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CLINICAL AND INSTRUMENTAL FEATURES OF PATIENTS WITH ACUTE PANCREATITIS OF THE SMOLENSK REGION

© Karuk M.V., Banenis M.G., Ivanishkina E.V., Rodin A.V., Tsareva V.M.

Smolensk State Medical University, 28, Krupskoj St., 214019, Smolensk, Russia

Abstract

Objective. To analyze the clinical and functional features of the acute pancreatitis, ECG results of patients from Smolensk region for optimization of diagnosis, treatment and prophylaxis.

Methods. Analysis of clinical features of acute pancreatitis in modern conditions was conducted in 58 patients of Smolensk region, who was on hospitalization in the general surgery department of Smolensk regional clinical hospital (42 men and 16 women) in age of 30-60 years old (average age $46,0 \pm 3,7$),

Results. As risk factors of developing acute pancreatitis patients of Smolensk region, we revealed alcohol abuse, tobacco smoking, malnutrition fatty foods, overeating. For a part of patients, the reason of pancreas lesion is the pathology of the biliary system.

Clinical manifestation of acute pancreatitis is very variable and combined with a clinic of biliary system disorders. The dominative symptom is pain localization in epigastric area, encircling character or with irradiation in spine with high intensity. In clinical blood count was noticed neutrophil leukocytosis, lymphopenia and increased sed rate. Within biochemical syndromes dominated cytolytic and cholestatic syndromes. Also noted the increase of amylase, urea, creatinine and hyperglycemia in blood serum. In ECG research was detected non-specific changes in rhythm and conduction, signs of hypertrophy of left ventricular, changes in myocardial depolarization were revealed.

Conclusion. The study of general clinical and functional characteristics of patients with acute pancreatitis, as well as the role of the main risk factors are the prime necessity in early diagnostic of disease and modern correction factors, influencing the effectiveness of therapy.

Keywords: Acute pancreatitis, risk factors, clinic-laboratory indicators, ECG research

КЛИНИКО-ИНСТРУМЕНТАЛЬНЫЕ ОСОБЕННОСТИ ТЕЧЕНИЯ ОСТРОГО ПАНКРЕАТИТА У БОЛЬНЫХ СМОЛЕНСКОГО РЕГИОНА

Карук М.В., Банёнис М.Г., Иванишкина Е.В., Родин А.В., Царева В.М.

Смоленский государственный медицинский университет, Россия, 214019, Смоленск, ул. Крупской, 28

Резюме

Цель. Провести анализ клинико-функциональных особенностей течения острого панкреатита, электрокардиографических данных у пациентов Смоленского региона для оптимизации диагностики, лечения и профилактики заболевания.

Методика. Анализ клинических особенностей течения острого панкреатита в современных условиях проведен у 58 пациентов Смоленского региона (42 мужчин и 16 женщин) в возрасте 30-60 лет (средний возраст $46,0 \pm 3,7$ лет), находившихся на стационарном лечении в хирургическом отделении Смоленской областной клинической больницы.

Результаты. В качестве факторов риска развития острого панкреатита у пациентов Смоленского региона выявлено злоупотребление алкоголем, табакокурение, нарушение питания с преобладанием жирной пищи, переедание. У части больных причиной поражения поджелудочной железы является патология билиарной системы.

Клинические проявления острого панкреатита весьма вариабельны, часто сочетаются с клиникой нарушений билиарной системы. Доминирующим симптомом являлся болевой с локализацией в эпигастральной области, опоясывающего характера или с иррадиацией в позвоночник, выраженной интенсивности. В общем анализе крови нейтрофильный лейкоцитоз, лимфопения,

ускорение СОЭ. Среди биохимических синдромов преобладали цитолитический и холестатический, отмечено увеличение уровня амилазы сыворотки крови, мочевины, креатинина, гипергликемия. При электрокардиографическом исследовании выявлены не специфические изменения в виде нарушения ритма и проводимости, признаки гипертрофии левого желудочка, нарушения процессов реполяризации миокарда.

