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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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THE ROLE OF RADIODIAGNOSIS OF NECROTIZING ENTEROCOLITIS IN PREMATURE INFANTS

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Abstract.

Introduction: Necrotizing enterocolitis (NEC) is the most often encountered pathology of newborns and always requires an emerging surgery in cases of perforation. An active study of more important diagnostic factors at early stages of a disease is one of the first aims of neonatologists and pediatric surgeons.

Aim: This study was therefore designed to examine the state of diagnostic problems in patients presenting with NEC, identification of possible ways of the improvement of a patient's diagnosis suffering from NEC and patients with perforated enterocolitis (PNEC), definition of the possibilities of roentgenologic methods for the determination of a disease stage of NEC.

Material and Methods: 69 infants aged one day to 1.5 months admitted at surgical department of K.Y. Farajeva Research Institute of Pediatrics between 2016 and 2021 inclusive were treated and evaluated. The capabilities of plain radiography and using radiocontrast methods of study to reveal NEC stages have been evaluated.

Results: The use of CSM has advantages: simplicity and accessibility in use, high diagnostic informativeness, identification of objective signs of NEC in 2-3 hours of research, allows assessing the severity of the patient's condition at an early date and timely correct treatment.

Key words. Premature infants, necrotizing enterocolitis, roengenologic diagnosis.

Introduction.

Necrotizing enterocolitis (NEC) is the most often encountered pathology of newborns and always requires an emerging surgery in cases of perforaton. Today there differ NEC of mature and premature infants and isolated perforations as well. In these groups NEC has a various clinical course-from quick and acute to intermittent and latent course with noticeable stages according to Bell. An active study of more important diagnostic factors at early stages of a disease is one of the first aims of neonatologists and pediatric surgeons. X-ray examination is the most significant diagnostic method in appearance of clinical picture of NEC. In our study we wanted to analyze the method of roentgenocontrast study of gastrointestinal tract (GIT). A starch-contrast mixture (SCM) was used in patients who has carried the diagnosis of NEC. In this respect, the use of SCM seems to have the advantages: simplicity and availability in application, high diagnostic information, revealing the objective features of NEC over 2-3 hours from the onset of investigation, allows us to evaluate severity of a patient's disease at early stages and timely correct the treatment.

NEC is a polyetiologic syndrome – related death. For a long time this pathology has not been distinctly defined as a nosologic form and existed under various diagnoses such as functional intestinal obstruction, intra-abdominal abscess, ileum spontaneous perforation, appendicitis, necrotizing colitis of newborns with perforations, ischemic enterocolitis, a newborn's intestinal infarction [1, 2]. Hypoxia and mesenteric blood flow disorders resulting in the disorders of barrier function of intestinal mucous should be considered as a driving link in NEC pathogenesis, microbic translocation in blood channel, inflammation resulting in a cascade of cytokine reactions, mucous alcerations, necrosis and perforation [3, 4]. The level of a disease with NEC comprises 0.3 to 3 per 1000 newborns and 10-25% - in premature infants. Today mortality values are not much better than in the first description of this disease W. Heinrich in 1944. Besides intensive combined efforts of neonatologists, pediatric surgeons, anesthesiologists-resuscitators and also the developed latest technologies of nursing and treatment of newborns, the levels of lethality range from 28 to 60 % for NEC complicated by perforation and peritonitis. And this determines the activity of this problem [5, 6, 7]. X-ray examination is one of the major and objective methods for the diagnosis of NEC[8,9]. The roentgenologic features of NEC are as follows: uneven flatulence of intestinal loops, pneumatosis of intestinal wall (linear or cyctic), gas in hepatic portal system, pneumoperitoneum, intra-abdominal liquid. Both pneumothorax and gas in hepatic portal system are the most frequent features of NEC [10,11,12]. The results of treatment most likely relate to timely diagnosis of NEC stages [13].

