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КЛИНИКО-ИНСТРУМЕНТАЛЬНЫЕ ОСОБЕННОСТИ ОСТРОЙ СПАЕЧНОЙ ТОНКОКИШЕЧНОЙ НЕПРОХИДИМОСТИ

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✓ ***Резюме***

Инструментальные методы визуализации в условиях неотложной хирургии позволяют не только подтвердить факт непроходимости, но и опосредованно оценить тяжесть течения, потенциальную необратимость и угрозу ишемии, что делает указанные параметры неотъемлемой частью прогностической модели стратификации риска острой спаечной тонкокишечной непроходимости

Ключевые слова: острая спаечная тонкокишечная непроходимость, клинико-инструментальные исследования, неотложная абдоминальная хирургия

O‘TKIR CHANDIQLI INGICHKA ICHAK TUTILISHINING KLINIK VA INSTRUMENTAL XUSUSIYATLARI

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✓ ***Rezyume***

Shoshilinch jarrohlik sharoitida instrumental vizualizatsiya usullari nafaqat ichak tutilishi faktini tasdiqlaydi, balki bilvosita jarayon kechishining og'irligini, potentsial qaytarib bo'lmaydigan ishemiya xavfini baholaydi, bu esa ushbu parametrlarni o'tkir chandiqli ingichka ichak tutilishida xavfni stratifikatsiya qilish uchun bashoratlash modelning ajralmas qismiga aylantiradi

Kalit so‘zlar: o‘tkir chandiqli ingichka ichak tutilishi, klinik-instrumental tekshiruv, shoshilinch abdominal jarrohlik

CLINICAL AND INSTRUMENTAL FEATURES OF ACUTE ADHESIVE SMALL BOWEL OBSTRUCTION

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✓ ***Resume***

Instrumental imaging methods in emergency surgery allow not only to confirm the fact of obstruction, but also to indirectly assess the severity of the course, potential irreversibility and the threat of ischemia, which makes these parameters an integral part of the prognostic model for stratifying the risk of acute adhesive small intestinal obstruction

Key words: acute adhesive small intestinal obstruction, clinical and instrumental studies, emergency abdominal surgery

Relevance

Acute adhesive small bowel obstruction (ASBO) remains one of the most pressing problems of emergency abdominal surgery. High recurrence rate, significant proportion of complicated course, as well as difficulties in early diagnosis and choice of treatment tactics determine the need for in-depth analysis of clinical, instrumental and immunological parameters in such patients (1,3,5,10,12,14). Clinical manifestation of ASBO can vary significantly depending on the form of the disease, duration of the adhesive process, volume of previous interventions and presence of concomitant pathology. At the same time, clinical and diagnostic characteristics at the stage of admission do not always allow confidently differentiating a potentially resolving form from a progressive one with risk of strangulation or perforation. This determines the importance of a comprehensive clinical and instrumental assessment (2,4,6,7,8,16,17,18,22).

The results of instrumental studies such as radiography, ultrasound scanning, computed tomography, and in some cases laparoscopy allow us to clarify the localization and severity of the adhesion process, determine the degree of dilation of intestinal loops, the presence of peristaltic activity and free fluid. However, even when using modern methods, there are borderline cases that require reliance on additional criteria, including laboratory and immunological ones (9,11,13,15,19,20,21). To study the clinical and instrumental features of acute adhesive small intestinal obstruction**.**

Materials and methods

The clinical and instrumental characteristics of the examined patients with various forms of OSTKN are presented. The analysis allows us to establish relationships between immune parameters and features of the clinical course of the disease, which is important both for prognosis and for substantiating approaches to pathogenetic therapy**.**

Parallel comparison of clinical observations, anamnestic factors and instrumental signs with treatment outcomes allowed us to conduct an exploratory analysis in order to identify predictors associated with an unfavorable course of the disease. This approach became the methodological basis for the subsequent statistical construction of a risk stratification model and determination of immunologically relevant indicators that are important when choosing the directions of pathogenetic therapy. The control group included 56 patients with OSTKO who received standard complex therapy without the use of immunomodulatory drugs. In accordance with the clinical tactics, two subgroups were identified within the group: control-1 (n = 35; 62.5%) - patients whose intestinal obstruction resolved against the background of conservative therapy, and control-2 (n = 21; 37.5%) - patients who underwent emergency or urgent surgery due to the lack of effect from conservative measures or the presence of a complicated course of the disease. This division made it possible to differentiate the clinical, instrumental and immunological features of the course of OSTKN depending on the treatment tactics.

