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COMPARATIVE CHARACTERISTICS OF THE PHYSICOMECHANICAL PROPERTIES OF SELF-ETCHING SELF-ADHESIVE CEMENTS FOR INDIRECT RESTORATIONS

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Annotation. In a comparative aspect, a study was made of the physicomechanical properties of composite cements for indirect restoration. It was found that in terms of adhesive strength of bonding with hard tissues, Maxcem Elite turned out to be the

ANAL MANOMETRY AND TOTAL INDEX OF ENDOGENOUS INTOXICATION IN THE DIAGNOSIS OF ACUTE APPENDICITIS

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Annotation. The purpose of the study was to improve the effectiveness of the diagnosis of acute appendicitis in children through the use of anal manometry and the total index of endogenous intoxication.

Materials and discussion of the study.

The study on the measurement of anal pressure included 60 girls who were hospitalized in the surgical departments of the Vinnytsya Regional Children's Clinical Hospital (Ukraine). Female children aged 3 to 17 years were examined. Abdominal pain, mainly in the lower extremities, was the main reason for seeking medical help. For anal manometry, patients were divided into three equal groups – 20 children each. The first group consisted of girls who were hospitalized with suspected acute appendicitis, but in the course of further examination and observation, acute surgical pathology was excluded. The second group included girls who underwent surgery for acute appendicitis. Girls of this group were not found peritonitis. The third group consisted of girls who underwent surgery for acute appendicitis and had peritonitis of varying severity. The study of endotoxiosis consisted of peripheral blood analysis in 400 children with suspected acute appendicitis, whose average age was 12.6 ± 1.2 years, resulting in a significant relationship between the level of endotoxiosis and the inflammatory process in the abdominal cavity.

Research results.

In the study, we have proven a significant direct proportional increase in the indicators of rectal sphincter tone and the level of endogenous intoxication in relation to the inflammatory process.

Conclusions.

Anal manometry method shown in the study clearly demonstrates the dependence of the tone of the rectal sphincters with the degree of spread of the inflammatory process.

Exceeding the value of the proposed total index of endogenous intoxication of the body more than twice indicates the child has the level of endotoxiosis characteristic of destructive forms of acute appendicitis, exceeding the index more than 2.5 times indicates

a possible complicated pathology in the form of peritonitis. The introduction of the developed total index of endogenous intoxication in the algorithm of acute appendicitis will improve the results of early diagnosis and predict the form of pathology and its nature in children.

Key words: measurement, acute surgical pathology, children, endogenous intoxication, index.

Introduction.

Acute appendicitis is one of the most common acute surgical diseases of the abdominal cavity in children. About 65–75% of surgical interventions in pediatric surgery account for acute appendicitis, which is due to the peculiarities of functional and morphological processes of the child's body, the rapid development of destructive processes [1,2,3–5].

Returning to the history of emergency surgery, the first known case of appendix removal surgery in pediatric practice is considered to be surgery performed by British surgeon K. Amiand on December 6, 1735. The procedure was performed on an 11-year-old patient with inguinal hernia perforated by metal pin appendix. The appendix along with the foreign object was removed, and the hernia containing the appendix has since become known as the Amiand's hernia [3].

Due to the emergence of scientific and technological progress in medicine and the introduction of new medical and diagnostic cases, the number of deaths associated with acute appendicitis has decreased significantly compared to the XIX century. However, even with the advent of high-tech tools, the surgeon's work with patients with abdominal pain remains very difficult. Acute appendicitis is one of the most common causes of pathological conditions of "acute abdomen" in children. The cause of acute appendicitis is still unknown. Only in some cases, macroscopically during surgery, you can detect fecal stones or the presence of helminths in the lumen of the appendix. Histological examination usually reveals epithelial hyperplasia, vascular thrombosis and other changes that may lead us to the cause of inflammation in the appendix. In children, appendicitis is one of the most common causes of laparotomy. This is due to the functional and morphological features of the processes of the child's body, the generalization of inflammatory processes, the severity of intoxication, the rapid development of destructive processes [4].

The problem of timely diagnosis of acute appendicitis in children of different ages remains one of the unresolved in the provision of urgent surgical care. Usually to clarify the diagnosis it is necessary to use additional laboratory and instrumental methods of research – general blood and urine tests, ultrasound, computed tomography of the abdominal cavity, the indicators of which are necessary for pediatric surgeons [6]. However, even the use of high-tech tools and considerable clinical experience does not always help in the timely recognition of acute surgical care.

