

Diagnosis And Treatment Of Gastroschisis In Newborns

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Abstract: Objective: Optimization of diagnostics and treatment of gastroschisis in newborn infants.

Material and Methods: We observed 92 patients with gastroschisis. Among them boys - 51 (55,4%), girls - 41 (44,6%). Born full-term - 47 (51%), preterm - 45 (49%) children. On the first day (0-24 hours) after birth received 78 (84.8%) patients, 24-48 hours - 12 (13%) and 48-72 hours - 2 (2.2%) children.

Results: In 60 (65.3%) revealed a total form, in 27 (29.3%) and subtotal in 5 (5.4%) - a local form of gastroschisis. 51 (55.4%) of 92 children diagnosed prenatally pathology. Ultrasonographic findings of gastroschisis were uneven contours of the anterior abdominal wall, and the defect was located a short distance from the umbilical cord. In our studies, ultrasound accuracy in gastroschisis was 100%. Surgery performed 84 (91,3%) patients. 65 (77,4%) neonates with total, subtotal and local form performed radical surgery. In 17 (18.5%) cases made-stage surgical correction. Postoperatively, 52 died (61.9%) children. The most common cause of postoperative mortality were aspiration pneumonia, and sclerema oligoanuria as a result of hypothermia on the road and a painful shock and sepsis and necrotizing enterocolitis, cardiovascular and respiratory failure.

Keywords: gastroschisis, newborns, treatment.

1. INTRODUCTION.

Gastroschisis is a birth defect that develops in a baby while a woman is pregnant. This condition occurs when an opening forms in the baby's abdominal wall. The baby's bowel

pushes through this hole. The bowel then develops outside of the baby's body in the amniotic fluid.

The opening is most often on the right side of the baby's belly button. It can be large or small, but is typically one to two inches in size. In more severe cases, the stomach and/or liver can sometimes make their way through the opening as well.

Because the bowel is outside of the baby's body, it is unprotected. That means there is a chance it can become irritated, swollen and damaged.

This condition is relatively rare but has seen an increase in recent years. It occurs in about one in every 2,000 babies. It develops early in pregnancy, during the fourth through eighth weeks. Gastroschisis occurs due to a weakness in the baby's abdominal wall muscles near the umbilical cord. If your baby develops this condition during your pregnancy, you will not experience any symptoms related to it.

The cause is typically unknown. Rates are higher in babies born to mothers who smoke, drink alcohol, or are younger than 20 years old. Ultrasounds during pregnancy may make the diagnosis. Otherwise diagnosis occurs at birth. It differs from omphalocele in that there is no covering membrane over the intestines.

Treatment involves surgery. This typically occurs shortly after birth. In those with large defects the exposed organs may be covered with a special material and slowly moved back into the abdomen.

Gastroschisis is one of the most severe malformations of the anterior abdominal wall that develops during the first 4 weeks of the prenatal period. The frequency of gastroschisis is approximately 1: 4000-6000 newborns [6]. It is now generally accepted that this embryological defect is fundamentally different from omphalocele. Gastroschisis develops as a result of a defect in the place where the second umbilical vein is located [4,6]. Treatment of children with such a pathology is still difficult. Mortality in gastroschisis remains very high (up to 65%) [4].

The reason for the high mortality of children with this pathology was the wrong tactics of managing patients in the antenatal, intrapartum, pre- and postoperative periods, as well as the choice of the method of closing the defect [1,3,4]. The question of optimal surgical treatment of gastroschisis is still controversial, due to their anatomical features. Radical simultaneous plastic repair with local tissues, which has always been preferred, is limited in use for defects of the anterior abdominal wall with pronounced viscer-abdominal imbalance [1,2].

The diagnosis of gastroschisis is suspected after routine blood tests show abnormally high alpha fetoprotein levels. Gastroschisis is diagnosed by routine ultrasound in the second trimester when free-floating intestine is seen.

For proper counseling and management, it is important to distinguish gastroschisis from other abdominal wall defects, such as omphalocele (a membrane-covered herniation of the abdominal organs into the base of the umbilical cord). Of great importance is prenatal ultrasound diagnosis of the fetus to address the issue of maintaining or terminating a pregnancy, identifying multiple malformations, timing and types of delivery of children with these abnormalities. The minimum time for diagnosis of these defects, according to the literature, is 12 weeks \pm 3 days [5].

In the CIS countries, mortality in congenital clefts of the anterior abdominal wall is from 9.1 to 68% [2].

The purpose of this study was the diagnosis and treatment of gastroschisis in newborns.

2. MATERIAL AND METHODS

We observed 92 patients with gastroschisis. Among them, there were 51 boys (55.4%), 41 girls (44.6%). 47 (51%) were born full-term, 45 (49%) babies were premature. On the first day (0-24 hours) after birth, 78 (84.8%) patients were admitted, after 24-48 hours - 12 (13%) patients, and after 48-72 hours - 2 (2.2%) children. In 51 (55.4%) newborns, gastroschisis was diagnosed antenatally. During pregnancy, they were observed by a gynecologist and pediatric surgeon in a perinatal center. The accuracy of prenatal diagnosis was 100%. Cesarean delivery was performed in 6 (6.5%) cases.

