UDC 616.712-007.24
DOI – https://doi.org/10.14300/mnnc.2023.18050
ISSN – 2073-8137

HYBRID (NUSS – RAVICH) CORRECTION OF LOCALIZED DEEP DEPRESSION OF CHEST WALL DEFORMATION

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ГИБРИДНАЯ (НАСС – РАВИЧ) КОРРЕКЦИЯ ГЛУБОКОЙ ЛОКАЛЬНОЙ ВОРОНКООБРАЗНОЙ ДЕФОРМАЦИИ ГРУДНОЙ КЛЕТКИ

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Pectus excavatum (PE) is the most common pathology of the chest wall. Correction of PE improves the quality of life of patients, as well as improves cardiopulmonary activity. The operation of choice in pediatric practice is the mini-invasive Nuss method. In rare cases, the Ravich method is used. In clinical observation, the first experience of surgical treatment of a child with a deep form of PE using the Nuss – Ravic hybrid technique with a description of the surgical procedure we were demonstrated. This approach has significantly – improved the cosmetic result and reduced the trauma of surgery.

Keywords: pectus excavatum, thoracoplasty, surgical correction

Воронкообразная деформация грудной клетки (ВДГК) – наиболее частая патология грудной стенки. Проведенная коррекция ВДГК повышает качество жизни пациентов и улучшает сердечно-легочную деятельность. Операцией выбора в детской практике является мини-инвазивный метод Насса. В редких случаях применяется метод Равича. В клиническом наблюдении продемонстрирован первый опыт оперативного лечения ребенка с глубокой ВДГК по гибридной методике Насса – Равича с описанием техники операции. Использование данного подхода позволило значительно улучшить косметический результат и снизить травматичность оперативного вмешательства.

Ключевые слова: воронкообразная деформация грудной клетки, торакопластика, хирургическая коррекция

For citation: Kuzmichev V. A., Pykhteev D. A., Gatsutsyn V. V., Duryagin V. D. HYBRID (NUSS – RAVICH) CORRECTION OF LOCALIZED DEEP DEPRESSION OF CHEST WALL DEFORMATION. *Medical News of North Caucasus.* 2023;18(2):209-211. DOI – https://doi.org/10.14300/mnnc.2023.18050

Для цитирования: Кузьмичев В. А., Пыхтеев Д. А., Гацуцын В. В., Дурягин В. Д. ГИБРИДНАЯ (НАСС – РАВИЧ) КОРРЕКЦИЯ ГЛУБОКОЙ ЛОКАЛЬНОЙ ВОРОНКООБРАЗНОЙ ДЕФОРМАЦИИ ГРУДНОЙ КЛЕТКИ. *Медицинский вестник Северного Кавказа*. 2023;18(2):209-211. DOI – https://doi.org/10.14300/mnnc.2023.18050

CWD – chest wall deformity
ECG – electrocardiography
EPGDS – esophagogastroduodenoscopy
FER – functions of external respiration
MSCT – multislice computed tomography
PE – pectus excavatum

Pectus excavatum (PE) is the most common congenital deformity among all pathologies of the anterior chest wall, with an incidence of 85–90 % (1:1000–3:1000 newborns), with a predominance of boys (4:1). Chest wall deformity (CWD) with ultra-deep local deformity due to significant curvature of the sternum is rare, and methods of surgical correction are not standardized.

Treating this deformation is a difficult task. The Nuss Thoroplasty does not lead to a complete correction due to the remaining acute thorax. Classic Ravich, a highly traumatic surgery with sternotomy and resection of sternocostal cartilage, is not welcomed in modern society to eliminate this defect. We present our first experience of hybrid correction of ultra-deep local CWD, combining gentle sternotomy without resection of a sternocostal skeleton with osteosynthesis and classical Nuss thoracoplasty [1].

Deep depression of CWD is diagnosed during a physical examination of the patient, combining local chest depression with a pronounced «banana» curvature of the sternum. The main reason for visiting a doctor and deciding on the subsequent correction of deformation is a cosmetic defect that decreases the quality of life [2, 3]. Severe funnel-like deformation can cause cardiopulmonary disorders, especially during physical exertion [4].

