of younger and working age, frequent disability of patients, the presence of threatening complications and insufficiently satisfactory treatment results. Peptic ulcer disease (PUD) affects up to 8-15% of the population. Despite the emergence of new drugs aimed at improving regenerative processes, a wide range of antacids, H₂-receptors of histamine, some improvement in traditional complex therapy, the emergence of more accurate criteria for evaluating the results of treatment (endoscopy, etc.), there is still an urgent need search for more reliable means and development of modern treatment of ulcer. Practice shows that conservative ulcer therapy, which successfully cures the exacerbation of the disease, in most cases does not prevent the next relapse, the frequency of which remains high - 60–90%.

Key words: influence, patient, improving regenerative processes, frequent disability of patients, conservative ulcer therapy.

This is due to the lack of a clear and clear understanding of the nature of the disease, specific information about the etiology and pathogenesis of peptic ulcer disease, with a variety of options for the clinical course, timing and nature of complications, which to some extent reduces the potential carrying out prophylaxis and effective pharmacotherapy aimed at the main pathogenetic links. Therefore, in some patients, objective conditions remain for chronicity in the mucous membrane of the stomach and duodenum of the pathological focus, the occurrence of frequent relapses, the development of severe complications.

Unfortunately, 15-20% of patients develop the disease with frequent relapses, 50-60% develop complications such as bleeding, penetration, perforation and stenosis. In this regard, the number of surgical interventions is increasing (up to 90,000 cases per year), and mortality in case of complications ranges from 26.4 to 42.3%. Dissatisfaction with the results of conservative treatment and the development of various complications in the course of treatment ultimately lead to surgical treatment of ulcer.

The general characteristics of patients

In the clinic of surgical diseases of the VI-VII courses of the medical faculty of the second Tashkent state medical institute (on the basis of the clinical hospital of the medical and sanitary part of Glav-Tashkent and the city clinical hospital of emergency and emergency care) for the period 1987-2001. 2759 patients with duodenal ulcer and its various complications were hospitalized. Of these, 1360 (49.3%) patients were operated on: for uncomplicated duodenal ulcer - 261 (19.2%) people, for its complications - 1099 (80.8%) people. (Table 1). All patients were diagnosed on the basis of general clinical, X-ray and endoscopic studies.

Table 1.
Distribution of patients with duodenal ulcers depending on gender and reasons for surgical interventions, people

Gender	The number of patients	The nature of complications of peptic ulcer				
		Uncomplicated DU	C теhoz	Bleeding	Perforation	Penetration
Female	2 34	64	53	30	57	30
Male	1 126	197	31 7	169	287	156
Overall: people. %	<u>1</u> 360 100	<u>261</u> 19,2	<u>37</u> 0 27, 2	<u>199</u> 14,6	<u>344</u> 25,3	<u>186</u> 13, 7

The male to female ratio was 4.8: 1. The age composition of patients: up to 19 years old - 30 (2.2%) people, 20-44 years old - 707 (52%), 45-59 years old - 449 (33%) years old, 60-74 years old - 137 (10, 1%), 75-90 years old - 37 (2.7%) people.

It should be noted that out of 1360 operated patients, 286 (21%) had associated complications (ulcer penetration with stenosis or bleeding, stenosis with bleeding, perforation with bleeding).

Emergency operations (ulcer perforation or profuse bleeding) accounted for 435 (32%) operations, urgent (failure of conservative therapy or repeated bleeding within 72 hours from the moment of admission) - 82 (6.0%), planned - 843 (62.0%). The overall mortality rate was 6.3% (85 patients).

According to the nature of the operation, all patients were divided into 3 main groups: I - palliative methods of surgery, II - vagotomy, III - resection methods (Table 2).

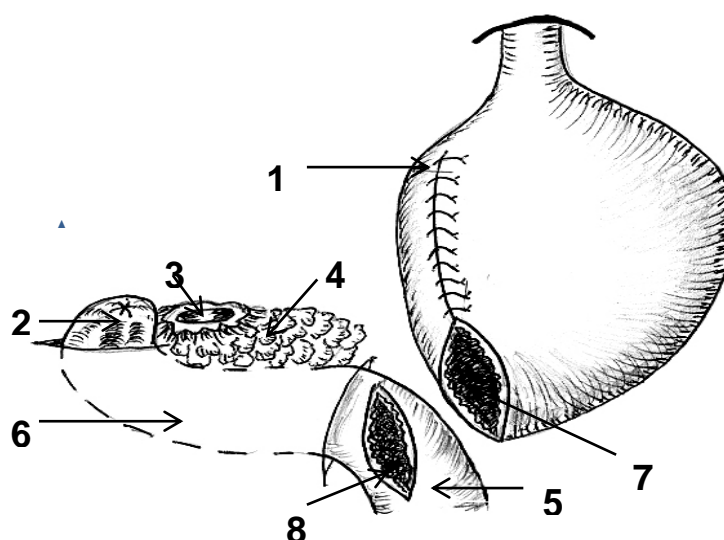
Table 2.
The volume of surgical interventions and their outcome for complicated duodenal ulcers, people(%)

The nature of the operation		The number of the patients	Died
Paliat. methods of operation.	Suturing	256	24 (9,4)
	Isolated. GEA	9	- (-)

		Stitching	19	7 (36,8)
		Isolated. GEA	19	2 (10,5)
Vagotomic methods of operation	2x CTB +	AE / B-1	90	3 (3,3)
		AE / B-2	114	5 (4,4)
		Finney PP	134	9 (6,7)
		GDA for Jabuli	46	2 (4,3)
		GEA	13	1 (8,3)
	CTIB +	Finney PP	63	2 (3,2)
		GDA for Jabuli	89	4 (5,6)
		GEA	8	– (–)
		ISPV	11	– (–)
Resection surgery methods		RZh according to B-1	117	6 (5,7)
		RZh for B-2: G / F	168	10 (6)
		RJ according to Balfour	25	1 (4)
		IRWC on B-2	179	9 (5)
Overall:			1360	85 (6,3)

In order to increase the efficiency of gastric cancer surgery according to the B-II method, the staff of our clinic modified some stages of this method (Fig. 1). The essence of the modification (MRS according to B-II) is that after processing the stump of the duodenum and the resected part of the stomach, part of the latter descends through the window formed into the mesocolon.

Then HEA is applied on an ultra-short loop (Inventor's certificate No. 9800495. "Method of applying HEAa") without the formation of a "spur" (Inventor's certificate No. 9800525. "Method of gastric resection without a spur") (Fig. 1., B). In this case, the HEA in relation to the axis of the jejunum is superimposed obliquely (45° in relation to the axis of the organ - with a narrow diameter) or in the transverse direction (with a wide diameter, the wall of the jejunum is dissected up to 2.0-2.5 cm) (fig. 1., A).



