Clinical and laboratory indicators in patients with infected pancreatic necrosis against the background of diabetes mellitus

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ANNOTATION: In the scientific thesis, the authors analyze the clinical and laboratory indicators of 62 patients with infected pancreatic necrosis (IPC) against the background of diabetes mellitus (DM). The conducted studies showed that in the first phase of infected pancreatic necrosis in patients with diabetes mellitus, a pronounced increase in inflammatory markers and organ dysfunction was noted in the interval from 1 day to 3 days of the disease. In the second phase of IPN in patients with diabetes, a slow decrease in the early inflammatory response and a slowdown in the trend towards clinical improvement were observed, which was important for justifying a personalized approach.

KEYWORDS: Infected pancreatic necrosis, diabetes mellitus, personalized approach, surgical treatment.

Клинико-лабораторные показатели у больных с инфицированным панкреанекрозом на фоне сахарного диабета

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АННОТАЦИЯ: В научном тезисе авторы анализируют клинико-лабораторные показатели у 62 больных с инфицированным панкреанекрозом (ИПН) на фоне сахарного диабета (СД). Проведенные исследования показали, что при первой фазе инфицированного панкреанекроза у больных с наличием СД отмечалось выраженные нарастания воспалительных маркеров и органной дисфункции в интервале от 1 суток до 3 дня заболевания. При второй фазе ИПН у больных с СД наблюдалось медленное снижение раннего воспалительного ответа и замедление тенденции клинического улучшения, что имело важное значение для обоснования персонализированного подхода.

КЛЮЧЕВЫЕ СЛОВА: Инфицированный панкреанекроз, сахарный диабет, персонализированный подход, хирургическое лечение.

Relevance. Choosing optimal surgical tactics for infected pancreatic necrosis (IPN) in patients with diabetes mellitus (DM) remains one of the most complex and controversial issues in abdominal surgery. In this category of patients, early surgical intervention can provoke the progression of multiple organ failure (MRP), while delayed rehabilitation often leads to the generalization of infection and the development of sepsis. In the last two decades, there has been a shift in the paradigm of surgical treatment of infected pancreatic necrosis (IPN) towards minimizing trauma from early laparotomy and necrosequestrectomy - to the phased use of transcutaneous drainage, video-necrosequestrectomy, and endoscopic methods.

The purpose of the study was: To study the dynamics of clinical and laboratory indicators in patients with infected pancreatic necrosis against the background of diabetes mellitus.

RESEARCH MATERIALS AND METHODS

The clinical material of the study was formed based on observations of 62 patients with TPI against a background of diabetes mellitus who were undergoing treatment between 2012 and 2018. The study was conducted at the RSCEMC Andijan branch.

General clinical and laboratory research methods were used. Instrumental research methods were used to confirm the diagnosis of pancreatic insufficiency, to clarify the extent and extent of pancreatic (PAS) damage, its retroperitoneal and parapancreatic tissues, and to dynamically assess the course of the pathological process.

Results and their discussion.

Dynamic observation of the clinical condition of patients with TPI against the background of diabetes mellitus allowed us to establish a sequence of progression and change in the severity of the systemic inflammatory response (SIR) against the background of standard therapy. Upon admission, most patients exhibited signs of a pronounced inflammatory response. The proportion of patients with ≥2 criteria for systemic inflammatory response syndrome (SVRS) was 64.5%, and almost 1/3 of patients demonstrated 3 or 4 signs of SVRS (29%). On the 1st day of treatment, the structure of the indicators shifted towards a further intensification of the systemic reaction, which was expressed in an increase in the proportion of patients with ≥2 signs of CVSR to 74.2% (46 patients) and an increase in severe variants of CVSR to 38.7%.

On the 3rd day of treatment, the inflammatory activity reached its maximum, and the number of patients with 3 or 4 signs of CVSR increased to 48.4% (30 cases).

Temperature indicators were characterized by a similar dynamic, and at the time of patients' admission to the clinic, febrile fever ≥38.5 °C was detected in 58.1% of patients, and on the 1st day, this indicator increased to 64.5%, followed by an increase

to 69.4% on the 3rd day of treatment. Only after 5 days did the proportion of patients with such a level of hyperthermia gradually decrease, indicating a delayed clinical response despite the measures taken. Temperature normalization within the range of ≤37.5 °C was observed in only 12.9% of patients upon admission and remained a rare phenomenon for up to 5 days. Only by day 10 did the proportion of patients with normal temperature values reach 45.2%, which indicated that some patients gradually entered the stabilization phase.

The pain syndrome also tended to be persistent in the early stages, with 67.7% of patients, upon admission to the clinic, assessed the pain as ≥7 points according to VAS. On the 1st day, the value practically did not change, remaining above 70%. On the 3rd day, the proportion of patients with severe pain began to decrease, however, the indicator remained high and amounted to 64.5%. The absence of a noticeable decrease in pain compared to the previous day was observed in 74.2% of patients on the 1st day and 80.6% on the 3rd day. This ratio reflected the slow regression of pain syndrome characteristic of PBI, especially in patients with DM.

Hemodynamic indicators exhibited a more moderate, but persistent dynamic, among which hypotension was noted in 19.4% of patients upon admission and reached its maximum on the 3rd day, constituting 30.6%. By day 5, the proportion of patients with hypotension gradually decreased, and similarly, the frequency of tachycardia exceeded 100 beats/min in 54.8% of patients upon admission and increased to 66.1% on day 3, which was consistent with the severity of the systemic reaction at this stage.