Results and discussions

Analysis of the complaint structure in patients of the control group with OSTKN allowed us to identify key clinical and symptomatic features that distinguish non-operated patients from those who required emergency surgery.

A total of 299 clinical complaints were recorded, of which about 56% (168 units) were in the subgroup of non-operated patients, and 44% (131 units) were in operated patients. Despite the smaller absolute number of patients in the latter subgroup, the total symptomatic load per patient was significantly higher: on average, 29.2% more complaints per patient (p=0.004), indicating a more severe clinical picture. A number of complaints were encountered with comparable frequency in both subgroups, primarily abdominal pain syndrome and bloating, reflecting the universality of these symptoms in any form of intestinal obstruction. However, such symptoms as lack of stool and gas passage, as well as vomiting, were more often observed in operated patients. Their frequency exceeded similar indicators in non-operated patients by 23.5% and 15.3%, respectively (p=0.019 and p=0.041). The proportion of these complaints among the total number of requests ranged from 2/3 to 3/4 of cases, which indicates their significance as clinical indicators of a progressive obstructive process.

The most pronounced differences were recorded for the so-called "predictors of decompensation", including systemic manifestations of inflammation and intoxication. Thus, complaints of fever were observed in operated patients 3 times more often than in non-operated patients (p = 0.002), and the symptom complex, including dry mouth, thirst and oliguria, occurred 2.1 times more often (p = 0.008). Their specific contribution amounted to, respectively, about 2/3 and more than half of the total number of complaints for each of these positions. A similar pattern was noted for complaints of repeated vomiting with bile: it occurred in operated patients 2.2 times more often than in those who were successfully treated conservatively (p = 0.015). Thus, the obtained results confirm that some symptoms, although they do not have absolute prognostic value, but with their cumulative increase, especially in combination with signs of a systemic reaction (fever, intoxication, hypersecretory vomiting) can indirectly indicate an unfavorable course and the need for surgical intervention. These data served as a starting point for the inclusion of clinical criteria in the multifactorial risk stratification scale developed in the following section.

Distribution of patients in the control group by duration of pain syndrome revealed significant differences between the subgroups of operated and non-operated patients. Almost every time category presented in the table has different prognostic value depending on the frequency of its occurrence in a particular clinical subgroup, despite comparable shares in the "total" column. Thus, more than two thirds (23 out of 35, or 65.7%) of non-operated patients were admitted within the first 12 hours from the onset of pain syndrome, while among the operated patients there were only 3 out of 21 (14.3%), i.e. almost 4.6 times less often (p=0.003). It is noteworthy that the "<6 hours" category, which made up 1/5 of the total sample (19.6%), in the overwhelming majority of cases (91%) belonged to patients treated conservatively. On the contrary, pain lasting more than 48 hours was observed exclusively in those who underwent surgery (28.6%), while their proportion among the total number of patients in this time group was 100% (p <0.001).

Special attention should be paid to the comparison of the 13-24 hour and 25-48 hour categories, each of which covered 21.4% of the entire sample (12 people). Despite the identical specific weight, the internal structure of these categories turned out to be fundamentally different. Thus, in the 13-24 hour interval, non-operated patients prevailed (8 out of 12, 66.7%), while in the 25-48 hour interval, on the contrary, operated patients prevailed (8 out of 12, also 66.7%). Thus, the same incidence in the population conceals a diametrically opposite prognostic load, which emphasizes the need to interpret such data in the context of the clinical outcome, and not in isolation.

To summarize, it can be stated that the duration of pain syndrome over 24 hours serves as a significant prognostic indicator of the surgical course of OSTKN. In more than half of the patients who underwent emergency surgery, the pain persisted for more than a day, while in the subgroup of non-operated patients this threshold was practically not exceeded. This indicator can be considered as an indirect criterion of a progressive adhesive obstructive process, which forms the pathophysiological basis for deterioration of motor skills, increasing intoxication and, as a consequence, decompensation of the disease. The obtained results justify the inclusion of the criterion of pain syndrome duration >24 hours in the prognostic risk stratification scale.

