

Non-Immune Hydrops Fetalis: Management and Outcomes

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Resume: The rapid development of fetal surgery has become possible thanks to modern online visualization systems, improvement of tools and equipment that allow penetrating into the special world of intrauterine development without consequences. One of the antenatal pathologies of the fetus that requires such high-tech minimally invasive methods of fetal treatment is non-immune fetal hydrops. This article discusses various aspects of non-immune fetal hydrops, including etiology, clinical picture, antenatal diagnosis and treatment tactics, and also provides some data on cases of non-immune fetal hydrops treated in the fetal medicine department of the Republican Specialized Scientific and Practical Medical Center for Maternal and Child Health.

Keywords: non-immune hydrops fetalis, immunoglobulin therapy, fetal arrhythmias, paracentesis, thoracocentesis, cordocentesis, amnioreduction.

Relevance of the topic

Nowadays, the problem of non-immune hydrops fetalis is being actively studied all over the world. The complexity of diagnosis and intrauterine treatment is associated with the polyetiology of the disease, as well as high perinatal mortality [1].

Non-immune hydrops fetalis is the final stage for a number of intrauterine diseases and its treatment, of course, requires highly specialized high-tech minimally invasive intrauterine interventions which used in modern fetal medicine [3]. If the disease occurs early in gestation, the mortality rate reaches 95% [4]. With the development of pathology in the third trimester, the probability of intra- or perinatal death of the child is about 80% and only early diagnosis of the disease and the use of high-tech modern medical methods in the antenatal period can reduce this figure to 20% [2].

Materials and methods. The study included 201 pregnant women with nonimmune hydrops fetalis. The study was carried out in 2 stages. At the 1st stage, a retrospective analysis was carried out at the Republican Center "Screening of Mother and Child" and consisted of 150 pregnant women with non-immune hydrops fetalis. At the second stage, a prospective study was conducted and 51 pregnant women were included who applied to the center of the RSPMCOG during 2020-2022. with a diagnosis of "non-immune hydrops fetalis", 9 of them had termination of pregnancy for medical reasons due to the detection of chromosomal abnormalities in the early stages of pregnancy. The remaining 42 pregnant women were divided into 2 groups depending on their choice of expectant or active management of pregnancy with non-immune hydrops fetalis. The 1st group included 20 women who used active tactics, the 2nd group included 22 women who refused active tactics and used wait-and-see tactics.

The causes identified in retrospective and prospective studies were divided into 14 categories and compared with the results of foreign studies. As a result of the analysis, trends similar to foreign studies were identified. The most common causes were cardiovascular pathologies and infections.

Results and discussion. According to the results of a retrospective analysis, pregnancy was terminated in 85% of women according to ultrasound, while in a prospective study, pregnancy was terminated in only 17.6% of cases due to the detection of chromosomal abnormalities.

This study used a graded approach to the treatment of NHF, with almost all cases starting with conservative treatment.

An internal protocol for the management of pregnancy in women with non-immune hydrops fetalis has been developed. Based on the established examination protocol, in 74.5% of cases the etiology of non-immune hydrops fetalis was established in the antenatal period, and in 25.4% of cases it was classified as idiopathic. Postpartum examination allowed establishing the etiology in 12% of cases.

This study was the first to examine the effectiveness of immunoglobulin therapy in pregnant women with nonimmune hydrops fetalis and to develop an immunoglobulin treatment regimen. Immunoglobulin therapy was mainly used for non-immune fetal hydrops caused by infectious factors. The effectiveness of treatment was assessed by ultrasound markers of inflammation and the titer of proinflammatory mediators in fetuses with non-immune hydrops. All immunoglobulin treatments in this study showed a decrease in proinflammatory markers after treatment. In 2 out of 9 cases (22.2%), treatment was ineffective. In the remaining 7 cases (77.7%), the pregnancy outcome was positive.

The study also developed a safer and more step-by-step sequence of algorithms for arrhythmia and fetal heart failure in non-immune hydrops. The effectiveness of antiarrhythmic and cardiotonic treatment was assessed by restoring fetal rhythm during ultrasound and echocardiography, reducing symptoms of hydrops fetalis, reducing symptoms of heart failure and tricuspid valve insufficiency, reducing cardiothoracic and cardiofemoral indices. In all cases of fetal tachyarrhythmias, treatment was successfully completed in 100% (4/4), in 72.7% (8/11) cases of heart failure, the symptoms of heart failure were eliminated as a result of treatment, in 27.3% (3/11) cases, the outcomes were unfavorable.

In the group with active tactics, fetal treatment was used in all cases. In 85% (17/20) of cases, fetal conservative therapy was used, in 55% (11/20) of cases, minimally invasive fetal surgical interventions were used. Minimally invasive operations on the fetus were performed only in cases where etiopathogenetic treatment was impossible or ineffective. Amnioreduction was performed in 45% (9/20), laparocentesis in 25% (5/20), thoracentesis in 10% (2/20) and septotomy in 5% (1/20). All operations were performed successfully and without complications.

According to the results of the study, in the group where active tactics were carried out, term births were observed more often and statistically significantly ($p < 0.001$). In the group where expectant management was used, urgent labor was not observed at all. This indicates the effectiveness of therapeutic manipulations for this disease.

Perinatal outcomes were compared between the retrospective group and the prospective active group, with survival rates being 3% (3/100) in the retrospective group and 70% (14/20) in the prospective group ($p < 0.001$).

Conclusion. Thus, intrauterine treatment for non-immune hydrops fetalis is preferable, since as a result of treatment, pregnancy is prolonged, the manifestations of non-immune hydrops fetalis are stopped, and perinatal outcomes are improved. The lack of diagnostic algorithms and tactics for managing pregnancy with non-immune hydrops fetalis in our country significantly affects perinatal outcomes in this pathology. Non-immune fetal hydrops diagnosed by ultrasound is often a reason for unjustified termination of pregnancy. A detailed study of the causes of non-immune hydrops at the prenatal stage will allow us to identify a category of patients who are promising for fetal therapy and fetal surgical interventions. This work will fill the gap in the field of fetal interventions in healthcare, and thereby contribute to the reduction of perinatal mortality.

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