The purpose of the study is to assess the state of the problem of diagnosing NEC patients, to determine possible ways to improve the diagnosis of NEC patients and patients with perforating necrotic enterocolitis (PNEC), to clarify the possibilities of the X–ray method for determining the stage of NEC disease.

Material and Methods. The analysis of a prospective examination of 69 children aged 1 day to 1.5 months who were admitted to the surgical department of the K.Y. Farajeva Research Institute of Pediatrics in 20016-2021 with a diagnosis of NEC was carried out**.** The capabilities of plain radiography and using radiocontrast methods of study to reveal NEC stages have been evaluated. The roentgenologic criteria allowing us to define the reversible and irreversible alterations in gastrointestinal tract for NEC have been well defined.

Statistical analysis of findings was made by generally accepted methods of variation statistics using the Fisher-Student's program by means of "Statistica 6.0" at personal computer. The data were considered significant if the levels of significance corresponded to ($p<0.05$).

Results and Discussions. All patients were divided into two groups. Mature infants comprised 19 patients (27.5%) and premature - 50 patients (72.5%). In 61.6 % of mature patients the disease started in infants aged 3-15 days, in premature patients – in 73.5% of infants aged 3-15 days. We revealed the following factors of NEC development associated with the risk of peritonitis progression: perinatal pathology of central nervous system (PPCNS), congenital failure, respiratory distress syndrome (PDC), intrauterine infections. A group of patients presenting with NEC and complicated by peritonitis comprised 29 patients. At the admittance the patients with complicated peritonitis (33.3%) before 12 hours showed a 100 % survival,

17 infants died, out of them 6 infants (35.3 %) ($p<0.05$) died at first day after hospitalization, four patients (23.5%) ($p<0.05$) - at 2-4 days. Thus, 10 patients were not curable. In group of patients presenting with NEC and complicated by peritonitis 3 infants (25%) showed a very low body mass, in group of died patients - 12 infants (70.1%) ($p<0.05$).

The table shows the results of a study of the hemostasis system in children with NEC complicated peritonitis.

Table. Hemostasis indicators in children with NEC complicated peritonitis

Indicators	Норма	NEC (n=29)
APTT, sec	44,03 ± 0,65	54,7 ± 1,02
TV, sec	14,54 ±0,1	16,6 ± 9,38
PV, sec	16,39 ± 0,23	23,36 ± 0,25
OFT, mcg/100 ml	1,5 ± 0,5	3,75 ± 0,62
Fibrin, g/l	3,3 ± 0,79	4,8 ± 0,73
XIIa, f-r min.	6,0 ± 0,15	28,2 ± 0,82
ADF, %	44 ± 0,68	78,4 ± 0,66
Platelet count, l 10^9	219 ± 11,5	180 ± 13,45
Platelet activity index,(femtoliter-FL)	8,1 ± 1,2	8,45± 1,1
ADP, sec	27,34 ± 0,48	36,35 ± 0,75
LET, sec	20,67 ± 0,23	34,5 ± 0,65
ECHT, sec	29,95 ± 0,35	40,93 ± 0,25
AT III,%	100,8 ± 2,8	140,6 ± 2,77
FV, %	92,95 ± 4,5	194,9 5 ± 6,7

Note. * — statistically significant differences compared with the control group (* $p < 0.05$; 0.01). ADP, sec — platelet aggregation with ADP; AT III, % — antithrombin III; ANT, sec — ancystrodone test in seconds; APTT, sec — activated partial thromboplastin time in sec; OFT, mcg/100 ml — orthophenanthroline test; PV, sec — prothrombin time in seconds; TV, sec — thrombin time in seconds; PV,% — Willebrand factor; XIIa factor, min — factor XIIa dependent fibrinolysis. LET- lebetox test with the venom of the common gyurza, ANT- ancystrodone test with the venom of the common snout, ECHT- echitox test with the venom of the many-scaled ephy.

