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The authors declare that they have no conflicts of interest

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CONGENITAL DIAPHRAGMATIC HERNIA IN NEWBORNS

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Abstract

Congenital diaphragmatic hernia is a congenital developmental defect that can be diagnosed during the prenatal period. Diaphragmatic hernias are common diseases and, although they can often be incidental, they must be recognized as a congenital defect of the diaphragm that is dangerous for the life of the newborn. Congenital diaphragmatic hernias are characterized by traumatic tears of the herniated diaphragm (Bochdalek, Morgagni). This condition is strictly treated by surgery. In such cases, children with this disease require diagnosis and preoperative preparation according to the protocol of the Ministry of Health of the Republic of Kazakhstan for at least two days. Surgical treatment is performed after hemodynamic stabilization. During the pre- and postoperative periods, all children require active intensive therapy. This article describes the key aspects of surgical treatment. Despite the fact that congenital diaphragmatic hernia is a severe congenital defect, sometimes accompanied by the pathology of several systems or organs, the stabilization and further surgical treatment of such patients have made significant progress. Modern foreign surgery has shifted towards endoscopic surgery. The data from foreign articles and studies in the field of congenital diaphragmatic hernia allow us to expand the range of possible methods for prenatal diagnosis and treatment.

Жаңа туған нәрестелердегі туа біткен диафрагма жарығы

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Тұжырым

Көкет жарығы бұл антенатальді кезеңде анықталатын туа біткен даму ақау. Көкет жарығы жиі кездесетін аурулар қатарына кіреді және бұл аурулар жиі кездейсоқ болғанымен, көкеттің туа біткен ақауы ретінде саналуы керек және жаңа туған нәрестенің өміріне қауіп төндіреді. Туа біткен көкет жарығы көкеттің травмалық жыртылумен сипатталады (Бохдалека, Морганья). Бұл ауру тек хирургиялық емделеді. Мұндай жағдайларда ауруға шалдыққан балаларға диагностика, ота алдындағы дайындық Қазақстан Республикасы Денсаулық сақтау министрлігінің хаттамасы бойынша кемінде екі тәулік жүргізілуі қажет. Хирургиялық ем гемодинамиканы тұрақтандырғаннан кейін жүргізіледі. Операцияға дейінгі және кейінгі кезеңде барлық балалар белсенді қарқынды терапияны қажет етеді. Бұл мақалада хирургиялық емдеудің негізгі сәттері көрсетілген. Туа біткен көкет жарығы бір ағза даму ақауы болғанымен, кейде бірнеше ағза біріктірілген патологиясы болуы мүмкін, мұндай науқастарды тұрақтандыру және одан әрі хирургиялық емдеу айтарлықтай өзгерістерге алып келеді. Көкет жарығы туа біткен ақау болуына қарамастан, кейде бұл ақауға бірнеше жүйе немесе ағзалардың туа біткен даму ақаулары қосарлануы мүмлін, науқас жағдайы тұрақтануы мен әрі қарай хирургиялық емінің біршама алға жылжуы байқалады. Заманауи шетелдік хирургия, эндоскопиялық хирургияға бет бұруда. Туа біткен көкет жарығы тақырыбындағы шетелдік мақалалар мен зерттеу деректері бізге антенатальды диагностика мен емдеудің мүмкін әдістерінің ауқымын кеңейтуге мүмкіндік береді.

Врожденная диафрагмальная грыжа у новорожденных

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Ключевые слова:
врожденная диафрагматическая грыжа, новорожденные, типы диафрагмальных грыж, неонатальная хирургия, диагностика

Аннотация

Диафрагмальная грыжа - врожденный порок развития, который диагностируются антенатальном периоде. Диафрагмальные грыжи - достаточно распространенное заболевание, и нередко являются случайной находкой, опасной для жизни новорожденного. Врожденные диафрагмальные грыжи характеризуются травматическими разрывами диафрагмы (Бохдалека, Морганьи). Данное заболевание лечится хирургическим путем. При таких случаях детям необходимо должная диагностика, предоперационная подготовка согласно протоколу Министерства Здравоохранения Республики Казахстан в течении не менее двух суток. Оперативное лечение проводится после стабилизации гемодинамики. В пред- и послеоперационном периодах все дети нуждаются в активной интенсивной терапии. В данной статье указаны ключевые моменты хирургического лечения диафрагмальных грыж. Несмотря на то, что врожденная диафрагмальная грыжа является тяжелым врожденным пороком, порой в сочетании с врожденными пороками развития других систем или органов, стабилизация и дальнейшее хирургическое лечение таких пациентов имеет значительные успехи, в частности эндоскопической хирургии. Данные зарубежных статей и исследований в области врожденной диафрагмальной грыжи позволяют нам расширить спектр возможных методов антенатальной диагностики и лечения.