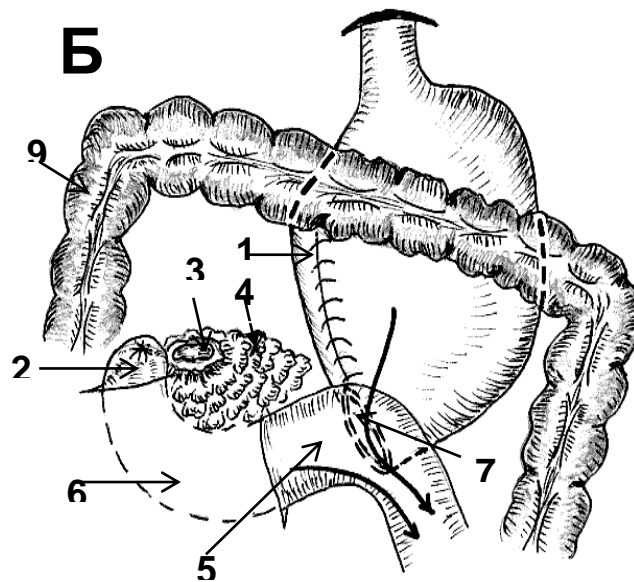


Figure 1. The scheme of the stages of the modified method of resection of 2/3 stomach according to B-II

A - Formation of the GEA. B - General view of the modified method of resection of 2/3 stomach according to B-II. 1 - stomach stump (sutured with single-row sutures), 2 - sutured duodenal stump, 3 - ulcer crater, 4 - pancreas, 5 - discharge loop, 6 - leading loop, 7 - hole in the stomach

For many years, the IWRM according to B-II has been successfully used in the surgical treatment of complicated gastroduodenal ulcers in the surgical departments of the 1st Clinical Hospital of the Ministry of Health of the Republic of Uzbekistan (former MSCH GTS), Tashkent Clinical Hospital of Emergency Emergency Medicine and I City Clinical Hospital.

The clinical results of various surgical interventions were assessed according to the data of outpatient and inpatient examination of patients. At the same time, in parallel with general clinical examinations, we studied the well-being of patients, complaints of abdominal pain, dyspeptic disorders, changes in body weight, and work capacity. On the basis of all these data, various immediate and long-term postoperative complications were identified. Patients with complications were admitted to the hospital, where they received conservative treatment, and some patients underwent repeated operations.

In the examined patients with duodenal ulcer (with retrospective analysis), the first established or "silent ulcer" was observed in 90 (12%) patients, an ulcer history up to 1 year - in 67 (9%), 1-3 years - in 75 (10%), 3-5 years - in 95 (12.7%), 5-10 years - in 224 (30%) and over 10 years - in 197 (26.3%). The size of the ulcer in 224 patients was up to 0.5 cm, in 449 - up to 1 cm, in 49 - 1-2.5 cm, in 22 - more than 2.5 cm.

In 400 (53.5%) patients, various concomitant diseases of the digestive system were diagnosed and among their main complaints were disorders of intestinal digestion in the form of dyspeptic disorders, in 94 (12.6%) - chronic diseases of other organs and systems (Table 3).

Table 3.
The accompanying illnesses

Organ diseases	The number of the patients	%	The accompanying illnesses	
			Diseases of other organs and systems	The number of the patients
				%

digestion	22	5,5	Hypertonic disease	6	7,0
Esophagitis	103	25,8	Chronic ischemic heart disease	9	0,2
Erosive bulbit	63	15,7	Chronic. unprofessional lung diseases	27	8,7
Chronic persistent hepatitis	94	23,5	Diabetes	8	8,5
Chronic pancreatitis	56	14,0	Chronic pyelonephritis	8	9,2
Chronic enterocolitis	62 37 25	15,5 9,2 6,3	Hypertonic disease	6	6,4
Chronic cholecystitis:	$\frac{400}{53,5}$	100	— —	$\frac{94}{2,6}$	100

The 400 patients with various disorders of intestinal digestion (main group), simultaneously with studies of clinical and biochemical parameters, motor-evacuation and secretory activity of the stomach (or its stump), carried out special studies to study cavity, membrane digestion and absorption of carbohydrates before surgery, in early (7-14 days), immediate (6-12 months) and long-term (2-5 and more years) periods after various types of operations. The control group consisted of 35 apparently healthy individuals - volunteers aged 20-75 years (Table 4).

Clinical and instrumental research methods

The clinical and biochemical research methods. In patients, the following were determined: general blood and urine analysis, residual nitrogen, urea, blood creatinine, total protein and its fractions, blood sugar, bilirubin (total, direct and indirect), blood enzymes (AST, ALT), blood and urine diastasis, electrolytes and chlorides, indicators of the blood coagulation system. In addition, all patients underwent an obligatory ECG.

Table 4.

The distribution of patients according to the study of the digestive-transport conveyor of carbohydrates depending on the complication of duodenal ulcer, the type of operations performed and various postoperative syndromes

The nature of the operations performed and types postoperative syndromes	The number of examined
Control group (healthy)	35
Uncomplicated YABDPK	27
Donkey. with bleeding	45
Donkey. with stenosis	40
Suturing a perforated ulcer	38
STV-JO	25
SPV-JO	22
STV-AE / according to B-I	19
STV-AE / according to B-II	22

RJ according to B-I	30
RJ according to B-II	31
IRW on B-II	30
NLF	20
Dumping syndrome	14
Diarrhea	16
Peptic ulcer	21

The instrumental research methods:

a) esophagogastroduodenofibroscoy - to assess the state of the lower third of the esophagus, physiological cardia, stomach contents, the severity of pathological changes in the mucous membrane of the stomach and duodenum, the patency of the companion, the severity of duodenogastric reflux, the localization and size of the ulcer, the severity of the activity of the ulcerative process and postoperative the rational state of the stomach;

b) X-ray examination of the stomach (or its stump) - in the morning on an empty stomach, taking into account the shape and location of the stomach, the type of peristaltic activity, the type and time of evacuation of the contrast suspension from the stomach, the presence of a “niche”, its size and localization;

c) ultrasound diagnostics (USL) of the liver, biliary tract and pancreas;

d) the secretory function of the stomach was investigated by the fractional probe method using the maximal histamine Kay test and the insulin test by Holander;

e) exocrine (amylolytic) function of the pancreas was studied by aspiration of duodenal contents through a probe, in which the activity of pancreatic β -amylase was determined.

The methods for the study of digestive-transport small intestine function

The method of carbohydrate (food) loads. This method is based on the fact that all complex substances (polymers), when assimilated, go through three stages of digestion (cavity, membrane digestion and absorption), oligomers - two stages (membrane digestion and absorption), and monomers - only the stage of absorption. Determining the content in blood, urine or feces of hydrolysis products of poly- and oligomers or individual monomers taken in metered quantities, it is possible to draw an indirect conclusion about the processes of cavity, membrane digestion and absorption.

The studies with carbohydrate loads, oral or intramural methods were performed in the morning on an empty stomach with an interval of 1 day. In this case, the amount of carbohydrates was used at the rate of 1 g per 1 kg of the patient's body weight and was dissolved in 200 ml of boiled distilled water.

