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Ultrasonic Examination in the Diagnostics of Obturational Intestinal Obstruction

Nurmetova Dilnoza Farkhadovna
Assistant, Bukhara state medical institute, catherdra oncology and medical radiology

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ABSTRACT

Traditional radiation diagnostic methods are in some cases uninformative, and the availability of computed tomography is limited . To date, there are no objective criteria for predicting the effectiveness of conservative therapy. The use of ultrasound in the diagnosis of acute small bowel obstruction is justified from a tactical point of view, since it is not delayed in time, does not weigh down the patient's condition, has sufficient information and does not carry radiation load. Due to its safety and ease of use, this technique can be used repeatedly in the process of conservative treatment to determine further treatment tactics.

Introduction. Acute intestinal obstruction is one of the most common pathologies in emergency surgery [1, 2]. The disease occurs in all age groups and ranks first among acute abdominal diseases in terms of mortality [1, 9]. One of the causes of high mortality is the severity of the condition of patients with untimely treatment of patients, diagnostic and tactical errors, as well as a significant number of postoperative complications [2, 6]. Traditional radiation diagnostic methods are in some cases uninformative [4, 7], and the availability of computed tomography is limited [5]. To date, there are no objective criteria for predicting the effectiveness of conservative therapy [3, 10]. Therefore, it should be considered relevant for clinical surgery to conduct research to assess the informative value of ultrasonography in the diagnosis of acute intestinal obstruction [2, 3, 8].

The aim of the study was to study the informative value of transabdominal ultrasound in the diagnosis and evaluation of the effectiveness of conservative and surgical treatment of intestinal obstruction.

Material and methods of research. The analysis of 140 clinical observations of acute intestinal obstruction in patients who were on inpatient treatment at the clinical base of the department for the period from 2021 to 2023 was carried out. All patients admitted to the hospital underwent physical examination, laboratory and instrumental examination.

The patients were divided into two groups: the first group consisted of 98 (70%) patients whose intestinal obstruction was resolved by conservative measures, the second group - 42 (30%) patients who underwent surgical treatment.An overview radiography of the abdominal cavity organs was performed according to the standard procedure by 130 (92.9%) of 140 patients. At the same time, the presence of Cloiber cups, Kerkring folds or gaustration was assessed and the presence of free gas in the abdominal cavity was excluded. If necessary, the study was repeated

after a certain time. With the effectiveness of primary therapeutic measures, the examination in 40 (30.7%) of 130 patients was supplemented by a study of the passage of barium suspension through the intestine with examination after 6, 12, 24 hours.

Ultrasound examination at admission was performed in 107 (76.4%), in dynamics for 5-6 days - 78 patients: in group I - 36 (25.7%) patients, in group II - 42 (30%). Echoscopy was prescribed to determine the causes of acute intestinal obstruction, differential diagnosis of forms and evaluation of the effectiveness of conservative and surgical measures. At the same time, the shape, size, location of organs, density and structure of the parenchyma of organs, the presence of focal formations, free fluid in the abdominal cavity were evaluated. When visualizing the intestine, the nature of peristalsis was assessed, its diameter, the thickness of the intestinal wall, the presence of edematous Kerkring folds were measured. To assess the effectiveness of conservative treatment, repeated examination was performed on 6-7 days from admission, surgical treatment - on 5-6 and 8-9 days. At the same time, the results obtained at admission and during the treatment were compared. A comparative assessment of the informative value of radiation diagnostic methods in both groups was carried out using the criteria "sensitivity", "specificity", "accuracy".

The results of the study and their discussion. A high incidence of acute intestinal obstruction was found in men of working age (53.6%) and among women (66.7%) of non-working age. Surgical interventions were performed in 57.1% of patients who had ineffective conservative therapy.

74.3% of patients previously had various surgical operations, 15.7% had acute surgical diseases (acute pancreatitis, peritonitis, paracolic infiltrates, acute diverticulitis, etc.) as the cause of motor disorders, and 10% could not determine the nature of producing and predisposing factors.

In 21% of patients, the clinical picture of intestinal obstruction had no specific radiological symptoms. This required the use of ultrasound and endoscopic diagnostics and made it difficult to objectively assess the effectiveness of the therapeutic measures. In group I, signs of intestinal obstruction were detected in 60 (65.2%) patients (in 32 (34.7%) - signs of small intestine, in 26 (28%) - colonic obstruction). No radiological signs of ileus were found in 32 (22.9%) patients. In group II, radiological signs of intestinal obstruction were detected in 32 (84.2%) patients (in 22 (58%) - signs of small intestine, in 8 (21%) - colonic obstruction).