Relevance

Congenital diaphragmatic hernia is a condition that results from the stretching and absence of chest muscles that normally separate the abdominal and chest cavities. It causes the displacement of organs such as the stomach, spleen, intestines, and liver into the chest cavity. According to a study by Eimear Kirby in 2020, diaphragmatic hernia affects 2.3-2.8% of live newborns. This condition is common among newborns, and despite treatment, 30-70% of infants have an unfavorable prognosis and complications. The treatment of diaphragmatic hernia has developed significantly in recent years, moving from postnatal stabilization to prenatal optimizations. Congenital pathology of diaphragmatic hernia is localized and often occurs alongside other organ and system defects.

The purpose of the study: to analyze the outcomes of surgical treatment of newborns diagnosed with a hernia of the diaphragm.

Materials and methods

In the neonatology and neonatal surgery department, 40 newborns with diaphragmatic hernia were treated between 2017 and 2021. Of these, 30 (75%) were boys and 10 (25%) were girls. During the antenatal period, all pregnant women underwent screening ultrasound examinations (USE). However, diaphragmatic hernia was diagnosed in 38 (95%) pregnant women. This pathology was not diagnosed in two pregnant women (5%). The time of detection of these defects coincided with the interval between 21 and 34 weeks of pregnancy. In pregnant women, congenital heart defects were detected in 8 (2%), one (2.5%) had omphalocele, and additional developmental defects were identified (Figure 1).

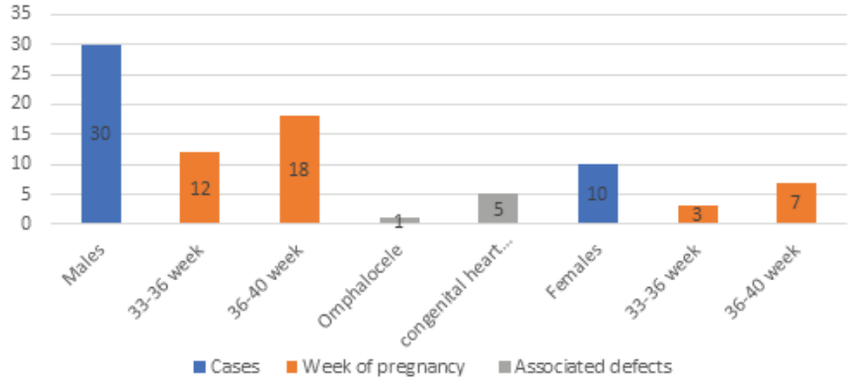
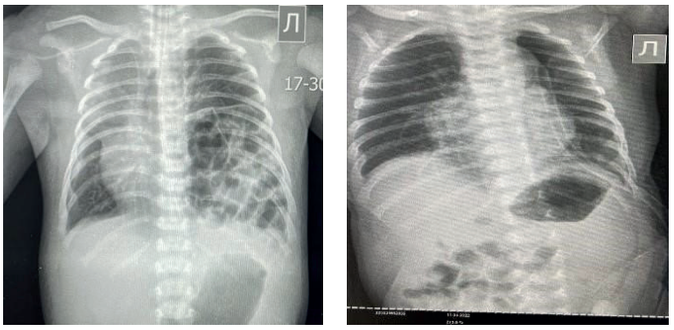


Figure 1.
Cases and gestational age (week)

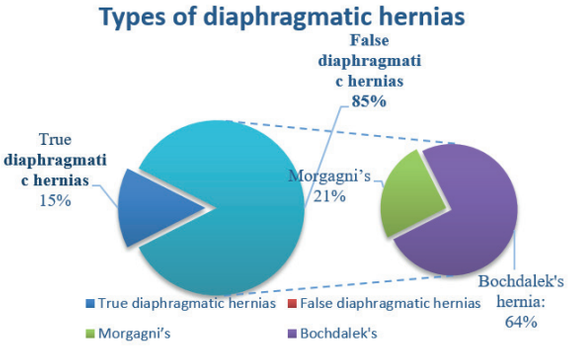
In the maternity ward, cases of newborns were evaluated, a general X-ray of the chest and abdominal cavity was performed, and 90% of infants were assisted with a mechanical ventilation machine. 10% of children were resuscitated without receiving initial care, and it should be noted that 10% of children did not become ill at all. In all cases, nasogastric tubes were installed. After stabilizing the newborns' condition, they were transferred to the neonatal surgery department of the scientific center for pediatrics and pediatric surgery within 24 hours after birth. Chest X-rays (Figure 2.) and ultrasound examinations of the abdominal cavity, clinical and laboratory studies were conducted. Prenatal screening is the gold standard for diagnosis: most often prenatal ultrasound, chest X-ray after birth, the method of ultrasound of the thoracic and abdominal cavity, EchoCG, FEGDS, computed tomography, therapeutic bronchoscopy.