Заключение. Изучение общей клинко-функциональной характеристики больных с острым панкреатитом, роли основных факторов риска имеет важное значение для ранней диагностики заболевания и своевременной коррекции факторов, влияющих на эффективность лечения.

Ключевые слова: ОП, факторы риска, клинко-лабораторные показатели, электрокардиографическое исследование

Introduction

Acute pancreatitis (AP) is one of the most common diseases of the digestive system, leading to physical and financial losses. The incidence of acute pancreatitis worldwide ranges from 4.9 to 73.4 cases per 100,000 people and has a marked upward tendency. Severe acute pancreatitis occurs in 15-20% of cases, with a high lethality – 25-45% [3, 4, 12, 15]. Moreover, developing pancreonecrosis from infectious complications has a lethality up to 85% [5, 9]. Early diagnosis of acute pancreatitis is very complex even at present. It is based on a thorough collection of history, objective physical data, laboratory tests, X-ray and CT scans. However, none of these items provide a reliable diagnostic result. Despite the large number of available laboratory and instruments tests, new methods are being developed to diagnose and assess the severity of acute pancreatitis.

The AP is an aseptic inflammation of demarcation type, which is based on the necrosis of the acidic cells of the pancreas and enzyme aggression followed by expanding necrosis and gland dystrophy, in which it is possible to damage surrounding tissues and remote organs, as well as systems and cause of secondary purulent infection [6].

The following etiological forms could be distinguished: Acute alcoholic and alimentary pancreatitis – 55%; Acute biliary pancreatitis (due to bile reflux to pancreatic ducts in biliary hypertension) – 35%; Acute traumatic pancreatitis (due to pancreatic trauma, including surgery or after ERP) – 2-4%; Other causes: autoimmune process, vascular insufficiency, vasculitis, drugs, infectious diseases, allergic factors, dishormonal process and diseases of nearby organs – 6-8% [6].

The leading role in toxemia pathogenesis in acute pancreatitis belongs to pancreatitis enzymes: trypsin, lipase, phospholipase - A2, lysosomal enzymes that cause oxidative stress, lipid stress syndrome, capillary thrombosis, hypoxia, acidosis, hypermetabolism, Damage to cell membranes and endothelia. Factors of aggression and organ dysfunction create a syndrome of «mutual burden» [14, 15].

Although the clinical pattern and morphological changes in the pancreas in acute pancreatitis have been described some 300 years ago, and in recent years various concepts of the etiology and pathogenesis of this disease have emerged and disappeared, A variety of treatment strategies are proposed and rejected.

The aim of the research is to analyze clinical-functional features and electrocardiographic data in patients with acute pancreatitis in the Smolensk region in order to optimize diagnosis, treatment and prevention of the disease.

Methods

In order to study clinical-functional features of acute pancreatitis in patients in the Smolensk region, 58 patients (42 men and 16 women) were examined in the surgical department of the regional clinical hospital at the age of 30-60 (average age 46.0±3.7). The duration of the disease was 35±5 days.

Diagnosis was based on anamnestic information, physical examination, laboratory test data (general and biochemical blood test, amylase serum and urine, general urine test, coprology study) and instrumental test (fibro gastroduodenoscopy, ultrasound examination and/or MRI/CT of abdominal organs, colonoscopy/rectoromanoscopy, electrocardiography). All patients in the hospital received traditional therapy (infusion, spasmolytic, antisecretory and antibacterial).

The statistical processing of the obtained results is carried out with the help of IBM SPSS Statistics 21 and includes calculation of average (M), standard average deviation (m), median (Me), minimum (min) and maximum (max) values.

Results of the study and their discussion

In the analysis of risk factors for acute pancreatitis, the pathology of bile pathways has been detected in 7 (12%) patients, and cholecystectomy was performed on 2 (3.8%) patients. In 14 (24%) patients – alcohol addiction syndrome. Alcohol abuse is recognized in the literature as the leading etiological factor in AP, which causes the main progression of the disease, which accounts for 55-80 % of all cases. The absolute quantity of ethanol with toxic effect [10] shall be decisive.