During the entire time of the study, the patients were starving, being in a state of physiological rest. Fingertip blood was collected before and 15, 30, 60, 90, and 120 minutes after exercise. The glycemic level was determined by the glucose oxidase method according to A. Dhalgvist and was expressed in mmol / L.

The calculations were performed using a calibration curve. The activity of carbohydrate hydrolysis was assessed by the nature of the obtained glycemic curve, where we were mainly interested in the percentage and maximum increase in glycemia within 30 minutes. In this case, we proceeded from the position established by AM Ugolev that an increase in glycemia in the first 15-30 minutes. after the introduction of carbohydrates (the ascending

part of the glycemic curve) mainly characterizes the state of the processes of membrane digestion and absorption, and the descending segment of this curve (60-, 90- and 120 minutes) mainly characterizes the processes of assimilation and deposition of absorbed monomers.

Therefore, we present only the results obtained at 30 min. after loading. It should be noted that when using the method of carbohydrate loads, it is possible to diagnose selective or generalized damage to the mechanisms of one or another link of the digestive-transport conveyor.

Starch test. The processes of cavity hydrolysis and absorption of carbohydrates in the MC can be judged by the method of starch loading, which is based on the fact that pancreatic α -amylase entering the MC is one of the main necessary enzymes in the assimilation of polysaccharides (starch), carries out the initial stages of hydrolysis (cavity digestion). The increase in glycemia after starch loading depends on the activity of pancreatic α -amylase and intestinal α -amylase, which determine the intermediate and final stages of starch hydrolysis and absorption of the resulting glucose.

Oligosaccharide assay. The processes of membrane hydrolysis and absorption of carbohydrates in MC can be judged by the load with maltose and sucrose. This test is the main indicator of the hydrolytic and transport capacity of enterocytes and, therefore, intestinal enzymatic activity. The rise of the glycemic curve by 50-60% indicates that both the enzyme systems of the MC and the processes of intestinal absorption are not disturbed; an indicator below 35% indicates a violation of the enzymatic activity of MC and intestinal absorption.

Glucose test. The processes of true transport (absorption of monomers) of carbohydrates in the MC can be judged by the glucose load. The glucose tolerance test is considered a traditional indicator of intestinal carbohydrate absorption. The test is based on the fact that glucose is readily soluble, does not require enzymatic processing for absorption, and is directly transported through the membranes of enterocytes. The increase in glycemia after glucose loading indicates the rate of active transport of this monomer.

But the glucose test has some disadvantages, the most important of which is the dependence of the glycemic curve on some organs and systems (for example, liver, pancreas, central nervous system) that control metabolism and deposition of absorbed glucose.

Therefore, in each specific case, one should take into account all possible factors affecting carbohydrate metabolism. In this connection, to study the true transport function of MC, we additionally used the loading method with D-xylose, which, as is known, is not metabolized.

D-xylose test. D-xylose - a five-carbon carbohydrate (pentose) is utilized only to a small extent (destroyed by intestinal bacteria) in the body. Normally, D-xylose is not present in the blood, it is not phosphorylated during absorption, and most of the factors affecting glucose metabolism do not significantly affect the conversion of D-xylose in the body. Thanks to this, the drug is very convenient for studying the absorption activity of TC.

To determine D-xylose in blood, we used the orcinic ultra-micromethod according to M. Rosental, J. Tomaszewski, based on the fact that D-xylose is dehydrated with concentrated hydrochloric acid to form furfural. The latter gives green color with orcin. The color intensity is proportional to the xylose content in the sample.

Intrajejunal way of carbohydrate loads. The oral administration of the drug can not always be used in patients with complicated duodenal ulcer, especially with decompensated

stenosis, postvagotomy atony, gastrostasis, anastomositis, etc. than it is impossible to obtain objective information about the state of absorption from the TC.

Therefore, to create the same type of conditions for the study of the digestive function of MC, the staff of the Scientific Center of Chemistry of the Republic of Uzbekistan developed an extraintestinal method of carbohydrate loads. For this, through the biopsy channel of the endoscope, a thin Teflon catheter is passed behind the pylorus ring under visual control, while the injected substrate directly enters the duodenum lumen.

This technique allows you to exclude the presence of the substrate in the stomach (or stump) and, thereby, creates the same conditions for research.

We slightly modified this method (rationalization proposal No. 350., 2001): instead of a Teflon catheter, we used a radiopaque angiographic catheter (The firm of Schneider Europe AG, Sweden) with an inner diameter of 0.2 cm. the channel of the endoscope under visual control is inserted 30 cm of the catheter behind the pylorus ring.

In this case, the catheter directly enters the initial part of the jejunum, which is confirmed by X-ray. The advantage of the developed method is that the probe is inserted only once, during the patient's primary endoscopy.

At the same time, the catheter is easily controlled and moves well along the endoscope, and during the operation it can be easily and easily pushed through the intestines without any difficulties. Most importantly, the catheter for a long time (up to 10 days) can be in the lumen of the TC without causing irritation in the nasal cavity, esophagus, TC; the patient has no discomfort during normal meals and loads through the mouth. And this, in turn, makes it possible to carry out a complete examination and correction of the digestive-transport function of the MC.

Periodically, using X-ray, you can monitor the location of the probe in the intestine. It should be noted that intrajunal administration of carbohydrates causes a more significant increase in the level of glycemia compared to oral administration.

This fact in itself is interesting both from the point of view of diagnosing the functional ability of MC and determining the severity of disturbances in gastric evacuation activity in complicated duodenal ulcer and its surgical treatment, as well as in organizing adequate preoperative preparation and postoperative management of patients.

The analysis of publications (authors) and the results of clinical and instrumental studies obtained by us allow us to assert that duodenal ulcer (DU) in most cases is accompanied by damage to other organs and systems, in particular, the digestive system. In the observed symptom complex, in many patients, enteral syndrome is distinguished, reflecting the defeat of the MC and the development of pronounced digestive-transport disorders, which aggravate the course of peptic ulcer disease and complicate timely diagnosis. Probably, the concept of "difficult to heal ulcers" was formed due to the functional insufficiency of the digestive organs.

Therefore, the final solution to the issue of treating patients with DF should include the treatment of diseases of the associated digestive organs (liver, pancreas (RV) and TC).

The achievements in the field of physiology and pathology of the digestive system and, especially, the discovery at the end of the 60s of the last century, by Academician A.M. its links. Therefore, in parallel with the general clinical examination, the exocrine (amyloly-

tic) function of the pancreas, the hydrolytic and transport functions of MCs, which characterize the state of cavity and membrane digestion and absorption of carbohydrates, were studied in the work.

Uncomplicated duodenal ulcer

The digestive-transport system was studied in 27 patients with DU without any complications. The age of the patients is 20-60 years; 17 men and 10 women. Studies have shown that between the duration of the course of ulcer and the activity of pancreatic amylase in the duodenal cavity there is a certain relationship (Fig. 1): with a history of ulcers up to 5 years, it exceeds the norm by 40%, and over 5 years - significantly decreases from the norm.

