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PREVALENCE AND CLINICAL FEATURES OF GASTROSCHISIS IN A REGION WITH A HIGH TECHNOGENIC LOAD

Research article

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Abstract

The purpose of this study was to determine the prevalence of gastroschisis and the incidence of visceroabdominal disproportion syndrome in gastroschisis in a region with a high technogenic load. The study was carried out in the northern areas of the Kemerovo region (Kuzbass) – territories with a high technogenic load. The obtained prevalence of gastroschisis was set at 6.9 cases per 10,000 children born. The surgical clinic received 112 children for the correction of the defect during this period. Visceroabdominal disproportion was detected in 91 (81%) newborns with gastroschisis, 21 (19%) children showed no signs of BAD, in 19 (17%) observations, BAD was mild, in 50 (44%) – moderate and in 22 (20%) severe. Concomitant malformations were noted in 15 (13%) cases, with intestinal atresia occurring in 11 (10%) children.

Keywords: newborns, gastroschisis, visceroabdominal disproportion, intestinal atresia, abdominal wall defects.

РАСПРОСТРАНЕННОСТЬ И КЛИНИЧЕСКИЕ ОСОБЕННОСТИ ГАСТРОШИЗИСА В РЕГИОНЕ С ВЫСОКОЙ ТЕХНОГЕННОЙ НАГРУЗКОЙ

Научная статья

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Аннотация

Целью данного исследования являлось определить распространённость гастрошизиса и частоту развития синдрома висцероабдоминальной диспропорции при гастрошизисе в регионе с высокой техногенной нагрузкой. Исследование проводилось в северных районах Кемеровской области (Кузбасса) – территориях с высокой техногенной нагрузкой. Полученная распространенность гастрошизиса установлена на уровне 6,9 случаев на 10000 родившихся детей. В хирургическую клинику за указанный период для коррекции порока поступило 112 детей. Висцероабдоминальная диспропорция выявлена у 91 (81%) новорожденных с гастрошизисом. У 21 (19%) детей признаки ВАД отсутствовали. В 19 (17%) наблюдения ВАД была легкой степени, в 50 (44%) – средней и у 22 (20%) тяжелой степени. Сочетанные пороки развития отмечены в 15 (13%) случаев, при этом атрезия кишечника имела место у 11 (10%) детей.

Ключевые слова: новорожденные дети, гастрошизис, висцероабдоминальная диспропорция, атрезия кишечника, дефекты передней брюшной стенки.

Introduction

Gastroschisis is a modern international term adopted to refer to a through paraumbilical defect of the anterior abdominal wall with the emergence of abdominal organs in newborns. This is one of the most severe congenital defects related to the so-called large surgical anomalies, in which emergency surgical treatment is needed in the near future after the birth of a child.

The prevalence of gastroschisis is relatively small, but in recent years the number of children born with this malformation has increased significantly. If twenty years ago the frequency of gastroschisis was 2,5 cases per 10,000 newborns, now it has increased to 4 cases per 10,000 live newborns. According to a number of authors, in many countries there is a "mini epidemic" of gastroschisis [1], [3], [5].

Mortality with gastroschisis currently remains at a fairly high level. It was significantly reduced only in the world's leading centers for pediatric surgery. So in the United States and Western Europe, it ranges from 4 to 10%, and according to some sources reaches 17%. In Russia, mortality is at the level of 6,5-25% [1], [4].

The average length of stay of patients with gastroschisis in the hospital ranges from 38 to 50 days. Treatment requires high financial costs associated with long-term parenteral nutrition, artificial ventilation of the lungs, the prescription of expensive medicines and laboratory control methods.

In addition, the presence of visceroabdominal disproportion syndrome, which is often associated with gastroschisis, significantly complicates the surgical correction of this congenital malformation. As a result, in 30-50% of cases, multiple surgical interventions are required aimed at stepwise immersion of organs into the abdominal cavity and reconstruction of its walls [4], [7].

The problem of correction of combined intestinal defects is also important in the treatment of gastroschisis. Atresia and stenose of the intestine occur in 5-25% of cases with gastroschisis. Mortality with such a combination reaches 40-66%. [1], [5].

Methods and principles of research

The study was carried out in the northern areas of the Kemerovo region (Kuzbass) – territories subject to high technogenic load, mainly due to chemical, coal mining and coal processing industries.

The work uses data from the Kemerovo Regional Medical Information and Analytical Center, the Kemerovo Regional Perinatal Center, analyzed the medical histories of patients with gastroschisis admitted to the Kuzbass Regional Children's Clinical Hospital named after Yu. A. Atamanov " in the period from 1997 to 2021.