9 patients (15.5 %) reported smoking. In literature, smoking is considered one of the main causes of acute pancreatitis, increasing its risk by 25 %. It was noted that the risk of AP increases with the number of cigarettes smoked. However, the mechanisms for damaging the effects of tobacco smoke on the pancreas are not fully understood [10]. In 9 (15.5%) patients, acute pancreatitis was caused by eating disorders, eating fatty food, roasted, smoked food. Since these causes are avoidable risk factors for acute pancreatitis, their detection is important in the prevention of disease development and its exacerbation, as well as in the diagnosis of pancreatic lesions.

The clinical manifestations of acute pancreatitis are highly variable, depending on the clinical form of the disease, the stage, severity of the current, the presence of complications, the etiology of the process and other factors, which sometimes makes it difficult to diagnose pancreatic damage, which is often combined with a clinic of biliary disorders. The dominant symptom was pain. The intense pain in the epigastric region proper and in the left side of the bed was reported by 57 (98.2%) patients. The surrounding nature of the pain has been identified in 44 (75.9 %) patients. The irradiation of pain in the interblade space was indicated by 14 (41.3%) patients. There were 11 (18.9 %) patients who indicated that the pain was intermittent after three to four hours of meals. A total of 37 (64%) of patients complained of nausea, 12 (20.6 %) of patients vomited once, and 35 (60.3%) of patients vomited repeatedly. There was no relief after vomiting 42 (72.4%) of the patient.

The loss of appetite was registered by 25 (43.1%) patients, the disgust to fatty food was identified in 10 (17.2%) people. 10 (17,2%) patients had complained of dry mouth and 15 (25.8%) on bitterness in the mouth. The flatulence was noticed by 56 (96.5%) patients, and gas and stool retention were in 30 (51.7%) patients. However, stool disorder such as diarrhea was detected in 12 (20.6%) people. Strong general weakness was noticed in 55 (94.8%) patients.

During examination pale skin was in 13 (22.4%) patients, and moreover icterus skin and scleras was noticed in 13 (22.4%) patients. Such diagnostic symptoms as Mondor (purple spots on face), Grey-Turner (cyanotic stains on belly sides) and Grunwald (cyanosis of umbilical region) were indicated in 11 (19%), hemorrhage was in 2 (3.4%). All patients had dry and white tongue. In the case of palpation, the morbidity in the epigastric region itself was found in 45 (77.5%) of patients, in the right upper quadrant region in 5 (8.6%), and in the left upper quadrant region in 8 (13.7%). The symptoms of Kerte (transverse painful resistance of the anterior abdominal wall in pancreas projection) and Meio-Robson (severe pain in lumbar palpation, especially the left rib-vertebral angle) were found in 43 (74.1 %) and 36 (62 %). The tension of the anterior abdominal wall muscles and the symptom of Shchetkin-Blumberg - in 25 (43.1%) of patients, local abdominal swelling in the epigastric region - in 13 (22.4%) of patients. In percussion, a pronounced tympanic sound was observed due to paresis of the transverse colon in 31 (53%) cases. In auscultation, the weakening of the intestinal peristaltics as a manifestation of dynamic intestinal obstruction – in 30 (51.7%) cases. The results are consistent with literature on clinical manifestations of acute pancreatitis [6, 11]. Five (8.6%) of the patients had a pancreonecrose complication.

Pancreato-renal syndrome in the form of albuminuria, increased creatinine level, urea serum was detected in 28 (48.2%) patients. Pancreato-cardiovascular syndrome, accompanied by chest pain, heartbeat, tachycardia, and heart rate disorder, has been observed in 22 (37.9%) patients. Arterial hypertension is noted in 1 (1.7 %) of the patient and hypotension in 13 (22.4%) of the patients.