In patients with acute appendicitis, especially in complicated cases, the presence of intoxication in the body is of great importance. Determination of integrated indicators of endotoxemia allows to assess the patient's condition without involving special research methods, according to the general clinical blood test [7]. The development of a new available algorithm for the diagnosis of acute appendicitis, which would take into account the integrated indicators of the hemogram and would allow in a short time to

decide on the feasibility of appendectomy, remains an unsolved problem of pediatric surgery.

The purpose of the study was to improve the effectiveness of the diagnosis of acute appendicitis in children through the use of anal manometry and the total index of endogenous intoxication.

Materials and discussion of the study.

The study on the measurement of anal pressure included 60 girls who were hospitalized in the surgical departments of the Vinnytsia Regional Children's Clinical Hospital (Ukraine). Female children aged 3 to 17 years were examined. Abdominal pain, mainly in the lower extremities, was the main reason for seeking medical help. For anal manometry, patients were divided into three equal groups – 20 children each. The first group consisted of girls who were hospitalized with suspected acute appendicitis, but in the course of further examination and observation, acute surgical pathology was excluded. The second group included girls who underwent surgery for acute appendicitis. Girls of this group were not found peritonitis. The third group consisted of girls who underwent surgery for acute appendicitis and had peritonitis of varying severity. All patients and their parents had previously obtained informed voluntary consent for anal manometry after being acquainted with the method of anal manometry. Anal manometry was performed immediately after rectal examination, which is mandatory in children with suspected acute appendicitis according to clinical protocols in Ukraine. Anal manometry was performed in the position of the child on his back. The WPM Solar device (MMS, Holland) used in the study consisted of a sensitive balloon with electrode, a computing module that was connected to a personal computer (Fig. 1).



Fig. 1. Device for measuring the tone of the rectal sphincters WPM Solar (MMS, Holland).

Before inserting the sensitive balloon into the rectum, the anal area was and the balloon was lubricated with a solution of Vaseline to reduce soft tissue resistance and reduce discomfort during the procedure. The procedure was performed without general and local anesthesia, because the diameter of the sensitive balloon does not exceed the diameter of an adult's finger and does not cause significant pain. The balloon with the sensor was inserted into the rectum to a depth of 3 cm in order to install it in the lumen of the anal sphincter (Fig. 2).



Fig. 2. Procedure for measuring anal pressure by inserting a sensitive balloon into the lumen of the sphincter.

Immediately after the introduction of the balloon, the value of the manometer in millimeters of mercury was recorded. The first indicator, the so-called reactive pressure, is an indicator that includes passive sphincter tone, as well as active conscious contraction of the sphincters in response to the balloon. To obtain the second, more important indicator (basal pressure), which takes into account only the passive tension of the sphincter muscles, it is necessary to hold the balloon in the lumen of the sphincter for 60 seconds. It is during this time that the sphincter pressure adapts to the balloon and significantly reduces the element of active tension of the striated muscles of the sphincter apparatus.

The diagnostic procedure was completed by determining the basal pressure. Measuring basal pressure is a more important indicator than measuring reactive pressure, because basal pressure more objectively reflects the constant tension of the sphincter muscles at rest. It is the basal pressure that reflects the nonspecific response of the sphincter apparatus to pain, and hence the inflammatory response, in the abdominal cavity or in the pelvic cavity by the mechanism of the visceromotor reflector. After the procedure, the device was cleaned and sanitized by disinfection in an antiseptic solution.

Statistical processing was performed using the computer program MS Statistica 5.0.

Research results. In the course of our study, the following indicators were identified. In children of the first group, the average value of reactive anal pressure was observed at the level of 59.65 ± 2.11 mm Hg, the average basal pressure was 50.35 ± 2.53 mm Hg. In patients of the second group, the data of sphincterometry were as follows. The average value of the reactive pressure was at the level of 89.1 ± 3.27 mm Hg, after holding the balloon in the lumen of the sphincter, the pressure decreased to its basal level, the average value of which was 70.7 ± 1.94 mm Hg. The highest value of mean anal pressure, compared to previous groups, was observed in the third group. The average value of anal pressure had the following indicators: reactive pressure - 106.4 ± 4.3 mm. rt. art., basal pressure - 77.85 ± 2.81 mm Hg. The overall mean value for patients with acute appendicitis was 97.75 ± 3 mm Hg. - reactive and 74.28 ± 1.78 mm Hg. - basal.