Approximately the same dynamics of shifts is observed when analyzing the data of the glyceimic response to starch load (Fig. 2.).

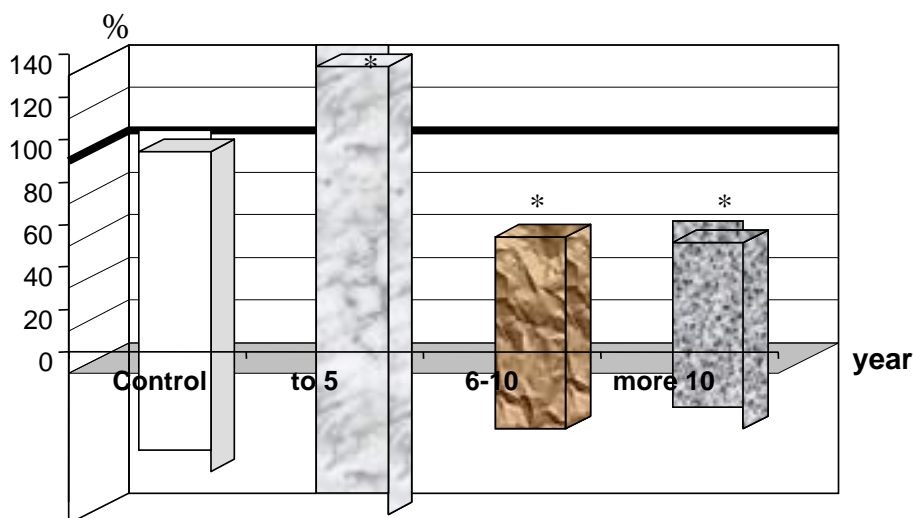


Fig. 2. The activity of pancreatic α-amylase (in%) in the content of the duodenum in healthy individuals (control) is a white bar and, depending on the duration of the disease, colored bars. * - significant difference from control (P <0.05), taken as 100%

Our studies have shown that the bulk of patients showed a completely clear picture of shifts in the ascending part of the glyceimic curve (15, 30 minutes) after loading with starch solution (Table 1), and in some cases there were shifts at the level of the descending part of the glyceimic curve.

Patients with uncomplicated duodenal ulcer are already 15 minutes responded to oral administration of starch by increasing blood glucose levels; its maximum growth occurred at 90 minutes after loading, and then - by 120 min. - there was a slight decrease in glucose levels. This decrease was quite high in 16 (60%) patients, slightly less in 6 (20%) and in the remaining 5 (20%) patients, the glyceimic curve was prediabetic. To confirm the obtained data, we present clinical example.

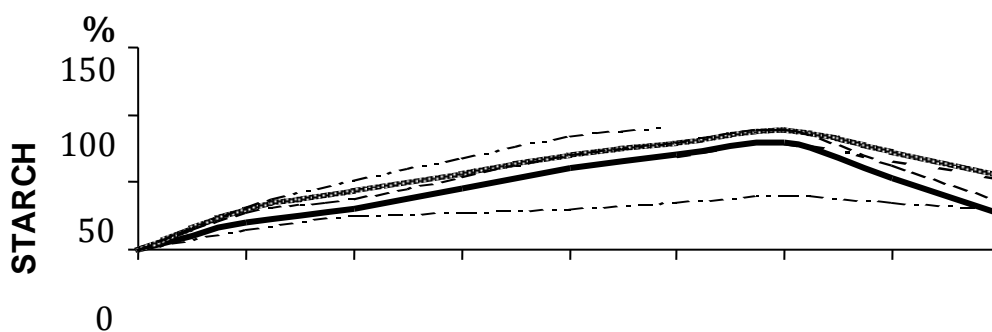


Table 3.

The increase in the level of glycemia after oral carbohydrate loads in healthy individuals (control) and in patients with uncomplicated DU in the dynamics of 120 min., (M \pm m), mmol / L.

Group	Time elapsed after loads, minutes					
	Be- gin- ning	15	30	60	90	120
THE LOAD WITH STARCH SOLUTION						
Control(n=35)	0	1,00 \pm 0,06	1,50 \pm 0,09	3,00 \pm 0,20	4,00 \pm 0,20	1,30 \pm 0,07
Uncomplicated DU (n=27)	0	1,50 \pm 0,08*	2,20 \pm 0,11*	3,50 \pm 0,18 *	4,30 \pm 0,22*	2,80 \pm 0,14*
THE LOAD WITH MALTOSE SOLUTION						
Control	0	2,90 \pm 0.15	3,40 \pm 0.20	1,60 \pm 0.09	0,50 \pm 0.03	0
Uncomplicated DU	0	1,40 \pm 0.07*	1,90 \pm 0.11*	1,50 \pm 0.08	1,00 \pm 0.06*	0,50 \pm 0.03*
THE LOAD WITH SUCHAROSE SOLUTION						
Control	0	1,80 \pm 0.10	2,50 \pm 0.15	1,00 \pm 0.06	0,30 \pm 0.02	0
Uncomplicated DU	0	0,90 \pm 0.05*	1,40 \pm 0.08*	1,00 \pm 0.05	0,60 \pm 0.04*	0,20 \pm 0.01*
THE LOAD WITH GLUCOSE SOLUTION						
Control	0	3,00 \pm 0.15	3,80 \pm 0.25	1,30 \pm 0.07	0,50 \pm 0.03	0
Uncomplicated DU	0	1,40 \pm 0.08*	2,50 \pm 0.15*	1,90 \pm 0.10*	1,00 \pm 0.06*	0,40 \pm 0.02*

Note. * - significant difference from control - P <0.05.

Thus, the activity of pancreatic α -amylase in the duodenal contents in patients with uncomplicated duodenal ulcer is significantly increased. Accordingly, the increase in glycemia after oral administration of starch is also significantly increased. Consequently, in patients with uncomplicated DU (5 years ago), the rates of the initial stage of hydrolysis of polysaccharides are increased.

When studying the state of membrane hydrolysis of carbohydrates, tested in patients with an increase in glycemia after loads with maltose, it was found that in the overwhelming majority of patients the maximum increase in blood glucose was 29 and 40%, respectively, for 15-30 minutes, and after loading with sucrose - 19 and 29% also for 15-30 minutes. However, the descending part of the curve after both loads, as in the case of starch load, differed in patients.

So, if in 15 (55.6%) of 27 patients, the glycemic level dropped quite sharply at 60 minutes after maltose load and returned to the initial one by 120 minutes, then in 7 (25.9%) patients the descending part of the glycemic curve started only 90 minutes after exercise and in the remaining 5 (18.5%) patients, the glycemic curve after exercise was prediabetic.

After sucrose load, in 18 (66.7%) patients, the maximum increase in blood glucose after sucrose load occurred within 30 minutes with a further rather rapid decline to the initial one; in 5 (18.5%) - the time of the peak of glycemia also fell on 30 minutes, but the rate of further decrease in the level of sugar was somewhat slowed down; in 4 (14.8%), the

glycemic curve somewhat resembled the prediabetic one. It should be noted that the deviation of glycemic data from the usual in some patients can in no way affect the conclusion about the inhibition of the hydrolytic-transport function of MC in uncomplicated duodenal ulcer.