According to our data, the survey radiography has a sensitivity of 95.7%, specificity - 88.9% and accuracy - 93.8%.

Echoscopy in the first group revealed an increase in peristalsis and the presence of antiperistaltic waves in 26 (40%) of 65 patients. The expansion of intestinal loops and fluid in the inter-loop space was not detected. In 32 (49.2%) patients of this group, there were no signs of violation of the passage of intestinal contents, or the violation of intestinal motility as a result of therapy was resolved by the time of examination. In the second group, 38 (90.5%) of 42 patients had signs of intestinal obstruction, 4 (9.5%) patients had no pathology. The sensitivity of ultrasonography was 87.7%, specificity - 94.1%, accuracy - 89.7 %.

The analysis of informativeness showed greater sensitivity, but less specificity of radiography in the diagnosis of acute intestinal obstruction and intestinal motility disorders in comparison with ultrasonography. The great specificity of ultrasonography in the diagnosis of small bowel obstruction is associated with the detection of fluid sequestration in the "third" space without gas accumulation. These situations are practically not detected during the survey radiography. In this regard, ultrasonography should be considered absolutely indicated in the primary diagnosis of intestinal passage disorders.

Comparing both groups, it was revealed that the average diameter of the intestine during ultrasound in group I was 3.6 ± 1.23 cm, in group II - 4.2 ± 1.59 cm. In the group of patients

admitted during the first day of the disease, the average diameter of the intestines during ultrasonography was 3.4 ± 1.12 and 3.9± 1.60 cm in group I and II, respectively. In those admitted over 1 day, the diameter of the loops was 3.9 ± 1.31 cm (in group I) and 4.4± 1.55 cm (in group II). Significant differences in the studied groups were not obtained due to the large spread of results. Almost in parallel, thickening of the walls of the small intestine was revealed, indicating an increase in edema, and, indirectly, an increase in intra-intestinal pressure. In 43.0% of patients, its thickness was almost normal (up to 3 mm), in 50.5% - from 3 to 6 mm, in 6.5% - over 6 mm.

The average values of the thickness of the intestinal walls during sonography were also noted, both between groups and by the duration of the disease. So, in group I, the wall thickness was less than 3.8 mm, and in group II (with ineffective therapy) - over 3.8 mm.

During ultrasound examination, it is important to determine the violation of intestinal motility. Pendulum-like peristalsis was noted in 43.9% of patients, in the future, due to a weakening of tone, it became sluggish (in 5.6%) or absent (in 12.1%). Visualization of Kerkring folds and fluid between bowel loops were detected in only 37.4% of patients.

Comparative analysis of peristaltic disorders showed that the probability of resolving acute intestinal obstruction is high with preserved peristalsis, and pendulum-like peristalsis in 42.0% or its absence in 38% indicate an unfavorable prognosis of the effectiveness of drug therapy and the need for surgical treatment. The fluid in the inter-loop space (up to 7% in group I, and 78-96% in group II), as well as visualization of Kerkring folds (from 19 to 32% in group I and 33-75% in group II) became informative in assessing the need for surgical treatment. A comparative analysis of the contents of the extended loops revealed no significant differences.

In group II, dynamic sonography showed that by 8-9 days after surgery, the diameter of the small intestine returned to normal in only 47.6% (Table 3). Although the average diameter tended to gradually normalize, however, by 8-9 days there was no complete regression, despite the absence of clinical manifestations. This circumstance dictates the need for repeated ultrasound examination already at the outpatient stage and, probably, prolonged use of prokinetics for the purpose of drug correction of persistent motor disorders.

The dynamics of changes in the thickness of the intestinal wall is similar to the change in diameter. The obtained significant difference in wall thickness indicates the preservation of the inflammatory process, intra-intestinal hypertension and a high probability of recurrence of motor disorders, which indicates the need to monitor patients on an outpatient basis and carry out rehabilitation measures.

Conclusion. The data obtained indicate that sonography is informative not only in detecting intestinal motility disorders, but also in assessing the effectiveness of therapeutic measures and the need for surgical treatment. We believe that in the protocol for the diagnosis of acute intestinal obstruction, it is necessary to provide for ultrasonography along with classical survey radiography. Repeated ultrasound examinations before discharge and on an outpatient basis are indicated in order to assess the process of restoring intestinal motility and the expediency of prescribing prokinetics in subclinical forms of dysmotor disorders.

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