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IMPACT OF PERINATAL MANAGEMENT IN PRENATAL SUSPICION OF AORTIC ARCH PATHOLOGY ON THE WORK OF INTENSIVE CARE UNIT OF CARDIAC SURGICAL CENTER

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The article contains results of performance of two approaches to management of newborns with prenatal suspicion of different variants of aortic arch pathology at one Cardiac Surgical Center. The way of optimisation of perinatal management of such patients by their stratification with changing of location and time of primary consultation in Cardiac Surgical Center and its result was described. Implementation of differentiated perinatal management possible to reduce incidence and length of stay in the cardiac intensive care unit of newborns with prenatal suspicion of aortic arch pathology without worsening outcomes.

Key words: *aortic arch pathology, perinatal management, intensive care*

Aortic arch pathology occurs in 10% of infants with congenital heart defects [1, 2] and has a wide range of morphogenetic including various complexity and prognosis. The term for cardiac care for these children depends on anatomic variant flaws. This group of pathology remains one of the most difficult for prenatal diagnosis [3]. Existing universal approach to perinatal management of patients with prenatal suspicion of aortic arch pathology as the critical heart defects

with duct-dependent systemic blood flow, contains the birth of these children near or directly in cardiac surgical centers, the using of prostaglandin immediately after birth to the moment of complex diagnostics [4]. Often the correct diagnosis of this pathology (excluding interrupted aortic arch) in the newborn requires follow-up of the process of natural closure of the arterial duct, i.e. waiting. The most significant consequence of over-diagnosis of pathology of this group are the costs of unjustified stay healthy baby in the intensive care unit (ICU) [5].

The aim of this study was to analyze the results of using of two approaches (differentiated and undifferentiated) to perinatal management of newborns with prenatal suspicion of aortic arch pathology.

Material and methods. To achieve the set target analyzed medical records of patients with prenatal suspicion of aortic arch pathology during 2011-2013, (202 fetuses). The entire study period was divided into two stages, depending on the approach to the management of these patients.

In the first phase (January 2011 - August 2012, 92 cases, 77 were born alive) used the universal approach described above.

In the second phase (September 2012 - December 2013, 110 cases, 81 born alive as of this writing) implemented a differentiated approach to the management of newborns with prenatal suspicion of aortic arch pathology.

Affiliation patients to one of three groups performed at prenatal echocardiographic examination. Anatomical criteria of group term its definition and recommendations for perinatal management of patients are shown in table 1.

Results and discussion. In 79 children (out of 158 live births, 50.0%) who had prenatally suspected aortic arch pathology, the diagnosis is confirmed. The frequency of prenatal diagnosis confirmation after birth in two stages with different perinatal management is not significantly different (χ^2=0.228; number of degrees of freedom 1; p>0,3).

Of the 77 live births during the first stage, all the children were consulted on the first day of life, 67 (87.0%) of them were admitted to the ICU. In 37 (48.1%) of them aortic arch pathology had been confirmed and surgery had been performed.

The actual length of stay in the ICU of patients before surgery or transfer to the department of general stay in undifferentiated approach amounted to 279 days (mean 3.6±0.7 days); while 148 (53.0%) had to forecast on 30 healthy children with prenatal false suspicion of aortic coarctation - the observation time for transfer to the department of general stay.

Of the 81 live births in the second stage to the 1st group included 4 children, or 4.9% (all examined and admitted on the first day of life), the 2nd - 17, or 21 %

Table 1.

Recommendations for perinatal management in suspicion of aortic arch pathology in the fetus

Group	Anatomical criteria	Determination term belonging to the group	Location of birth	Term of counseling of newborn at cardiac center
I	Interrupted aortic arch	36 weeks	Nearby cardiac center	During the first day of life
II	Borderline left heart or variants of hemodynamically single ventricle with aortic coarctation			
III	Isolated aortic coarctation	34 weeks	Specialized regional maternity hospital on a residence	On the day of discharge from the maternity hospital and not later than 5 days

(all examined on the first day, 12 of them were admitted at ICU, 5 re-examined on the day of discharge from the maternity hospital - in the two aortic arch pathology is excluded), the 3rd - 60 children, or 74.1 %.