Clinical case. Patient M., a 16-year-old boy, was under our care and treatment. On arrival at the hospital, he complained of a local abrupt abnormality of the lower third of the sternum, which had progressed rapidly since the age of 12. Physical examination, clinical and instrumental data, including radiography and computed tomography, made it possible to establish the diagnosis of PE (Fig. 1). Considering the identified type of deformity and the absence of contraindications, it was decided to perform a Nuss – Ravich hybrid thoracoplasty.

Fig. 1. CT-scan. PE with extra deep local deformity

Sternotomy was described earlier [5]. The first stage was a V-shaped horizontal gentle sternotomy at the top of the deformation, retaining the posterior cortical layer. You can do it with a hammer and a chisel or a saw. The remodeling of the sternum can be accomplished by pressing down on the top of the deformation and by extending the body of the sternum upwards. By preserving the posterior cortical layer and reducing the edges of the sternum, this method is similar to the «raw branch» type. This method is used without resectioning the sternum complex in the case of rigid breasts.

The combination of Nuss' operation with sternal osteosynthesis was described earlier [6]. The standard Nuss thoracoplasty was performed after sternotomy and before osteosynthesis. We used bilateral thoracoscopy for visual inspection. The plate was placed inclined through a peak deformation to maximize the height of the sternum, with a stabilizer located at the top right [7]. Then the video control of the pleural cavities was performed, the position of the correcting plate was assessed, the lung expansion was estimated, thoracoports were removed, leaving the pleural effluent. After completing the Nuss operation, osteosynthesis of the sternum was performed with two parallel vertical titanium plates (DePuy-Synthes, Switzerland) with two-way fixation with locking screws. The vertical similar arrangement of the plates allows the median sternotomy to be performed in the future. Drainage of the subcutaneous and axillary space was performed as a result of active effluents. Drainages from the pleural cavities were removed after achieving tightness. The operation lasted 260 minutes. The patient was activated the next day after surgery, physiotherapy and breathing exercises were connected. Prolonged epidural analgesia for three postoperative days made it possible to avoid using narcotic analgesics and exclude the patient's stay in the intensive care unit. Antibiotic prophylaxis in the average therapeutic dosage and nonsteroidal anti-inflammatory drug was assigned. X-ray examination of the chest organs with an evaluation of the results was performed in the early postoperative period and before discharge on the 5th day (Fig. 2). The patient was discharged in satisfactory condition on the 6th day (Fig. 3). Check-up after three months. After the surgery, the sternotomy wound was healed with primary intent without signs of inflammation. The corrective reverse plate shall be removed 36 months after the operation.