Based on the results of the study, a certain pattern was found, characterized by an increase in both reactive and basal, which is directly proportional to the degree of inflammatory process in the abdominal cavity (Table 1).

Table 1.

The level of anal pressure in children hospitalized with abdominal pain.

Type of anal pressure	Group I (mm Hg)	Group I (mm Hg)	Group I (mm Hg)	P
Reactive	$59,65 \pm 2,11$	$89,1 \pm 3,27$	$106,4 \pm 4,3$	p1<0.01 p2<0.01
Basal	$50,35 \pm 2,53$	$70,7 \pm 1,94$	$77,85 \pm 2,81$	p1<0.05 p2<0.01

Note: p1 - reliability of comparison of results between I and II groups;

p2 - reliability of comparison of results between I and III groups.

However, given the above indicators, it should be noted a significant difference between the indicators in patients with acute appendicitis and patients in whom acute surgical pathology was excluded during the examination and dynamic monitoring. It is this difference in pressure that helps in resolving the issue of surgical tactics for the patient. Indicators between groups II and III were not so significant differences. The difference between mean basal pressures in patients of the last two groups was less than 10 mm. rt. Art. The difference between the indicators of groups II and III is not so clinically important, because patients from these groups were diagnosed with acute appendicitis, and therefore they underwent emergency surgery in any case.

Female patients (400 girls) aged 1 to 17 inclusive were involved in the analysis of endogenous intoxication indicators, on the basis of Vinnytsia Children's Regional Clinical Hospital (Ukraine), which was divided into 4 groups (100 children per group): Group I - actually healthy children; Group II - patients with abdominal pain in whom after further research surgical pathology was excluded; Group III - patients operated with destructive forms of acute appendicitis, without peritonitis; Group IV - patients operated with destructive forms of acute appendicitis with peritonitis. Children with catarrhal forms of acute appendicitis were not included in the study. The mean age of patients was 12.6 ± 1.2 years.

Taking into account the data and information reports of other researchers, we proposed a total index of endogenous intoxication (TIEI), which took into account all components of the general blood analysis, and which was calculated by the formula

$$TIEI = \left(\frac{L \times ESR}{100} + \frac{(e + bas + ban + s + j + myel)}{(mon + lym)} \right) / 2,$$

L - the number of leukocytes; ESR - erythrocyte sedimentation rate; e - eosinophils; bas - basophils; ban - band neutrophils; s - segmented neutrophils; j - juvenile neutrophils; myel - myelocytes; mon - monocytes; lym - lymphocytes. TIEI normally averages is 1.42 ± 0.06 c. u.

The study of the value of TIEI in various forms of pathology has determined the presence of positive dynamics. The total index of endogenous intoxication was 1.42 ± 0.06 ($p < 0.05$) in patients of the first group. In group II, the index level was 2.31 ± 0.32 ($p < 0.05$). The value of the total index of endogenous intoxication was 3.52 ± 0.45 ($p < 0.05$) in patients of group III. In children of group IV, the total index of endogenous intoxication was 3.80 ± 0.31 ($p < 0.05$).

The presence of such a positive dynamics of the total index of endogenous intoxication indicates the presence and increase in the value of endogenous intoxication with the growth of tissue destruction, which is regarded as a direct sign of intoxication.

Conclusions.

Therefore, after conducting a clinical study, which involved measuring the anal pressure of the sphincters in various pathologies of the abdominal cavity and pelvic organs, we can say about the feasibility of using this technique in the practice of surgeons. The above method demonstrates a fairly high informativeness. Therefore, it can be used as an additional element of diagnosis in complex clinical cases, especially in girls with overweight, cases with atypical location of the appendix, and atypical course of the disease. This method clearly demonstrates the dependence of the tone of the rectal sphincters with the degree of spread of the inflammatory process in the abdominal cavity and pelvic cavity.

An new approach to the interpretation of endogenous intoxication according to general blood analysis based on the value of the total index of endogenous intoxication allows to assess the severity of endotoxiosis, based on which it is possible to predict the form of pathology and timely choose the necessary treatment tactics. Exceeding the value of the proposed total index of endogenous intoxication of the body more than twice indicates the child has the level of endotoxiosis characteristic of destructive forms of acute appendicitis, exceeding the index more than 2.5 times indicates a possible

complicated pathology in the form of peritonitis. The introduction of the developed total index of endogenous intoxication in the algorithm of acute appendicitis will improve the results of early diagnosis and predict the form of pathology and its nature in children.

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