Upon admission, in addition to general clinical research methods, all patients underwent abdominal x-ray, ultrasound of the internal organs and umbilical ring defect, echocardiography, and neurosonography.

Gastroschisis requires surgical treatment to return the exposed intestines to the abdominal cavity and close the hole in the abdomen. Sometimes this is done immediately but more often the exposed organs are covered with sterile drapings, and only later is the surgery done. Affected newborns frequently require more than one surgery, as only about 10% of cases can be closed in a single surgery: 1141–1142.

Pregnancies in which the fetus has gastroschisis are at risk for certain complications such as poor fetal growth, decreased amniotic fluid volume, preterm delivery and stillbirth. Normally, women with a baby with gastroschisis can have a vaginal delivery, and cesarean delivery is only performed for standard obstetrical reasons. A vaginal birth permits the mother to have a shorter and easier recovery, and does not increase the risk for complications in the baby.

Given the urgent need for surgery after birth, it is recommended that delivery occur at a facility equipped for caring for these high-risk neonates, as transfers to other facilities may increase risk of adverse outcomes. There is no evidence that cesarean deliveries lead to better outcomes for babies with gastroschisis, so cesarean delivery is only considered if there are other indications.

The main cause for lengthy recovery periods is the time taken for the infant's bowel function to return to normal. After surgery infants are fed through IV fluids and gradually introduced to normal feeding.

After gastroschisis repair, it takes time for the intestine to recover and function normally. For this reason, first feedings are provided through an intravenous (IV) line. Once intestinal function returns, oral feedings or feedings via an NG tube are slowly started while IV feeds continue.

Pumping and freezing of breast milk is encouraged for feedings, because a mother's milk is particularly beneficial for infants with special medical needs. Oral feedings are slowly increased. This is a gradual process, and infants who have undergone gastroschisis repair might experience occasional setbacks, including the need to temporarily stop oral feeds to rest the intestine, or additional surgery. When your baby can tolerate full feedings, whether oral, NG or a combination, with adequate weight gain, she is ready to go home. Prior to discharge, our nursing staff will teach you any special feeding techniques or other specialized care you may need to know to care for your child at home.

The length of stay in the hospital after gastroschisis repair varies, depending on a variety of factors:

- Whether your baby was born prematurely
- If there was any intestinal blockage (atresia)
- If there are feeding difficulties

After discharge from the hospital, your baby will be closely monitored by a pediatrician and will periodically return to CHOP for appointments with the pediatric surgeon. Close attention will be paid to the condition of the intestine and your baby's growth. While long-term prognosis can be very good, babies who sustained more severe injury to the intestine will need to be followed more closely and may need a prolonged course of intravenous nutrition either at home or within the hospital.

Gastroschisis is labeled as simple or complicated. This is based on how inflamed the bowel and/or organs are that have moved through the opening.

With simple gastroschisis

With complicated gastroschisis, one or more of the following occurs:

The bowel outside of the baby's body is extremely damaged, e.g., a portion of the tissue has died (called necrosis), or the bowel has become twisted or tangled.

Intestinal atresia, which occurs when part of the baby's bowel doesn't form completely, or the intestine is blocked.

Other organs, such as the stomach or liver, protrude out of the opening as well.

Simple cases are more common than complicated ones.

It is possible for gastroschisis to be detected in the third month of pregnancy. However, we most often perform evaluations for it at 20-24 weeks, after it has shown up on an ultrasound.

It is most commonly diagnosed by ultrasound around weeks 18-20 of pregnancy.

Some women are referred to us for gastroschisis late in pregnancy. We see them within two weeks of their referral. It is important to make a diagnosis and delivery plan as early as possible.

In babies with gastroschisis, the ultrasound will show loops of bowel floating freely. This often shows up when a woman goes in for a routine ultrasound with her obstetrician (OB). An evaluation for gastroschisis consists:

An ultrasound (we can use an ultrasound performed within two weeks of your appointment with us, or one will be done on the day of your evaluation)

Possibly an MRI and/or a fetal echocardiogram to test your baby's heart function

A meeting with a nurse, social worker and genetic counselor

A team meeting with a maternal-fetal medicine specialist (MFM), pediatric surgeon and neonatologist

An important part of the evaluation is determining whether the condition is gastroschisis or omphalocele. These conditions can sometimes look similar on an ultrasound. In omphalocele, a sac from the umbilical cord covers and protects the intestines that are outside of the baby's body.

After your tests are complete, our team of experts meets with you to discuss the extent of the baby's condition and its impact on the rest of the pregnancy. We'll also cover medical treatments that might be needed right after the birth of your child, and long-term prognosis of babies with gastroschisis.