According to the results of an ultrasound examination of the abdominal organs, an increase in the size of the pancreas in 31 (53.4%) of the patient, diffuse changes in pancreatic parenchyma, and a decrease in the echogenicity – 49 (84.5%) of the patients has been detected. Roughness, deformity of the contours of the organ in 52 (89.7%) of the patients, and cyst of pancreas were in 3 (5.1%) of the patients examined. According to the ultrasound, the gallbladder was moderately enlarged, usually the contents are heterogeneous, and the walls are thickened in 10 patients (17.2%). Elongation of the gall bladder with inflection was detected in 8 (13.7%) patients.

In MRI/MCT/CT tests conducted in 18 (31%) patients: pancreas enlarged in size in the area of the head, fracture of structure was disturbed, wirsung's duct was not dilated. Parapancreatic and paragastric cellular tissues in the area of the head were fatigue, heavy. General blood test data and biochemical indicators for patients with acute pancreatitis are listed in the table. 1-4.

Table 1. Result of CBC of patients with acute pancreatitis before treatment

Indicator	Standart	Valid	M±m (average ±deviation)	Mediana (Me)	Minimum (min)	Maximum (max)
WBC	4,0-9,0×10 ⁹ /l	52	13,66±0,86	13,1	2,9	28
RBC	3,8-5,5×10 ¹² /l (f)	16	4,45±0,85	4,69	2	5,56
	4,3-6,2×10 ¹² /l (m)	36	4,38±0,91	4,16	3,04	6,5
HGB	120-140 g/l	52	139,25±4,07	134	74	193
	120-160 g/l (f)	16	140,56±25,2	137,5	74	190
	130-180 г/л (m)	36	138,67±31,37	129	90	193
HCT	35-45% (f)	16	41,65±7,27	42,9	21	52,7
	39-49% (m)	36	40,67±8,96	38,45	28,5	59,9
MCV	80-100 (fL)	52	93,27±0,97	92,3	69,2	105
MCH	26-34 г (pg)	52	31,97±0,47	31,8	20	37
MCHC	30-370 (g/l)	52	339,85±2,52	344	288	384
PLT	180-320×10 ⁹ /l	52	173,46±11,46	175	9	477
MXD%	5-10 %	8	7,61±0,57	8	5,1	8,9
LYM%	25-40 %	52	14,77±1,29	10,9	4,5	36
NEUT%	47-72%	17	78,56±2,45	81,4	61,7	90,2
MXD#	0,2-0,8×10 ⁹ /l	8	1,01±0,12	0,9	0,7	1,4
LYM#	1,2-63,0×10 ³ /μl	52	1,67±0,12	1,4	0,5	4
NEUT#	2,0-5,5×10 ⁹ /l	17	11,84±1,08	13	5	18,7
RDW-SD	39,0-46,0	17	48,36±1,01	47,2	45,4	61,8
RDW-CV	11,6-14,0	17	13,67±0,19	13,3	12,2	18,2
PDW	15,0-17,0	52	17,43±0,32	17,85	12,4	21,7
MPV	7,0-11,0	52	8,47±0,21	8,4	5,2	12,6
P-LCR	13-43 %	8	27,21±0,83	26	25,9	0,03
PCT	0,16-0,33	52	0,15±0,01	0,15	0,03	0,27
Sed rate	0-20 mm/h (f)	18	23,1±4,42	15	5	67
	0-15 mm/h (m)	36	25,22±3,4	18	3	70

Analysis of laboratory tests showed signs of cytolysis (increased activity of ALT, ACT, GGT), manifestations of cholestatic syndrome (increased activity of alkaline phosphatase, level of general and direct bilirubin, cholesteroline), increase in level of amylase in 42 (72.4%) patients.