One of the pathognomonic signs of OSTKO is the cessation of the passage of intestinal contents and gases. Analysis of the duration of this symptom in the control group showed significant differences in the structure of the indicator between the operated and non-operated patients. These differences were not only quantitative, but also qualitative, which gives grounds to consider this parameter as a potential marker of a severe course. Thus, more than half of the non-operated patients (18 out of 35, or 51.4%) sought medical help within the first 12 hours from the moment of cessation of stool and gases. Among the operated patients, such dynamics were extremely rare: only 2 out of 21 patients (9.5%), which is 5.4 times less often (p = 0.001). This may indicate that early decompensation of motor function and rapid development of symptoms are more often characteristic of reversible, functional forms of OSTKO. On the contrary, time intervals over 24 hours were significantly more typical for the subgroup of patients who underwent emergency surgery. Thus, the duration of absence of stool from 25 to 48 hours was recorded in every third operated patient (33.3%), which is 2.3 times more often than among those who did not undergo surgery (p=0.026). An even more pronounced difference was observed in the group of patients with symptoms persisting for more than 48 hours: only in those who underwent surgery (7 out of 21, 33.3%), while in the group treated conservatively,

such cases were not registered (p<0.001). The share of this category was almost 1/5 of the entire sample, demonstrating the extreme degree of intestinal obstruction.

The 13-24 hour category deserves special attention, as it was quantitatively comparable in both subgroups (approximately 25% of the subgroup), but its weight in the general population (26.8%) does not reveal any differences without taking into account the clinical context. Among those not operated, it often represented a phase of reversible motility slowdown, while in those operated, it was a stage of increasing decompensation before admission. Thus, data on the duration of absence of stool and gases revealed a clear correlation between the prolongation of symptoms and the likelihood of the need for surgical intervention. A duration of more than 24 hours can be considered a functionally significant criterion and justification for earlier immunological risk stratification. The obtained results support the inclusion of this parameter in the structure of a comprehensive prognostic scale, along with other time and laboratory-instrumental markers of severe course of OSTCN.

Objective signs recorded during the initial examination of patients with OSTCN play a key role in making a decision on urgent surgical tactics. Analysis of the four most significant clinical and physical parameters revealed reliable differences in their frequency between the subgroups of patients in the control group, which confirms their prognostic value. Thus, an increase in body temperature above 38.0 ° C, as a sign of a systemic inflammatory reaction, was detected in almost half of the operated patients (47.6%), while among non-operated patients this indicator was only 14.3%, i.e. it was 3.3 times less common (p = 0.008). In the total sample, fever was recorded in 15 patients, of which 2/3 belonged to the operated subgroup, emphasizing its differentiating significance.

The gap was even more pronounced in terms of tachycardia over 100 bpm: it occurred in more than half of the operated patients (61.9%), but only in every fifth unoperated patient (22.9%) - 2.7 times less often (p = 0.004). Of the 21 patients with tachycardia in the overall group, more than 60% were operated, which allows us to consider this indicator as a marker of the hemodynamic response to inflammation or the initial phase of hypovolemia. The analysis of the surgical history deserves special attention: the presence of two or more abdominal interventions in the anamnesis was detected in almost 3/4 of the operated patients (71.4%), while among the unoperated this indicator was only 28.6%, that is, it was 2.5 times lower (p = 0.002). This emphasizes the important role of repeated operations in the formation of a pronounced adhesive process that can lead to resistant obstruction.

The most significant difference was noted for the symptom of peritoneal irritation, which was detected in 66.7% of those who underwent surgery, versus 8.6% of those who did not, i.e. almost 8 times more often (p <0.001). Of the 17 patients with this symptom in the entire sample, 82.4% were those who underwent surgery, making the symptom one of the most specific indicators of a complicated course (peritonitis, ischemia, strangulation). Thus, the identified differences allow us to state that the listed clinical signs (fever, tachycardia, multiple previous interventions, and peritoneal symptoms) have a high differentiating ability and can serve as clinical components of the risk stratification scale. Their presence in combination with other laboratory and immunological markers strengthens the rationale for early surgical intervention or active immunotherapy within the framework of a pathogenetically oriented approach.

Analysis of the general clinical blood test parameters revealed a number of reliable differences between the subgroups of operated and non-operated patients, which allows us to consider these parameters as components of the systemic response to complicated disease. Thus, the total number of leukocytes in patients who underwent surgery was statistically significantly higher than in patients treated conservatively (p<0.001), reflecting the activation of the leukocyte link as part of the inflammatory response to ischemic and compression stress. Along with this, an increase in the relative number of neutrophils (p<0.001) was observed with a parallel decrease in the proportion of lymphocytes (p<0.001), which is typical for a left shift in the leukocyte formula and is characteristic of acute destructive inflammation. This caused a significant increase in NLR, which was twice as high in the operated patients than in the non-operated patients (p<0.001), which emphasizes its value as a sensitive marker of immune-inflammatory dysregulation.