Intraperitoneal pressure during surgery was used as diagnostic criteria for visceroabdominal imbalance syndrome (SVAD). Intraperitoneal pressure was measured in the bladder cavity using an aqueous pressure gauge when the musculoaponeurotic edges of the operating wound converged over the emergent organs after being fully or partially submerged in the abdomen during the first surgery.

The middle axillary line was taken as the zero mark. Before the measurement, having previously emptied the bladder through the catheter, sterile physiological solution was introduced into its cavity at the rate of 1 ml per 1 kg of the body weight of the newborn.

At an intravesical pressure of 10 mmHg and above, clinically significant visceroabdominal disproportion was considered to occur. The degree of BAA was determined by the pressure value. At a pressure of 10 to 15 mmHg, BAA was classified as light, at a pressure of 15 to 20 mmHg – medium and at a pressure of 20 mmHg and above – heavy [2].

Main results

During the presented period, the total number of children born (born alive and dead) in the northern areas of the Kemerovo region was 239400, in which in 165 cases gastroschisis were detected. The prevalence of gastroschisis obtained in this way in the northern regions of the Kemerovo region was set at 6,9 cases per 10,000 children born. Over the period from 1997 to 2001, it amounted to 6,7 cases, and from 2002 to 2007 – 6,9 and from 2008 to 2021 – 7,0 cases per 10,000 births.

The surgical clinic received 112 children for the correction of the defect during this period. Among those with gastroschisis, the ratio of boys to girls was 1,4:1. The average birth weight was 2200±300 gr., babies were born mainly at gestational age of 36,5±0,5 weeks. Intrauterine development was delayed in 37 (33%) cases.

Visceroabdominal disproportion was detected in 91 (81%) newborns with gastroschisis. 21 (19%) children showed no signs of BAD. In 19 (17%) observations, BAD was mild, in 50 (44%) – moderate, and in 22 (20%) patients, visceroabdominal disproportion was severe. In one case, along with total gastric and intestinal eventration, we observed a rare gastroschisis eventration of part of the liver and gallbladder.

Concomitant malformations were noted in 15 (13%) cases, with intestinal atresia occurring in 11 (10%) children.

Discussion

Interest in the study of the prevalence of gastroschisis is dictated by an increase in the number of cases of this disease in newborn children according to various sources, while there is a significant fluctuation in the frequency of 1-2 to 4 cases per 10,000 births [4], [8]. According to our data, this figure is almost twice as high, which is possibly due to a large man-made load on the population in the Kemerovo region. In addition, we see a significant frequency of visceroabdominal disproportion syndrome exceeding 80%, according to other researchers, this figure is 40-50%, which is also possible due to the peculiarities of the environmental situation and requires further research in this direction [1], [3].

In surgical practice, the term visceroabdominal disproportion seems to be one of the first to be used by E. W. Fonkalsrud, proposing, based on the degree of severity of visceroabdominal disproportion, to choose a method of surgical correction in newborn children with gastroschisis [10], [12].

Under visceroabdominal disproportion, it is now accepted that the volume and shape of the abdominal cavity do not correspond to the volume and shape of the evented internal organs. Given that the eventration of internal organs, mainly small and colon, occurs in utero, to a large extent BAD depends on the degree of underdevelopment of the abdominal cavity and pathological infiltration and dilation of the eviscerated intestine. In clinical practice, it is important to diagnose this condition in order to determine the tactics of further treatment. With severe visceroabdominal imbalance, multiple surgical interventions are often required [2].

Radical simultaneous surgery for gastroschisis due to BAD is possible only in 30% of patients, in other cases, as a rule, the use of silastic sacs is required, followed by repeated surgical interventions [7], [9], [11]. According to most researchers, the severity of BAD is the most important factor determining the level of complications and mortality in children with gastroschisis [6], [8], [9].

Conclusion

A region with a high technogenic load is characterized by a high incidence of gastroschisis, which is about 7 cases per 10,000 children born.

Newborn babies with gastroschisis were born preterm at 36-37 weeks gestation in most cases and often had intrauterine developmental delay.

In children born with gastroschisis in a region with a high technogenic load, in more than 80% of cases there is visceroabdominal disproportion syndrome, combined malformations occur with a frequency of 13% of the total number of cases, while intestinal atresia was noted in 10% of children.

Конфликт интересов

Не указан.

Рецензия

Все статьи проходят рецензирование. Но рецензент или автор статьи предпочли не публиковать рецензию к этой статье в открытом доступе. Рецензия может быть предоставлена компетентным органам по запросу.

Conflict of Interest

None declared.

Review

All articles are peer-reviewed. But the reviewer or the author of the article chose not to publish a review of this article in the public domain. The review can be provided to the competent authorities upon request.

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