Table 2. Result of CBC of patients with acute pancreatitis after treatment

Indicator	Standart	Valid	M±m (average ±deviation)	Mediana (Me)	Minimum (min)	Maximum (max)
WBC	4,0-9,0×10 ⁹ /l	57	11,85±0,89	9,5	4,5	33,5
RBC	3,8-5,5×10 ¹² /l (f)	16	4,18±0,76	4,46	2,01	4,9
	4,3-6,2×10 ¹² /l (m)	40	4,3±0,9	4,41	1,46	6,5
HGB	120-140 g/l	57	132,1±4,08	130	50	193
	120-160 g/l (f)	16	38,5±7,18	40,3	20	50,7
	130-180 г/л (m)	41	38,17±11,3	37,5	0,39	59,9
HCT	35-45% (f)	57	90,02±1,98	92,1	67,6	107,4
	39-49% (m)	57	29,74±0,89	31	20	36,5
MCV	80 - 100 (fL)	57	293,65±14,17	334	29,9	361
MCH	26-34 г (pg)	57	236,91±15,1	228	32	583
MCHC	30-370 (g/l)	7	7,71±2,17	8	0,06	18,9
PLT	180-320×10 ⁹ /l	37	16,65±1,71	12,9	0,2	40,6
MXD%	5-10 %	14	66,33±8,29	83,45	0,75	90,2
LYM%	25-40 %	8	3,04±1,54	0,9	0,4	12,4
NEUT%	47-72%	47	1,75±0,14	1,6	0,5	4,9
MXD#	0,2-0,8×10 ⁹ /l	15	10,69±1,68	13,7	2,7	18,7
LYM#	1,2-63,0×10 ³ /μl	18	42,66±4,34	47,25	14	65,6
NEUT#	2,0-5,5×10 ⁹ /l	42	14,35±0,92	13,6	0,12	49
RDW-SD	39,0-46,0	45	17,49±0,29	17,8	12,3	21,7
RDW-CV	11,6-14,0	48	8,19±0,29	8,4	5,2	12,6
PDW	15,0-17,0	7	26,85±4,64	31	0,25	36
MPV	7,0-11,0	46	0,17±0,101	0,15	0,0014	0,35
P-LCR	13-43%	18	12,56±4,78	12	5	24
PCT	0,16-0,33	36	13,36±7,3	12,5	3	26
Sed rate	0-20 mm/h (f)	57	11,85±0,89	9,5	4,5	33,5
	0-15 mm/h (m)	16	4,18±0,76	4,46	2,01	4,9

Hyperglycemia, hypoproteinemia, hypoalbuminemia, increased C-reactive protein as a manifestation of systemic inflammatory response syndrome [2, 8], increased creatinine, urea. After treatment, the levels of cytolytic, cholestase, glucose and amylase decreased slightly.

The above data indicate that patients with acute pancreatitis, who has just been admitted to the hospital, have neutrophilic leukocytosis, lymphopenia in general blood test, which has retained and after treatment, but with a lower extent. The sed rate accelerated before treatment, but after treatment within normal values.

Table 3. Result of biochemical blood test of patients with acute pancreatitis before treatment

Indicator	Standart	Valid	M±m (average ±deviation)	Mediana (Me)	Minimum (min)	Maximum (max)
Glucose	3,5-6,4 (mmol/l)	50	9,52±0,68	7,9	5,2	28,3
Bilirubin general	6,8-20,5(μmol/l)	58	45,2±7,97	20,35	7	235,8
Bilirubin direct	1,7-4,5 (μmol/l)	29	53,78±8,84	34,6	0,7	144,2
Bilirubin indirect	1,7-17 (μmol/l)	27	27,24±5,34	12,4	8,7	91,6
Creatinine	39-111 (μmol/l)	51	131,56±15,5	106	41	628
Cholesterol	3,6-5,2 (μmol/l)	8	6,49±0,77	5,5	5,5	9,57
General protein	65-85 (g/l)	49	61,2±1,54	64	37	87
ALT	<40 IU/L	51	89,25±15,57	57	1	512
AST	<40 IU/L	50	156,72±29,03	87,5	23	1027
GGT	5-55 IU/L	48	231,1±44,42	86	21	1482,8
AP	32-120 IU/L	47	130,93±18,94	91	41	805
Amylase	22-100 IU/L	45	561,55±70,22	411	57	2144
Albumine	35-52 (g/l)	19	28,19±1,53	27	20	38
CRP	0-10	2	24,26±23,54	24,26	0,72	47,8
Urea	2,9-8,3 (mmol/l)	45	8,09±0,91	6,5	2,4	32,8