Thus, with uncomplicated duodenal ulcer, the level of glucose absorption from maltose and sucrose solutions significantly decreases compared with healthy individuals, which indicates a decrease in the function of membrane hydrolysis and transport, which is realized with the participation of intestinal enzymes maltase and sucrase and associated transporters.

The results of studies to determine the proper transport function of MC in uncomplicated DU, i.e. the level of glycemia after glucose load showed its regular decrease in all patients. This decrease (49%) occurred within 30 minutes. after loading. However, in the future, the character of the glycemic curve in some patients varied somewhat: in 7 - the increased level of glucose after exercise decreased somewhat more slowly, and in 3 - we observed a prediabetic curve.

However, the analysis showed that the level of glycemia at 15 and 30 minutes. After glucose load in patients with uncomplicated duodenal ulcer is always lower than in healthy people, in whom the increase in glucose level by 30 min. was 75%.

Oral administration of D-xylose showed an increase in its concentration in the blood already by 15 minutes, reached a maximum by 30 minutes, then it rapidly decreased, reaching almost the initial level by 120 minutes. However, the level of increase in the concentration of this pentose was significantly lower than in healthy people, which also confirms the conclusion about the impaired absorption of monosaccharides in MC.

The results of studies with a differential determination of the increase in the level of glycemia in the same patients after oral and intrajunal administration of carbohydrates, see Table 4., and fig. 3.

With both methods of introducing loads, the maximum increase in glycemia fell on 15 and 30 minutes. with a further gradual decrease in the level of glycemia by 60-120 minutes. In some cases, a deviation from this pattern was observed - a shift in the maximum level of glycemia by 60 minutes. after the load, with a further rather slow decrease in it to 120 min.

After loading with starch, the maximum increase in blood glucose occurred at 60 and 90 minutes. with a further gradual decrease in it in the subsequent periods of the study (120 min.). In this case, a shift in the maximum level of glycemia was also observed in the later periods after exercise. ...

Table 4.
Differential characteristics of various methods of administering carbohydrate loads in patients with uncomplicated duodenal ulcer (M □ m), mmol / L

Carbohydrates	The carbohydrate load methods			
	Through the mouth		Intraintestinal	
	Time elapsed after loads, minutes			
	15	30	15	30

Starch	1,50 ± 0,08	2,20 ± 0,11	1,70 ± 0,09	2,30 ± 0,12
Maltose	1,40 ± 0,07	1,90 ± 0,11	1,60 ± 0,08	2,00 ± 0,12
Sucrose	0,90 ± 0,05	1,40 ± 0,08	1,00 ± 0,07	1,60 ± 0,08
Glucose	1,40 ± 0,08	2,50 ± 0,15	1,50 ± 0,08	2,70 ± 0,14
D-xylose	0,26 ± 0,01	0,65 ± 0,03	0,30 ± 0,02	0,69 ± 0,04

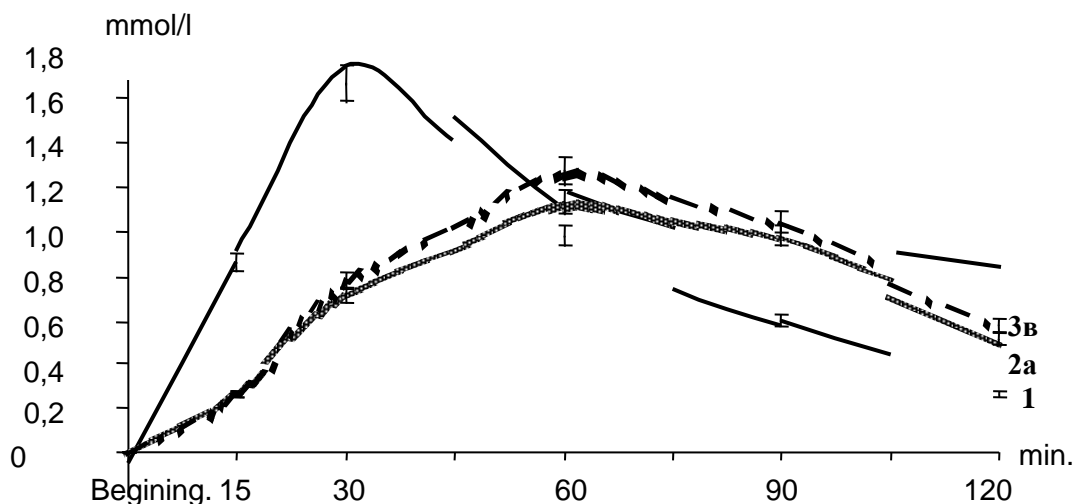


Figure 3. The increase in the level of D-xylose in the blood over time after oral load in patients with uncomplicated duodenal ulcer. (1) as well as after intrajunal administration to the same patients (2a, 3b)

These functions (membrane digestion) are suppressed in this pathology, in contrast to the activity of pancreatic α -amylase (cavity digestion), which increased under these conditions. As for the proper transport function (absorption) of MC, it decreases with DU. This is evidenced by experiments with glucose and D-xylose loads.

Bleeding duodenal ulcer

Profuse bleeding from the DU, accompanied by a high overall (4-8%) and postoperative (20-30%) mortality, is one of the most difficult problems of modern surgery.

The state of cavity, membrane digestion and absorption of carbohydrates was studied in 45 patients with duodenal ulcer complicated by bleeding of varying severity, before surgery (33 men and 12 women aged 20-80 years). Bleeding was mild in 15 patients, moderate in 16, and severe in 14.

All studies were carried out only on the second day - after a complete stop of bleeding from the ulcer. Patients in whom conservative therapy was ineffective, as indicated, underwent emergency surgery. The criterion for stopping bleeding was stable hemodynamics, red blood counts, general condition of the patient, pulse, blood pressure, endoscopic signs of stopping bleeding, and other indicators.

Previously, it was shown that there are rather sharp individual fluctuations of the parameters studied by us (amylolytic activity of the contents of the duodenum, absorption

of various carbohydrates from solutions). However, in relation to many indicators, it is still possible to find the unidirectionality of their shifts. Here are some clinical examples to illustrate this.