When studied the homeostatic system in infants suffering from NEC complicated by peritonitis showed the following changes: in coagulative link in adrenocorticotropin (ACT) a 15.1%, decrease of maximal coagulative activity, a 13 sec prolongation of activated time of plasma recalcification, a 10 sec of activated partial thromboplastin time, 35.6% reduction of prothrombin index. Prothrombin time increased by 7 sec, thrombin time – by 2 sec. Fibrinogen showed the increase by 1.5 gr/l, Coagulation time with toxins was increased in lebetoxic - by 11 sec, echotoxic – by 9 sec, AHT – by 9 sec as compared with those of normal control values ($p<0.05$). In vascular platelet link there were observed reduced platelet amounts up to 180 ± 13.45 × 109/l, the time with thrombin aggregation has been increased by 2 sec, with ADA aggregation – by 34.4 %, in shortening of time of ristomycin aggregation – by 2 sec ($p<0.05$).

An index of platelet activity also showed the increase by 4.4 %, Villebrand's factor – by 102.96 ($p<0.05$). The study of fibrinolytic system showed the following changes: prolonged time of XIIa dependent fibrinolysis as much as 4.7 times ($p<0.05$), moderate increase of soluble fibrinmonomer complexes in ophthalmology as much as 2.53 times ($p<0.05$), antithrombin III content – as much as 1.04 times. Again, however, it should be emphasized that a group of patients presenting with NEC showed hydrocoagulation consumption of prothrombin complex and other plasma factors (II, V, VII, IX, XI, XII FF). Furthermore, we feel that heterogenic coagulases also indicate to alterations in coagulative homeostasis and deep deficiency of IIF, IF and hepatogenic disfibrinogenemia. Increased fibrinmonomer complexes aggravate the process of fibrin formation. The changes in vascular platelet state related to moderate thrombocytopathy with the increase of aggregation activity in ADF-test, high rate of endothelioza and suppressed fibrinolysis in internal way of activation for normal amounts of physiologic anticoagulant of antithrombin III. X-ray examinations in patients of this group (29 infants) showed that a feature as "free gas" in abdominal cavity occurred in 18 cases (65.5 %) ($p<0.05$), 11 infants (34,5 %) ($p<0.05$) in the presence of perforation of hollow organ do not show "free gas" in abdominal cavity. The analysis of X-ray examinations of abdominal cavity in patients presenting with NEC allowed us to establish the term "fixed pneumoperitoneum". This term allows us to interpret it as a passage of flatus into abdominal cavity on the background of inflammatory adhesive-infiltrate process. It fixes the gas passage from intestine to interloop area in the form of various diameter cavities measuring from 1-2 cm seen on roentgenogram as festoon picture resembling lace. This picture has a definite volume in abdominal cavity, as a rule, closely to the necrotic focci or intestinal perforation. On repeated X-ray examinations interposition of such cavities does not change significantly. The differentiation of the concept of "free gas" in abdominal cavity, pneumoperitoneum and "fixed pneumoperitoneum" is important as fixed pneumoperitoneum is a roentgenologic feature, which allows us to indicate the presence of hollow organ perforation having no such a sign as "free gas".

It is most likely, that free gas in abdominal cavity shows a rapid developed destructive process in intestinal wall and significant passage of flatus when inflammatory adhesive-infiltrative process is not so much noticeable to fix it in limited interloop areas. It is therefore spread all over abdominal cavity, occupies subdiaphragmatic space, and thereby creates "tensed pneumoperitoneum". This feature differs from that of pneumatosis – interstitial gas location in intestinal wall as in pneumatosis the focal gas vesicles are smaller and more localized in the form of chains and connected with intestinal wall affected. Roentgenologic manifestations of PNEC (11 patients) with no "free gas" in abdominal cavity were as follows: fixed pneumoperitoneum ("lace of death") – 8 (72.7 %) ($p<0.05$), stable interposition of flatus in abdominal cavity when studied in dynamics – 8 (72.7 %) ($p<0.05$), asymmetry of gas filling in abdominal cavity – 6 (54.5 %), lateral canals darkening – 3 (27.3 %) ($p<0.05$), veiling, reduced transparency of intestinal loop image -3 (27.3 %) ($p<0.05$), pneumotosis – 2 (18.2 %) ($p<0.05$).