Table 4. Result of biochemical blood test of patients with acute pancreatitis after treatment

Indicator	Standart	Valid	M±m (average ±deviation)	Mediana (Me)	Minimum (min)	Maximum (max)
Glucose	3,5-6,4 (mmol/l)	50	7,81±0,64	6,5	1,7	20,4
Bilirubin general	6,8-20,5 (μmol/l)	58	24,25±5,42	11	6	235
Bilirubin direct	1,7-4,5 (μmol/l)	29	41,84±12,71	27	6,8	160
Bilirubin indirect	1,7-17 (μmol/l)	27	22,34±6,5	14,2	0,3	91,6
Creatinine	39-111 (μmol/l)	51	139,58±21,78	80	4,3	721
Cholesterol	3,6-5,2 (μmol/l)	8	8,29±4,16	5,1	2,9	74
General protein	65-85 (g/l)	49	65,3±1,49	66	37	86
ALT	<40 IU/L	51	64,57±9,87	40,5	1	326
AST	<40 IU/L	50	104,49±19,7	49	14	730
GGT	5-55 IU/L	48	152,31±23,02	84	14	709
AP	32-120 IU/L	47	117,98±11,89	93	47	420
Amylase	22-100 IU/L	45	381,4±82,62	133	25	2144
Albumine	35-52 (g/l)	19	31,44±2,14	32	20	52
CRP	0-10	3	61,23±26,03	14,9	0,72	186,4
Urea	2,9-8,3 (mmol/l)	45	7,69±1,36	3,9	1,9	38,3

In order to study the presence of a polyorgan dysfunction, especially from the side of the cardiovascular system, which at different frequencies, according to literature, is found in patients with acute pancreatitis. An analysis of electrocardiograms (ECGs) of patients was carried out (table 5). The EKG was recorded in all 12-leads at 50 mm/s. The QT interval, reflecting the duration of the heart muscle repolarization processes, was measured from the onset of depolarization, the QRS complex, to the end of the T wave when returning to isolation. The elongated interval of QT, which is the predictor of the development of ventricular rhythm disorders, was considered to be from 0.44 s.

On the cardiovascular side, according to the ECG, various changes were observed: tachycardia in 26 (44.5%) patients, bradycardia in 2 (3.4 %) patients, arrhythmia in 3 (5.1%) patients, and deviation of the electrical axis of the heart (EAH) on the left in 12 (20.6%) patients. An acceleration of atrioventricular conduction has been found in 3 (5.1%) patients. Blockages of the legs of the Gisa beam have been found:

partial blockage of the left leg of the Gisa beam in 6 (10.3 %) patients, complete blockage in 12 (20.6%), incomplete blockage of the right leg of the Gisa beam in 4 (6.8%) patients, complete blockage in 4 (6.8%).

Table 5. Result of ECG reasearch of patients with acute pancreatitis

Indicator	Standart	Valid	M±m (average ±deviation)	Mediana (Me)	Minimum (min)	Maximum (max)
Heart rate	58	60-90	96,46±3,21	99	58	150
PQ (s)	49	≤0,2	0,11±0,007	0,12	0,03	0,2
QRS (s)	49	≤0,1	0,11±0,05	0,1	0,04	0,2
QT (s)	49		0,34±0,007	0,34	0,24	0,46

Signs of left ventricle hypertrophy, according to EKG, were observed in 9 (15.5%) patients. More frequently observed changes in the ST segment and the T tooth (flattened, negative) were observed, indicating non-specific changes in the myocardial repolarization process. There are various explanations in the literature for cardiovascular disorders in pancreatitis, particularly changes in electrocardiography. This may be related to both the toxicity to myocardium of pancreatic enzymes and electrolytic imbalance, as well as associated cardiac pathology.