Perfusion indicators also showed deterioration in the early stages, among which oliguria was recorded in 1⁄4 of patients on the 1st day of treatment and reached 33.9% by the 3rd day, after which it gradually decreased.

Symptoms of respiratory failure also showed an increase by the 3rd day, and if they were recorded in 32.3% of patients upon admission, then on the 3rd day this indicator reached 43.5%. Such changes were often combined with fever, tachycardia, and increased pain syndrome, forming a clinical picture requiring more careful observation. At the same time, impaired consciousness was less common, however, the tendency to increase by the 3rd day remained, reaching 16.1%. This sign was usually accompanied by a combination of hemodynamic instability and a pronounced inflammatory response.

Assessment of the response to antibacterial therapy (ABT) in dynamics showed a slow regression of clinical manifestations. The absence of a satisfactory response in the form of persistent pain syndrome and fever was noted in 54.8% of patients upon admission, and on days 1-3 the indicator increased to 64.5% and 71% respectively. Only by the 10th day did the proportion of such observations decrease to 1⁄4 of patients.

Overall, the dynamics of clinical indicators demonstrate that in patients with IUI against a background of diabetes mellitus, the maximum severity of the systemic

inflammatory response is observed in the interval between 1 and 3 days, and stabilization signs become noticeable only after 7 days of treatment. Such a structure of changes emphasizes the slow onset of clinical improvement and the stability of the early phase of the inflammatory response, which creates an unfavorable background for decision-making on management tactics and forms the basis for analyzing laboratory and morphological data.

Dynamic observation of laboratory parameters in patients with IUI against a background of diabetes allowed us to assess the depth of VVR, the degree of organ dysfunction, and the influence of hyperglycemia on the course of IUI. At the time of patients' admission to the clinic, the main markers of CVR were at high values, which corresponded to pronounced clinical symptoms. Leukocytosis reached 15.2±3.1 $x10^9$/l, and LII exceeded 5 units. (5.1±1.0 units), which indicated an active process of pancreatic tissue destruction. Already on the 1st day of therapy, there was a further increase in the intensity of the inflammatory response. Leukocytes increased to 16.3±3.4 $x10^9$/l, LII reached 5.6±1.1 units, reflecting the continued involvement of systemic mechanisms of inflammatory response.

The maximum severity of the laboratory profile of CVR occurred on the 3rd day of conservative treatment. During this period, the concentration of C-reactive protein (CRP) increased to 255.1±57.2 mg/l, and the level of procalcitonin (PCT) averaged 5.6±2.1 ng/ml. The obtained values well corresponded to the clinical picture, in which the highest indicators of hyperthermia, tachycardia, and the number of CVD signs were observed.

By day 5, moderate stabilization of inflammatory indicators occurred in most patients, among which leukocytes decreased from 17.5±3.6 $x10^9$/l to 16.8±3.5 $x10^9$/l, CRP decreased to 243.2±49.7 mg/l, and PCT levels began to regress to 5.1±1.9 ng/ml. Despite gradual improvement, these figures remained high, reflecting the persistent inflammatory activity in TPI in patients with diabetes mellitus. Only after 7 and especially 10 days, a more pronounced decrease in the main markers of inflammation was noted, which coincided with a decrease in the frequency of febrile temperature and a decrease in pain syndrome.

Carbohydrate metabolism indicators demonstrated their own dynamics, when the average glucose level at the time of patients' admission to the clinic was 11.8±2.4 mmol/l, and on the 1st and 3rd days, a tendency to increase persisted, reaching 12.8±2.8 mmol/l. Such hyperglycemic resistance was observed in most patients and was often combined with the need to intensify insulin therapy.

Kidney functional indicators also changed parallel to the inflammatory phase of the disease, with creatinine levels at the time of admission (on the zero day) being 112±28 μmol/l and increasing to 138±36 μmol/l on the 3rd day, which corresponded to the frequency of oliguria episodes presented above. On the 5th and subsequent day, a

gradual decrease in creatinine levels was observed, reflecting the beginning of kidney function restoration in most patients.

The functional state of the liver in the early stages of treatment of patients showed a moderate deterioration, among which total bilirubin increased from 24.3±8.1 to 32.4±11.3 μmol/l by the 3rd day, AST and ALT showed similar dynamics with a peak on the 3rd day, reflecting the hepatobiliary system's response to systemic inflammation and decreasing only by the 10th day. Along with this, pancreatic enzymes showed a gradual decrease, in particular, amylase decreased from 580.7±160.2 to 300.2±86.7 U/l, lipase - from 780.5±67.4 to 380.4±42.8 U/l by day 10. This dynamic characterizes the natural process of decreasing enzymatic activity against the background of pancreatic tissue destruction and is not a specific diagnostic marker in the late period of PIP. Fibrinogen reached its maximum on the 3rd day and then decreased, while lactate increased to 3.1±0.9 mmol/l on the 3rd day, after which it began to decrease. Endotoxemia remained consistently elevated until the 5th day and regressed only by the 10th day. Overall, coagulation indicators and endotoxemia markers exhibited a characteristic profile.

Conclusion. Thus, the dynamics of laboratory indicators emphasizes the two-phase nature of TPI in patients with DM. The first phase was characterized by a pronounced increase in inflammatory markers and organ dysfunction between 1 day and 3 days of the disease. The second phase manifested as a slower decrease in these indicators, which was observed only after 7 days. Such a structure of changes confirms the resistance of the early inflammatory response and the slow formation of a tendency towards clinical improvement, which is important for subsequent analysis of morphological changes and justification of the need for a personalized approach.

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