3. RESULTS AND DISCUSSION

Among our patients, the total form was revealed in 60 (65.3%), the subtotal in 27 (29.3%) and the local gastroschisis in 5 (5.4%). Multiple developmental abnormalities associated with the underlying defect were detected in 22 (23.9%) of the newborn. In 70 (76.1%) patients, gastroschisis was the only malformation. In the structure of concomitant malformations, most often 13 children (59.1%) found gastrointestinal defects, 5 (22.7%) patients had cardiovascular system defects, and 4 (18.2%) children had malformations of other organs and systems. Most of the children with gastroschisis were admitted in very serious condition due to improper transportation (hypothermia along the way, pain shock, aspiration due to lack of a gastric tube, covering the prolapsed intestines with a cold gauze), which aggravated the condition of the newborns, had a negative impact on the course of the postoperative period and required longer preoperative preparation.

Currently, special attention is paid to the prenatal diagnosis of gastroschisis. Gastroschisis is quite easily detected using ultrasound. The accuracy of antenatal diagnosis is 80%. From 13 weeks of gestation, it is possible to diagnose gastroschisis in the fetus [5].

In 51 (55.4%) of our patients, gastroschisis was diagnosed antenatally. Echographic signs of gastroschisis were uneven contours of the anterior abdominal wall, and the defect was located at a small distance from the umbilical cord. The accuracy of ultrasound for gastroschisis in our studies was 100%. The average period of antenatal diagnosis of gastroschisis in the fetus in our studies was 24-25 weeks.

Prenatal detection of this defect made it possible to choose the most optimal algorithm for managing pregnancy and childbirth. In all cases, for pregnant women with fetal gastroschisis, delivery was carried out in a perinatal center, on the basis of which a republican center for neonatal surgery was created. The birth was carried out with the participation of an obstetrician-gynecologist, resuscitator and pediatric surgeon. Due to the fact that the neonatal surgery center operates at the perinatal center, there was no need to transport children with gastroschisis. Treatment and preoperative preparation of a newborn with gastroschisis began immediately after birth in the neonatal intensive care unit. In this case, anesthesia was performed, the eventual intestinal loops were packed in a sterile synthetic bag. Preoperative preparation consisted in the correction of homeostasis disorders. For this purpose, antibacterial and infusion therapy was performed. The criterion for the adequacy of preoperative preparation was the restoration of diuresis and the improvement of hemodynamic parameters in a short time.

All newborns with gastroschisis at admission underwent decompression of the gastrointestinal tract. For this purpose, gastric sounding and aspiration of its contents were performed suboperatively under relaxation, as well as a vent tube was inserted into the rectum and manual "extrusion" of the contents of the entire intestine was performed. This made it possible to significantly reduce the volume of the intestines, which significantly reduced viscer-abdominal imbalance and facilitated the immersion of the intestines in the abdominal cavity.

Surgery was performed on 84 (91.3%) patients. 8 (8.7%) patients with gastroschisis were admitted in a very serious condition and soon died before the operation. 65 (77.4%) newborns with total, subtotal and local form underwent radical surgery. At the same time, 4 of them (6.2%) simultaneously performed iliostomy due to congenital atresia of the intestine. In 17

(18.5%) cases, newborns with gastroschisis performed stage-by-stage surgical correction. Of these, 2 (11.8%) patients were sutured to the edges of the defect with a Schuster bag for 8 to 10 days with a daily decrease in its volume in order to gradually eliminate visceros-abdominal imbalance. Fifteen (88.2%) patients had a ventral hernia.

In the postoperative period, only 52 (61.9%) children died. We conducted an analysis of postoperative mortality depending on the timing of the detection of gastroschisis. As mentioned above, in 51 of our patients, antenatal gastroschisis was diagnosed and childbirth occurred in a perinatal center. These children did not need long distance transportation. So, in this group of children, postoperative mortality was 31.4% (16 patients). Postoperative mortality among children (40 patients) from other maternity hospitals who underwent long-term transportation was 90% (36 patients).

The most common cause of postoperative mortality was aspiration bronchopneumonia, sclera and oligoanuria due to overcooling along the way and pain shock, as well as sepsis and necrotic enterocolitis, cardiovascular and respiratory failure. The immediate cause of death in 18 newborns with gastroschisis, in addition to the above factors, were multiple defects of 2 or more systems, which led to the early death of children in the near postoperative period.

4. CONCLUSIONS

1. Prenatal diagnosis of gastroschisis in the conditions of the perinatal center allows you to build an algorithm for delivering children in advance, conduct adequate preoperative preparation and choose the most optimal treatment tactics for the first time after birth.

2. Suboperative decompression of the intestine under relaxation can significantly reduce the volume of the intestines and reduce the degree of visceros-abdominal imbalance. This helps to reduce the number of palliative interventions for gastroschisis in newborns.

Attempted vaginal delivery is becoming increasingly prevalent for women with a pregnancy complicated by gastroschisis. Recommendations from research literature findings may be diffusing into clinical practice. A significant proportion of women with this anomaly still deliver by planned cesarean suggesting further reduction of surgical delivery for this anomaly is possible.

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