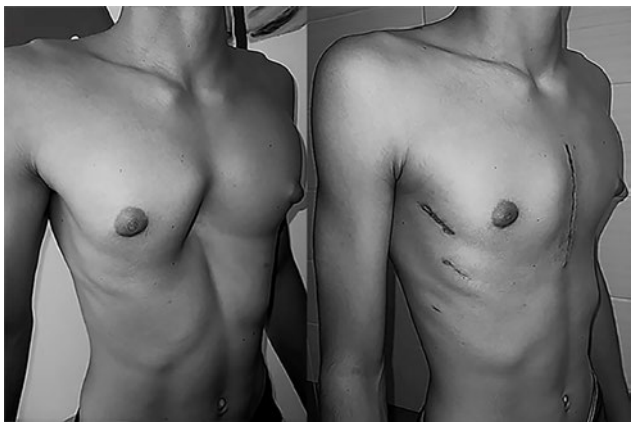

Fig. 2. Before and after correction of the PE with extra deep local deformity

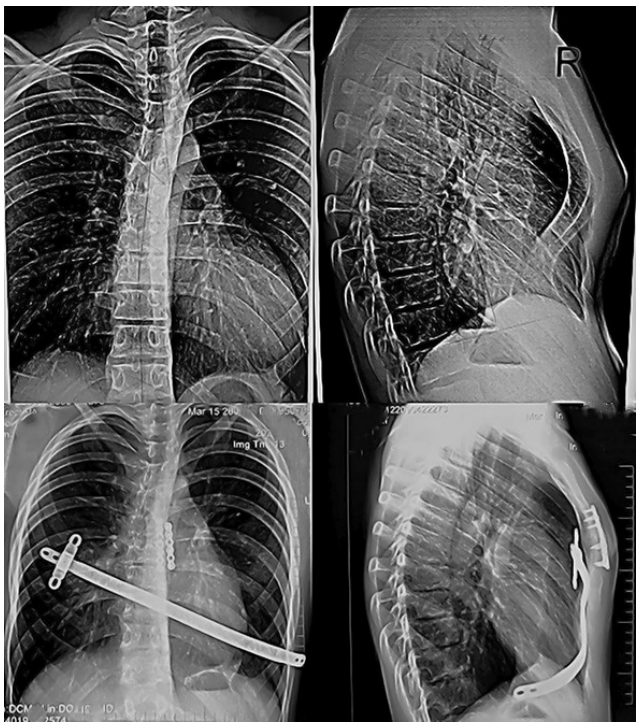

Fig. 3. X-ray of thorax before and after procedure

Conclusion. The presented clinical case demonstrates a rare type PE treatment in pediatric surgical practice. The use of hybrid technology significantly improved the cosmetic result and reduced the injury of the intervention. This contributed to the early activation of the patient, as well as reducing the time of postoperative rehabilitation.

Disclosure: The authors declare no conflict of interest.

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UDC 616.348-002:573.6
DOI – https://doi.org/10.14300/mnnc.2023.18051
ISSN – 2073-8137

BIOMARKERS OF NECROTIZING ENTEROCOLITIS THROUGH THE PRISM OF ETIOPATHOGENESIS

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БИОМАРКЕРЫ НЕКРОТИЗИРУЮЩЕГО ЭНТЕРОКОЛИТА С ПОЗИЦИЙ ЭТИОПАТОГЕНЕЗА

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The review analyzes the pathogenetic aspects of using diagnostic markers of necrotizing enterocolitis (NEC). The substantiation of the leading and common tags for various pathological factors depending on the period of the disease in newborns is carried out. Peculiarities of diagnostics, characteristic of different stages of the disease, are considered. Thus, using biomarkers that consider the staging and severity of the course of NEC in newborns will allow targeted interventions on various etiopathogenetic links to prevent disease progression and reduce mortality.

Keywords: necrotizing enterocolitis, biomarkers, children

В обзоре представлен анализ патогенетических аспектов использования диагностических маркеров некротизирующего энтероколита (НЭК), предложенных на сегодняшний день. Проводится обоснование ведущих и общих маркеров для разных патологических факторов в зависимости от периода заболевания у новорожденных. Рассмотрены особенности диагностики, характерные для различных этапов заболевания. Таким образом, использование биомаркеров, учитывающих стадийность и тяжесть течения НЭК среди новорождённых, позволит проводить таргетное воздействие на различные этиопатогенетические звенья для предупреждения прогрессирования заболевания и снижения летальности.

Ключевые слова: некротизирующий энтероколит, биомаркеры, дети

For citation: Vinel P. K., Tsareva V. V., Sinitskiy A. I., Kozhevnikov A. S., Sherstobitov A. V., Semenov I. A. BIOMARKERS OF NECROTIZING ENTEROCOLITIS THROUGH THE PRISM OF ETIOPATHOGENESIS. *Medical News of North Caucasus*. 2023;18(2):211-218. DOI – https://doi.org/10.14300/mnnc.2023.18051

Для цитирования: Винель П. К., Царева В. В., Синицкий А. И., Кожевников А. С., Шерстобитов А. В., Семёнов Ю. А. БИОМАРКЕРЫ НЕКРОТИЗИРУЮЩЕГО ЭНТЕРОКОЛИТА С ПОЗИЦИЙ ЭТИОПАТОГЕНЕЗА. *Медицинский вестник Северного Кавказа.* 2023;18(2):211-218. DOI – https://doi.org/10.14300/mnnc.2023.18051