Conclusions

The study of the general characteristics of patients with acute pancreatitis and the role of the main risk factors is important for the early diagnosis of the disease and the timely correction the factors influencing the effectiveness of treatment. The dominant clinical symptom of patients of the Smolensk region is currently pain with localization in epigastric, encircling character or with irradiation in the spine, with high intensity, arising 3-4 hours after food. More comon syndromes – pancreaticovascular and pancreaticorenalis. CBC shows neutrohilic leucocytosis, lymphopenia, EOF acceleration. Among the biochemical syndromes cytolytic and cholestatic are prevalent, also there has been an increase of the amylase, urea, creatinine and hyperglycemia.

In ECG reseaches are not detected any specific changs in rhythm and conductivity disorders, signs of hypertrophy of the left ventricle, disorders of the repolarisation of miocard. The risk factors of development of acute pancreatitis in patients of the Smolensk region remain alcohol abuse, smoking, eating disorder with dominance of fatty food, overeating, biliary system pathology. By drawing the attention of patients and relatives to the risk factors and clinical manifestations of the disease, it is possible to promote the secondary prevention of pancreatic lesions, prevent or at least slow down progression of the disease and complications. It is possible because of persuading patients of the toxicity of alcohol, nicotine, increase patients' commitment to strict observance of diets and diets, as well as treatment schemes.

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Информация об авторах

Карук Марина Валентиновна – студентка ФГБОУ ВО «Смоленский государственный медицинский университет» Минздрава России. E-mail: mariybanenis@mail.ru

Баненис Мария Гинтасовна – студентка ФГБОУ ВО «Смоленский государственный медицинский университет» Минздрава России. E-mail: mariybanenis@mail.ru

Иванишккина Елена Владимировна – доктор медицинских наук, доцент, заведующий кафедрой пропедевтики внутренних болезней ФГБОУ ВО «Смоленский государственный медицинский университет» Минздрава России. E-mail: elena_ivanishkina@mail.ru

Родин Антон Викторович – кандидат медицинских наук, доцент кафедры общей хирургии с курсом хирургии ФДПО «Смоленский государственный медицинский университет» Минздрава России. E-mail: doc82@yandex.ru

Царева Валентина Михайловна – доктор медицинских наук, профессор кафедры терапии, ультразвуковой и функциональной диагностики ФДПО ФГБОУ ВО «Смоленский государственный медицинский университет» Минздрава России. E-mail: elena_ivanishkina@mail.ru

Information about the authors

Karuk Marina V. – Student of the Smolensk State Medical University of the Ministry of Health of Russian Federation. E-mail: mariybanenis@mail.ru

Maria Gintasovna B. – Student of the Smolensk State Medical University of the Ministry of Health of Russian Federation. E-mail: mariybanenis@mail.ru

Ivanishkina Elena V. – Doctor of Medical Sciences, Associate Professor, Head of the Department of Propaedeutics of Internal Diseases of the Smolensk State Medical University of the Ministry of Health of the Russian Federation. E-mail: elena_ivanishkina@mail.ru

Rodin Anton V. – Candidate of Medical Sciences, Associate Professor of the Department of General Surgery with the course of Surgery of the Smolensk State Medical University of the Ministry of Health of the Russian Federation. E-mail: doc82@yandex.ru

Tsareva Valentina M. – Doctor of Medical Sciences, Professor of the Department of Therapy, Ultrasound and Functional Diagnostics of the FSUE of the Smolensk State Medical University of the Ministry of Health of the Russian Federation. E-mail: elena_ivanishkina@mail.ru

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