The observation 4.4. The patient K. M. K. 58 years old (medical history No. 1185), entered the farm on 24.02.98. with complaints of general weakness, dizziness, moderate pain in the epigastric region, nausea, three-fold vomiting in the form of coffee grounds, the presence of black stools. According to the patient, pain in the epigastric region was disturbed for 12 days. Three days before contacting us, the above complaints appeared. Repeated EGDFS from 02/26/2019: Chronic specular ulcers of the upper (0.2x0.8cm) and lower (0.8x0.6cm) walls of the outlet part of the duodenal bulb, complicated by bleeding and with a fixed thrombus. Erosive antrum gastritis. R□-scopy of the gastrointestinal tract from 1.03.19: Chronic peptic ulcer of the duodenum. Ultrasound from 5.03.98: Chronic cholecystitis. Complete blood count from 24.02.2018: Hg-80, Er.-2.5, CP-0.85, L-9.8, PTI-80, Ht-29. After oral carbohydrate loads with solutions of starch, maltose, sucrose, glucose and D-xylose, the normoglycemic type of the glycemic curve was revealed, where the maximum increase in glycemia fell on 30 minutes, accounting for 40% of the initial level and a rapid decrease by the end of the study (120 min.) to the initial level.

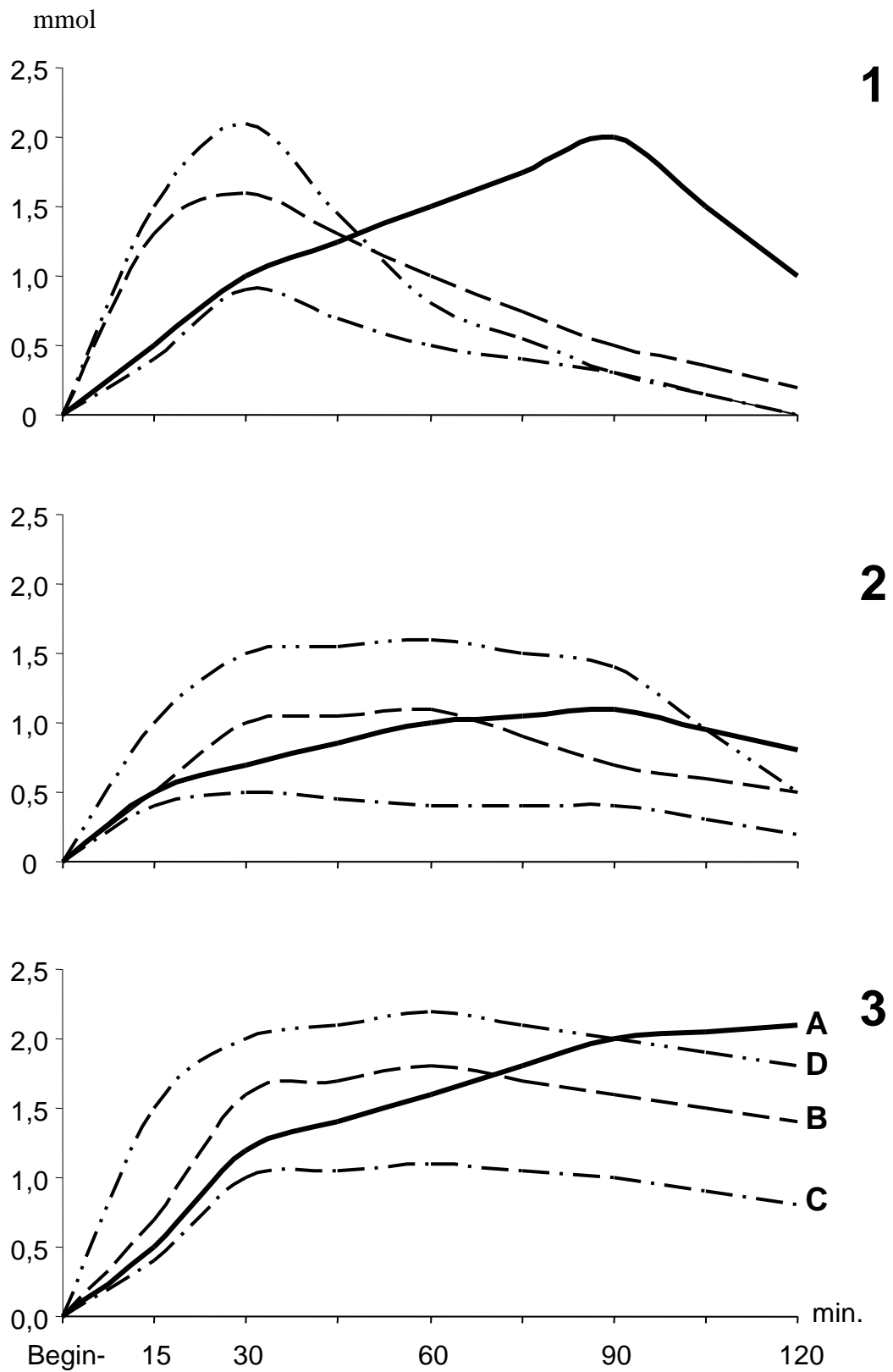
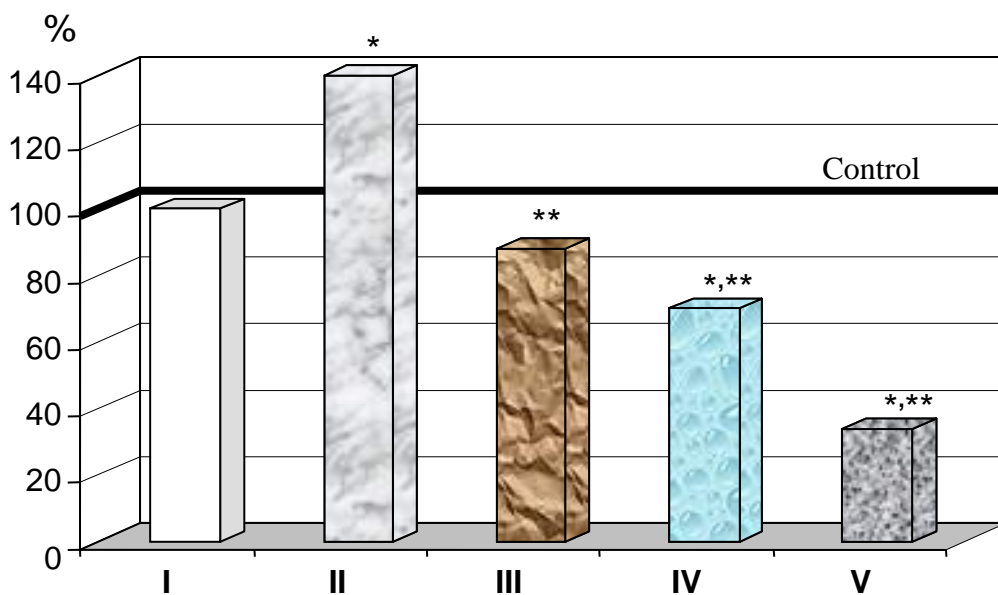