In the management of 8 children (13.3 %) of the 3rd group recommendations have not been followed , three of them consulted before 5 days of life in a stable state (one dmitted in the ICU, performed elective surgery in 8 days, two re-examined on the day of discharge from the maternity hospital - aortic arch pathology is excluded); five consulted after 5 days of life due to the inability to transport through concurrent pathology (three were admitted in the ICU and operated for one day, two has no aortic arch pathology). The remaining 52 (86.7%) examined at 5 days of life, 19 of them admitted to the department of general stay and operated routinely. Thus, in 39 children (48.1% 2 and 37 from the 2nd to the 3rd group) prenatal diagnosis was not confirmed, and they were not in the ICU. All patients of the second stage than those who had concurrent extracardiac pathology were stable state at the initial examination, admission and before surgery. The total and average actual length of stay of patients before surgery or transfer to the department of general stay in using of differentiated perinatal mangement amounted to 60,2 and 0.7±0.6 days respectively. Given previous experience of undifferentiated approach, we calculate the expected length of stay of patients in each group of the 2nd period and the expected total length of stay in the ICU (289.5 days, table 2).

As shown in table 2, the actual length of stay in the ICU was able to significantly and reliably reduce in patients of the 2nd and 3rd groups.

Table 2.

Changing the length of stay in the neonatal intensive care unit when using a differentiated approach to perinatal management

Group	The expected length of stay, days	The actual length of stay (mean±SD), days	Difference, days
I	8.4	8.7 (2.2±0.5)	0.3
II	52.5	42.9 (2.6±1.7)	-9.6

III	228.6	8.6 (0.5±0.5)	-220.0 ($p<0.05$)
Total	289.5	60.2 (0.7±0.6)	-229.3 ($p<0.05$)

Given the quantitative predominance the patients of the 2nd and 3rd groups, such differentiated perinatal management leads to a significant reduction in the number of admissions of newborns with prenatal suspicion of aortic arch pathology in the first days of life and, therefore, significantly reduce the actual length of stay of these children in the cardiac ICU.

Conclusion

1. Prenatal diagnosis of the aortic arch pathology remains challenging with low specificity (high percentage of over-diagnosis).
2. Universal, undifferentiated approach to the management of newborns with prenatal suspicion of aortic arch pathology has led to a significant incidence and duration of stay in the cardiac ICU of patients with false prenatal suspicion of aortic coarctation.
3. Development and implementation of a differentiated approach to the management of these patients have significantly and reliably reduce the incidence and duration of stay of neonates in cardiac ICU, which had a significant positive economic effect without worsening outcomes.

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ВПЛИВ ПЕРИНАТАЛЬНОЇ ТАКТИКИ ПРИ ПРЕНАТАЛЬНІЙ ПІДОЗРІ ПАТОЛОГІЇ ДУГИ АОРТИ НА РОБОТУ ВІДДІЛЕННЯ ІНТЕНСИВНОЇ ТЕРАПІЇ КАРДІОХІРУРГІЧНОГО ЦЕНТРУ

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У статті наведено результати застосування двох підходів до ведення новонароджених із пренатальною підозрою різних варіантів патології дуги аорти в межах одного кардіохірургічного центру. Описано алгоритм та результати оптимізації перинатального ведення таких пацієнтів шляхом їх стратифікації зі зміною місця пологів та терміну першої планової консультації в кардіохірургічному центрі. Впровадження диференційованої перинатальної тактики дозволило зменшити частоту випадків та тривалість перебування в кардіохірургічному відділенні інтенсивної терапії новонароджених із пренатальною підозрою патології дуги аорти без погіршення результатів лікування.

Ключові слова: *патологія дуги аорти, перинатальна тактика, інтенсивна терапія*

ВЛИЯНИЕ ПЕРИНАТАЛЬНОЙ ТАКТИКИ ПРИ ПРЕНАТАЛЬНОМ ПОДОЗРЕНИИ ПАТОЛОГИИ ДУГИ АОРТЫ НА РАБОТУ ОТДЕЛЕНИЯ ИНТЕНСИВНОЙ ТЕРАПИИ КАРДИОХИРУРГИЧЕСКОГО ЦЕНТРА

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В статье приведены результаты применения двух подходов к ведению новорожденных с пренатальным подозрением различных вариантов патологии дуги аорты по данным одного кардиохирургического центра. Описан алгоритм и результаты оптимизации перинатального ведения таких пациентов путем их стратификации с изменением места родов и времени первой плановой консультации в кардиохирургическом центре. Внедрение дифференцированной перинатальной тактики позволило уменьшить частоту случаев и длительность пребывания в кардиохирургическом отделении интенсивной терапии новорожденных с пренатальным подозрением патологии дуги аорты без ухудшения результатов лечения.

Ключевые слова: *патология дуги аорты, перинатальная тактика, интенсивная терапия*