Additionally, LII and GPI were calculated, which reflect the degree of morphological restructuring of the cellular composition of the blood against the background of endotoxemia. Both indicators were significantly higher in patients who underwent surgery (LII - p<0.001; GPI - p<0.001), which indicates a pronounced reactive stress in the system of nonspecific resistance and confirms their

relevance in the system of early diagnostics of complicated forms of OSTCN. Against the background of increasing inflammatory and toxic load, a statistically significant decrease in hematocrit (p=0.02) was also noted, with a relative decrease in hemoglobin levels, however, the latter did not reach the level of significance (p>0.05), which allows us to regard it as an accompanying, but not a key indicator. Taken together, the data from the general clinical blood test make it possible to identify a number of laboratory parameters that are potentially predictive for assessing the severity of the condition, including: leukocytosis, NLR, LII and GPI, which were subsequently used to construct a multifactorial scale for stratifying the risk of severe course of ATCN. These indicators are highly accessible, resistant to interpretation errors and reflect the fundamental mechanisms of the acute inflammatory response, which makes them valuable for clinical practice.

Blood biochemical parameters in patients with OSTKN reflect not only the systemic inflammatory response, but also the nature of metabolic disorders that develop against the background of intestinal obstruction, hypovolemia, and catabolic destruction. Comparison of subgroups showed that the operated patients demonstrated significantly more pronounced deviations in most of the studied parameters.

The most pronounced differences were noted in the level of CRP, a sensitive marker of acute inflammation. In operated patients, CRP values were almost twice as high as in non-operated patients ($p < 0.001$), which reflects the severity of the cytokine-mediated response and strengthens the rationale for including this indicator in the prognostic scale. An increase in CRP was accompanied by a decrease in the level of total protein and albumin (both $p < 0.001$), which can be interpreted as a result of synthetic liver dysfunction against the background of systemic inflammation and relative hypercatabolism. The hypovolemic component, indirectly reflected in the increase in the concentration of urea and creatinine, was statistically significantly expressed in the operated patients (p=0.004 and p=0.001, respectively). These indicators can also be considered as functional indicators of deterioration of tissue perfusion and early kidney damage caused by both dehydration and the toxic effect of inflammatory mediators.

Glucose values in the operated patients were moderately but significantly higher (p=0.03), which is interpreted as a component of stress hyperglycemia, typical for acute surgical pathology with a pronounced inflammatory component. Although this indicator is not directly included in the stratification scale, it can be useful for additional assessment of the severity of the metabolic background.

Taken together, the obtained biochemical shifts confirm that the complicated course of OSTCN is accompanied by a cascade of systemic changes, including inflammatory, metabolic and hypoproteinemic reactions. Of these, the most significant from a prognostic point of view are the levels of CRP, albumin and urea, which are included in the stratification model as a reflection of the depth of destructive processes and the systemic inflammatory background.

Hemostasis system indicators obtained during the initial examination of patients with OSTCN allow an objective assessment of the degree of involvement of the coagulation cascade in the systemic inflammatory process. Analysis of the presented data revealed significant differences between the subgroups and emphasized the role of hemostatic changes in the formation of complicated course.

Thus, in operated patients, significantly higher fibrinogen values were recorded ($p<0.001$), which reflects the phase of acute inflammatory response with the involvement of coagulation factors and synthetic activation of the liver. At the same time, the D-dimer level, which on average exceeded the values of non-operated patients by more than 2.5 times ($p<0.001$), indicates the presence of active fibrinolysis and microthrombosis, which corresponds to signs of intestinal ischemia, peritonitis or latent DIC syndrome. It is D-dimer that demonstrates the greatest stratification power and is reasonably included in the prognostic scale as an independent predictor of a severe course.

Continuing the assessment of the hemostasis cascade, it is possible to note the prolongation of the activated APTT in the operated patients (p=0.01), which may indicate both the compensatory phase of hypercoagulation and the initial signs of coagulopathy. Similarly, the INR was higher in the operated subgroup ($p<0.01$), reinforcing the idea of a violation of the coagulation balance in the progressive pathological process. Despite the absence of statistically significant differences in the absolute number of platelets ($p>0.05$), the platelet-lymphocyte ratio (PLR) was significantly higher in patients who underwent surgery ($p<0.01$). This indirectly indicates the activation of the platelet component of the

immune response and can be used as an addition to the integrated assessment of the inflammatory-hemostatic status.