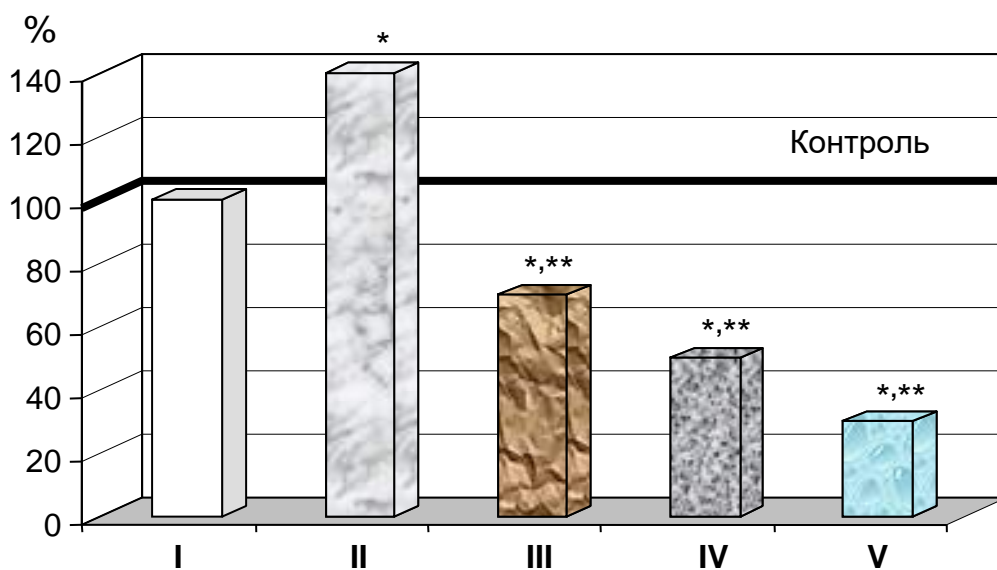
Figure.4. An increase in the level of glycemia after oral loading with a solution of starch (A), maltose (B), sucrose (C) and glucose (D) in patients with: duodenal ulcer complicated by moderate bleeding: K.M.K. (1), A.Sh.U. (2), R.B.R. (3).

The observation 4.5. *The patient A. Sh. U. 37 years old (medical history No. 9839), was admitted to the farm on December 29, 2017 with complaints of general weakness, dizziness, nausea, vomiting mixed with blood, the presence of black stools. According to the patient, the duodenal ulcer has been suffering from peptic ulcer for 6 years. The above complaints appeared this morning. Before that, for 20 days, pain in the epigastric region was disturbed. EGDFS from 12/29/2018: Chronic ulcer (1.0 cm) of the anterior-inferior bulb of the duodenum with signs of stopped bleeding. Severe cicatricial and ulcerative deformity of the pylorus, complicated by inflammatory stenosis. Severe gastritis, NFC, erosive reflux esophagitis. R[□]-scopy of the gastrointestinal tract from 01/06/2018: Chronic peptic ulcer of the duodenum. Ultrasound scan from 01/05/2017: Chronic hepatitis, chronic cholecystitis. Complete blood count from 29.12.97: H₆-77, Er.-2.8, CP-0.8, L-7.2, PTI-71, Ht-24. After oral carbohydrate loads with solutions of starch, maltose, sucrose, glucose and D-xylose, a flat type of glycemic curve was revealed, where the maximum increase in glycemia fell on 30 minutes, amounting to 19% of the initial level and remained at this level until the end of the study. (fig. 4., 2)*

The observation 4.6. *The patient R. B. R. 48 years old (medical history No. 1697), was admitted to the farm on March 13, 2017 with complaints of general weakness, dizziness, nausea, vomiting mixed with blood in the form of coffee grounds. According to the patient, pain in the epigastric region began 4 days ago. Today at about 6^{□□} in the morning the aforementioned complaints appeared. He does not associate his illness with anything. This is the first time that such a case is noted. No ulcerative history. Repeated EGDFS from 03/16/2017: Chronic ulcer (0.6x0.8 cm) of the lower wall of the outlet part of the duodenal bulb. Erosive bulbite. Moderate cicatricial and ulcerative deformity of the pylorus and walls of the duodenal bulb. Signs of stopped bleeding. R[□]-scopy of the gastrointestinal tract from 2018: Chronic peptic ulcer of the duodenum. Ultrasound scan from 03/25/2018: Chronic hepatitis, chronic cholecystitis, chronic pancreatitis. General blood test from 03/15/2018. NV-80, Er.-2.6, TsP-0.8, L-4.0, PTI-90, Nt-25. After oral carbohydrate loads with solutions of starch, maltose, sucrose, glucose and D-xylose, a prediabetic type of the glycemic curve was revealed, where the maximum increase in glycemia fell on*



A The activity of pancreatic α -amylase in the contents of the duodenum in patients with duodenal ulcer complicated by bleeding: III – mild degree, IV – average degree и V – severe degree



B The activity of pancreatic α -amylase in the contents of the duodenum in patients with duodenal ulcer, complicated: III – компенсированный, IV – субкомпенсированный и V – декомпенсированный стенозом.

Figure. 5. The activity of pancreatic α -amylase in the contents of the duodenum: I - in healthy individuals; II - with duodenal ulcer. A - with duodenal ulcer complicated by bleeding: III - mild, IV - moderate, V - severe. B - with duodenal ulcer complicated by stenosis: III - compensated, IV - subcompensated, V - decompensated.

* - reliable difference from healthy individuals; ** - from uncomplicated duodenal ulcer.

30 minutes, amounting to 40% of the initial level and remained at this level until the end of the study (Fig. 4), 3).

The study of the activity of pancreatic α -amylase of the contents of the duodenum on the 2nd day after persistent cessation of bleeding of varying severity showed (Fig. 5, A) that with a mild degree of blood loss-amylolytic activity does not significantly decrease from the control (by 17%), with a moderate degree - this decrease becomes significant (by 36%), and with a severe degree - more pronounced (by 70%).

Simultaneously with a change in the activity of the enzyme in the initial stage of hydrolysis of carbohydrates, the transport and hydrolytic-transport functions of MCs change. This is confirmed by the change in the value of the increase in glycemia after starch, maltose, sucrose and glucose loads (Table 3).

Table 4.

Increase in glycemic level for 30 min. after oral carbohydrate load in patients with duodenal ulcer complicated by bleeding (M \pm m), mmol / l

Group	The carbohydrate loads			
	starch	maltose	sucrose	glucose
DU without complication	2,20 \pm 0,11	1,90 \pm 0,10	1,40 \pm 0,08	2,50 \pm 0,13
DU, complicated with bleeding, degree:				
- light	1,90 \pm 0,10	1,80 \pm 0,09	1,30 \pm 0,07	2,30 \pm 0,12
- average	1,00 \pm 0,07 *	1,60 \pm 0,07 *	0,90 \pm 0,06 *	2,10 \pm 0,10
- heavy	0,40 \pm 0,03 *	0,60 \pm 0,03 *	0,50 \pm 0,03 *	0,90 \pm 0,05 *

Note. * - reliable difference from uncomplicated DU.

The indicators of the level of glycemia after loading with carbohydrates in patients with duodenal ulcer complicated by mild bleeding did not change in comparison with the indicators of uncomplicated DU. With an average degree of bleeding, this indicator does not change after glucose and maltose loads, and after starch and sucrose loads it significantly decreases (by 55 and 36%, respectively).