Figure 2.
After and before X-Ray



It should be noted that of these 40 (100%) newborns, 33 children (82.5%) were treated with a diagnosis of false left-sided diaphragmatic hernia. Of these, 30 (90.9%) were children with Bochdalek hernia. Morgagni hernia was found in 9.1% of cases (Figure 3).

Figure 3.
Types of diaphragmatic hernias



Results and discussion

And the remaining 7 (17.5%) infants received treatment for true diaphragmatic hernia. Over these 5 years, no other types of diaphragmatic hernia were encountered. According to the statistics of the surgical waiting list, 7 (17.5%) children underwent thoracoscopic normalization for true diaphragmatic hernia. Of the 33 (82.5%) infants, 31 (93.9%) underwent surgery on the abdominal cavity. The remaining 2 children (6.1%) underwent thoracotomy. Of these 33 (82.5%) infants, 27 infants (81.8%) underwent diaphragm autoplasty during the operation, and 6 (8.2%) infants underwent alloplasty (Figure 5) with synthetic material (Gore-Tex). In cases of double defect (omphalocele), during the operation, the omphalocele defect was introduced into the left diaphragm, an operation was performed on the diaphragm, and then the abdominal organs were placed in a Schuster bag due to incompatibility with the abdominal cavity. The second stage was performed after 7 days.

According to this 5-year statistic, 5 (12.5%) infants died in our hospital. The cause of death is often persistent pulmonary hypertension and congenital heart disease.

Figure 4.
Intraoperation laparotomy view

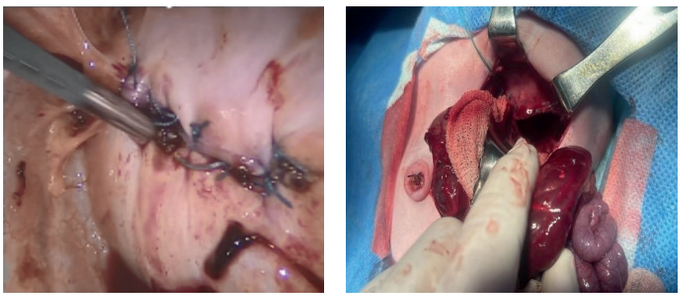
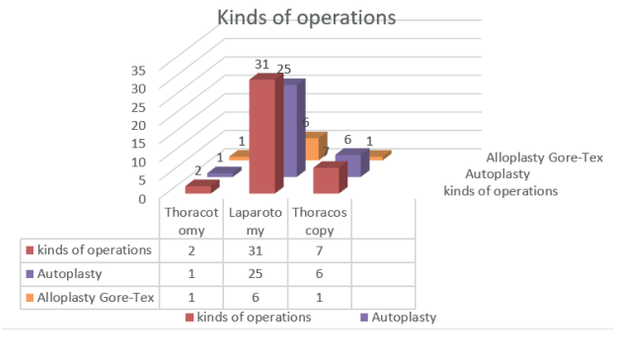


Figure 5.
Kinds of operations



Overall, this study provides valuable information on the treatment of diaphragmatic hernia in newborns and highlights the importance of prenatal screening for this condition. The findings of the study suggest that false left-sided diaphragmatic hernia is more common than true diaphragmatic hernia, and that surgery on the abdominal cavity is more frequently performed than thoracotomy. The study also highlights the importance of early diagnosis and prompt treatment in improving outcomes for newborns with diaphragmatic hernia.

Conclusion

Based on the information presented, it can be concluded that there is a need to increase the level of perinatal care, particularly in the area of prenatal screening for diaphragmatic hernia. Pregnant women should be hospitalized at the 3rd or 4th degree of pregnancy to ensure early detection of any potential health issues in the fetus. In addition, the medical team should follow the protocol of the Republic of Kazakhstan to provide appropriate first aid to newborns and avoid any unfavorable conditions during transportation. These measures can help reduce the mortality rate of infants with diaphragmatic hernia and improve their chances of successful treatment.

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