Thus, among the hemostasis system parameters, the levels of fibrinogen, D-dimer, and PLR, which reflect coagulation activation, inflammatory-thrombotic background, and the severity of tissue hypoxia, demonstrated the greatest diagnostic and prognostic significance. These data confirm the need to include coagulation profile elements in the system of early risk assessment of complicated ATCO course and complement the previously identified clinical and laboratory predictors. Comprehensive visualization of abdominal organs in ATCO provides valuable objective data that allow us to judge not only the presence of obstruction, but also its expected reversibility. A comparative analysis of the results of instrumental studies in patients in the control group showed that certain signs are visualized predominantly in patients who subsequently required surgical treatment, which allows us to consider them as non-invasive stratification markers of complicated course.

Thus, one of the most clearly differentiating signs was the dilation of small intestinal loops by more than 3.5 cm according to MSCT data. This criterion was registered in the overwhelming majority of operated patients, i.e. in more than 90% of cases, while among those who were successfully treated conservatively, it was found only in every fourth case ($p<0.001$). Such dilation, especially in the absence of peristalsis, may reflect a persistent level of high-plug obstruction associated with a mechanical compression component and impaired venous outflow. The second important indicator of a severe course was the presence of free fluid in the abdominal cavity, mainly detected by ultrasound or MSCT data. This sign was recorded in 3/4 of operated patients, but only episodically, i.e. in 1 out of 7 in the subgroup that avoided surgery ($p<0.001$). The detection of fluid, especially in combination with other signs, is often interpreted as indirect confirmation of peritonitis or venous hypertension due to strangulation.

No less significant was the parameter of absence of peristalsis according to ultrasound data. Although it does not have absolute specificity in itself, its pronounced prevalence in the subgroup of operated patients (71.4% versus 22.9%) makes it a potential component of a comprehensive assessment of motor failure and functional blockage of the intestinal link ($p<0.001$). Absence of peristalsis is especially informative in combination with wall thickening and absence of passage of contrast agent. In addition, less specific but important background features were analyzed, including multiple visualized adhesions, fluid and gas levels in the same segments, and intestinal wall thickening over 4 mm. Although they were not included in the prognostic scale, their combination with the main parameters allows for increased diagnostic reliability and justification for active therapy. Thus, instrumental imaging methods in emergency surgery not only confirm the fact of obstruction, but also indirectly assess the severity of the course, potential irreversibility, and the threat of ischemia, which makes these parameters an integral part of the prognostic risk stratification model for OSTKO.

The conducted complex analysis of clinical, symptomatic, laboratory and instrumental data in patients of the control group with OSTCN allowed to identify a number of signs statistically and clinically associated with the need for emergency surgical intervention. Among them are an increase in the duration of pain syndrome and absence of stool, fever, tachycardia, peritoneal symptoms, leukocytosis, an increase in CRP and D-dimer, as well as such visual signs as loop expansion, absence of peristalsis and contrast delay. However, despite the high sensitivity and predictive value of individual signs, none of them in isolation has absolute specificity. Certain clinical categories (for example, patients with pain for 13-24 hours, or an NLR level of 4-5 units) demonstrated borderline or uncertain characteristics, which emphasizes the limitations of routine diagnostics in risk stratification and choice of tactics.

Thus, the revealed signs, although they form the basis for constructing a prognosis scale, do not provide a complete pathogenetic explanation for the differences in the course of the disease, which is especially important for clarifying the indications for pathogenetically oriented therapy. This necessitates an in-depth assessment of the immunological status as an additional factor that can increase the accuracy of stratification and identify patients at risk of complications with a clinically unexpressed picture. It is precisely for the purpose of filling this diagnostic gap in the future that it is recommended to study the data of the immunological examination of patients obtained upon admission and during dynamic observation. Analysis of immune parameters will allow us to assess the severity of systemic inflammation, the presence of dysregulation of the innate and adaptive links of

immunity, as well as to determine immunological markers that have prognostic value for assessing the severity of the course of OSTKN and the feasibility of including immunotherapy in the complex treatment.

Conclusion

1. A comprehensive analysis of clinical, symptomatic, laboratory and instrumental data in patients of the control group with OSTCN allowed us to identify a number of signs statistically and clinically associated with the need for emergency surgical intervention. Among them, we can highlight an increase in the duration of pain syndrome and lack of stool, fever, tachycardia, peritoneal symptoms, leukocytosis, an increase in CRP and D-dimer, as well as such visual signs as loop expansion, lack of peristalsis and contrast delay.
2. The identified signs, although they create the basis for constructing a prognosis scale, do not provide a complete pathogenetic explanation for the differences in the course of the disease, which is especially important for clarifying the indications for pathogenetically oriented therapy. This necessitates an in-depth assessment of the immunological status as an additional factor that can increase the accuracy of stratification and identify patients at risk of complications with a clinically unexpressed picture

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