Clinical studies show that the use of water-soluble contrast substance (barium sulfate) in newborns is unacceptable due to occurrence of severe complications of aspiration, obturation and in some cases of perforation character. Water- soluble contrast substances applied have been limited due to rapid resorption of roentgenographic substances. With the aim of roentgen-contrast investigations of GIT in patients suffering from NEC starch-contrast mixture (SCM) developed by us has been applied which contained water-soluble substances and starch. In mature infants SCM has been used in the volume of 10-15 ml, in premature infants – 5-7 ml. Patients underwent to roentgenography in vertical position in 2-3 hours after SCM injection. 2 hours later SCM have been measured in distal part of

intestine. Of 75 patients presenting with NEC 12 patients (16%) ($p<0.05$) underwent to roentgen-contrast assessment. Eight patients showed a delay of SCM evacuation into colon more than 3 hours after the injection. However, its concentrations as Kloyber's cup were not observed. And this excluded our suspicion for destructive stage of the process and established the diagnosis of stage IA NEC.

Four of 12 infants developed more prolonged failure of passage and evacuation of SCM from intestine. However, contrast masses have been concentrated as Kloyber's cup, which has been seen on repeated roentgenograms in dynamics 3 hours later. In these patients, NEC has been confirmed. All roentgenologic manifestations of NEC were divided into early reversible and late irreversible manifestations. Early reversible manifestations are as follows: increased pneumatization, developed extension, intestine loop widening, intestine wall thickening and straightening, delay of SCM evacuation from intestine up to 3 hours. Late irreversible manifestations are as follows: fixed pneumoperitoneum, dackening of lateral canals in abdominal cavity, veiling, reduced transparency of intestine loops, pneumatosis, free gas presence, disturbed passage and presence of static fixed zone of GIT, when studied, using SCM a contrast delay has been observed more than 3 hours.

Conclusion.

1. In the X-ray examination of NEC patients, the absence of "free gas" in the abdominal cavity is not a reliable sign excluding perforation of the hollow organ.
2. In newborns with NEC, pneumatosis is usually associated with a local infarction of the intestinal wall and areas of preperforation and perforation. This phenomenon is usually accompanied by symptoms of generalized peritonitis.
3. The detection of symptoms of "fixed pneumoperitoneum" is an X–ray sign that allows us to talk about the presence of perforation of a hollow organ without such a sign as "free gas", which allows us to assess the severity of a CERTAIN patient at an early stage and timely adjust treatment.
4. The use of KKS has advantages: simplicity and accessibility in use, high diagnostic information content, identification of objective findings of NEC in 2-3 hours of research.

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РЕЗЮМЕ

Роль рентгендиагностики некротического энтероколита у недоношенных младенцев

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Введение: Некротический энтероколит (НЭК) – наиболее частая неотложная патология новорожденных, всегда требующая экстренного оперативного вмешательства в случаях перфорации. Активное изучение наиболее значимых диагностических факторов на ранних этапах заболевания является одной из первых задач неонатологов и детских хирургов.

Цель исследования: уточнить возможности рентгенологического метода для определения стадии некротического энтероколита у недонощенных младенцов.

Материал и методы: проведен анализ обследования 69 детей в возрасте от 1 суток до 1,5 месяцев с диагнозом НЭК. Оценены возможности обзорной рентгенографии и применение рентген контрастных методов исследования для определения стадии НЭК: при рентгенографии применялась крахмал контрастная смесь (ККС).

Результаты: Применение ККС имеет преимущества: простота и доступность в использовании, высокая диагностическая информативность, выявление объективных признаков НЭК за 2- 3 часа исследования, позволяет в ранние сроки оценить тяжесть состояния больного и своевременно скорректировать лечение.

Ключевые слова: недонощенные младенцы, некротический энтероколит, рентгендиагностика.