We found that in duodenal ulcer complicated by stenosis, the activity of pancreatic α -amylase in the duodenum content is significantly reduced in comparison with healthy individuals (control), and the magnitude of this effect depends on the degree of duodenal stenosis (Fig. 5, C): with compensated stenosis - by 30%, with subcompensated - by about 50%, with decompensated stenosis - by 70%.

In other words, cavity hydrolysis of polysaccharides is rather significantly reduced, but more pronounced in the decompensated form of stenosis.

With stenosing DU, the hydrolytic-transport function looked as follows: with compensated stenosis (Table 4), the function of the amylase-transport complex (load with starch) is 59% lower than with uncomplicated DU, with sub- and decompensated forms stenosis, this decrease is aggravated and expressed to an even greater extent - by 77 and 86%, respectively.

Table 5.

The increase in the level of glycemia after 30 minutes after carbohydrate loads in patients with duodenal ulcer complicated by stenosis (M \pm m), mmol / l

Group	Carbohydrate loads				
	starch	maltose	sucrose	glucose	D-xylose
DU without complication	2,20± 0,11	1,90± 0,10	1,40± 0,08	2,50± 0,13	1,05± 0,05
DU, complicated by stenosis:- compensating	0,90±0,06	1,40±0,08	1,00±0,05	1,50±0,08	0,60±0,05
-subcompensation	0,50±0,03	0,80±0,05	0,80±0,04	0,90±0,05	0,39±0,03
- decompensated	0,30±0,02	0,40±0,03	0,60±0,03	0,40±0,02	0,20±0,01

Note: * - significant difference from uncomplicated DU - $P < 0.05$.

The function of the maltase-transport complex in DU complicated by stenosis also changes. Increase in glycemia for 30 min. after maltose load with compensated, sub- and decompensated forms of stenosis, it was significantly reduced by 26, 58 and 79% compared with uncomplicated duodenal ulcer. The same relationship between the degree of stenosis and a decrease in the function of the disaccharidase-transport and self-transport systems was established under sucrose, glucose and D-xylose loads.

If we compare the degree of decrease in the increase in glycemia after various carbon-water loads, it can be established that with decompensated stenosis, the absorption of glucose from solutions of maltose and glucose decreases to a somewhat greater extent (79 and 84% of uncomplicated DU) than the absorption of the same monomer formed after sucrose hydrolysis (57% of control).

Thus, the degree of impairment of the functions of transport and hydrolytic-transport systems depends on the form of stenosis. They are rather sharply manifested in compensated stenosis and are even more aggravated in sub- and decompensated forms of stenosis.

The analysis showed that the increase in glycemia in patients with DU, complicated by compensated, sub-, and decompensated stenosis after intrajunal administration of glucose is 56, 120 and 300%, respectively, greater than after oral administration (Figure 8). Approximately the same ratio of the increase in glycemia is observed after intrajunal and oral administration of D-xylose, maltose, sucrose and starch.

Consequently, with DU, complicated by stenosis, all three links of the digestive-transport conveyor of carbohydrates are disrupted. As a result, the decrease in

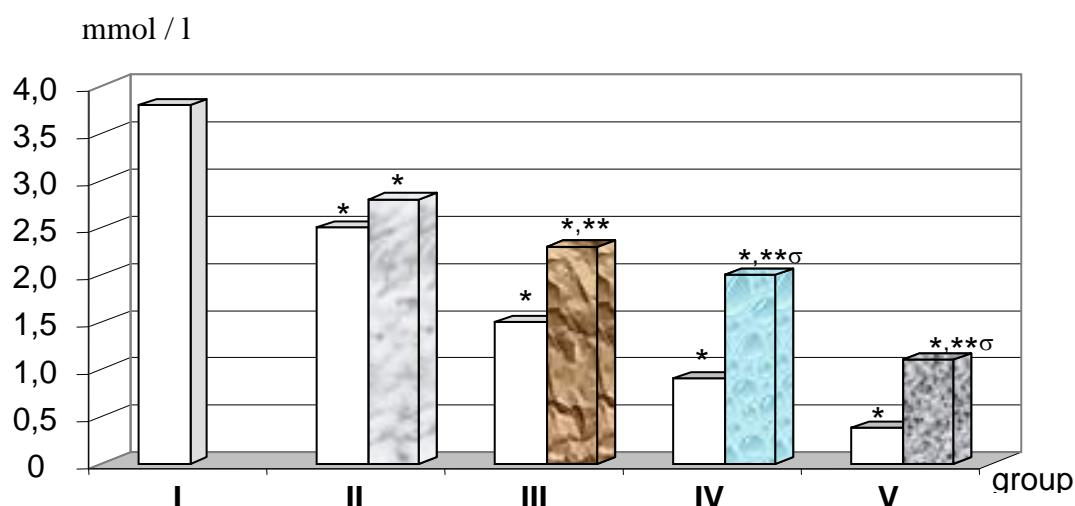


Figure 6. Increase in glycemia for 30 min. after oral (white bars) and intrajunal (colored bars) administration of glucose solution to patients with uncomplicated DU (II), complicated by compensated (III), subcompensated (IV) and decompensated (V) stenosis. I is an indicator of healthy faces* - reliable difference from healthy individuals; ** - from oral administration.

the function of glucose transporters, both “free” and those included in the enzymatic transport complexes in DJ complicated by stenosis, largely depends on the degree of stenosis, which is confirmed by a significant increase in transport and hydrolytic-transport processes with the introduction of a substrate, bypassing pathological focus. These data are of interest for the diagnosis of the functional capacity of MC and the organization of adequate correction of its impaired function in the treatment of patients with stenoses in the pre- and postoperative period.

The degree of impairment depends, first of all, on the severity of the observed stenosis and the link of the digestive-transport conveyor: cavity digestion is reduced even at the smallest degree of stenosis (compensated form) and becomes more pronounced as the degree of stenosis increases.

Exactly the same relationship between the inhibition of membrane hydrolysis and transport functions and the degree of observed deviations from the norm is observed when studying the function of free glucose transporters (absorption). Thus, with DU, complicated by stenosis, all three links of the digestive-transport conveyor of carbohydrates are disrupted.

Therefore, the decrease in the function of glucose transporters, both “free” and those included in the enzymatic transport complexes in DU complicated by stenosis,

largely depends on the degree of stenosis, which is confirmed by a significant increase in transport and hydrolytic-transport processes with the introduction of a substrate, bypassing pathological focus. These data are of interest for the diagnosis of the functional capacity of MC and the organization of adequate correction of its impaired function in the treatment of patients with stenoses in the pre- and postoperative period.

The degree of impairment depends, first of all, on the severity of the observed stenosis and the link of the digestive-transport conveyor: cavity digestion is reduced even at the smallest degree of stenosis (compensated form) and becomes more pronounced as the degree of stenosis increases. Exactly the same relationship between the inhibition of membrane hydrolysis and transport functions and the degree of observed deviations from the norm is observed when studying the function of free glucose transporters (absorption).

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