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INTRAPARTUM FETAL HYPOXIA: SEARCH FOR MATERNAL PREDICTORS OF PATHOLOGY

A retrospective analysis of the medical records of 203 women who gave birth at full term in a second-level obstetric hospital was carried out in order to study the characteristics of the medical history, the course of gestation and the outcome of childbirth with intrapartum fetal hypoxia (IHF, distress). **Materials and methods:** postpartum women were divided into 2 groups: group 1 (control) - 36 people (17.73%) without intrapartum fetal hypoxia (IHF) (average gestational age at the time of birth - 39.4 weeks), group 2 (main) - 167 patients (82.27%) with IHF (average period - 40.4 weeks). **Results and Conclusion.** Postpartum women of group 2 (with IGP) were younger than women of group 1 ($28,16 \pm 5,52$ years and $30,25 \pm 4,94$ years, respectively, $p = 0,01$). In the obstetric and gynecological history of patients in group 2, primiparous women were more often noted (61%) with a large number of previous pregnancies (2.59). Gynecological pathology in the anamnesis was 2.4 times more likely to be detected in patients of group 2 with a significant predominance in the structure of inflammatory diseases of the cervix, uterine fibroids, endometrial polyp, and polycystic ovary syndrome. In the main group, pregnant women were significantly more likely to be diagnosed with respiratory diseases (21.4%), somatization disorder (F45 - neurocirculatory dystonia) (20.96%), obesity and other hyperalimentation (18.56%), subclinical hypothyroidism (13.77%). Myopia from childhood is 2.24 times more likely to be established as a concomitant diagnosis in group 2 postpartum women. In the main group, there were significantly more nicotine-dependent pregnant women (7.78%). Our data are consistent with domestic and foreign studies and indicate that further systematic study of maternal prognostic factors of fetal distress during childbirth is necessary to develop preventive pregravid programs.

Key words: full term pregnancy, fetal hypoxia, fetal distress, preconception risk factors

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Introduction. Statistics from the Russian Federation show that the country is in a demographic crisis [1]. The medical side of this issue poses an urgent task for the medical community: a personalized approach to the management of each pregnancy, careful and safe delivery. The most difficult problem of modern obstetrics is intrauterine fetal hypoxia (fetal distress), which is the cause of up to 40% of stillbirths and neonatal mortality [2, 5, 8].

The development of acute intrauterine hypoxia is caused by impaired blood supply to the fetus; the most common cause of the development of this condition during pregnancy is premature placental abruption or thrombosis of the placental vessels; during childbirth - pathology of uterine contractility [3, 7]. The result of perinatal hypoxia is damage to various organ systems, primarily the central nervous system, which is not only a medical, but also a social problem [1, 9, 13]. Many questions regarding the causes of fetal distress are controversial. According to a number of authors, the effectiveness of calculating antenatal risk factors for fetal distress is low, and anamnesis data and past infectious diseases are not modifiable and have little specificity for the development of intrapartum fetal hy-

poxia (IHF) [4, 9]. However, the number of cases included in the studies is small; at the same time, the authors point to a significant incidence of obesity and early reproductive age in mothers of newborns with intrapartum fetal hypoxia (IFH) [4, 10]. Other researchers have identified a high frequency of complicated somatic and obstetric-gynecological history in IGP [3, 5, 6, 14]. Additional research is required to explain these discrepancies.

To date, there are no published systematic data on low- and average-risk pregnant women for perinatal and maternal mortality that analyze pre-conceptional risk factors for intrapartum fetal hypoxia (IHF) at full term.

The purpose of our study was to assess the causes of intrapartum fetal hypoxia (IHF) during full-term pregnancy in a second-level obstetric hospital, if possible, to provide medical care while analyzing preconception risk factors.

Materials and research methods. A retrospective analysis of medical documentation (birth history, individual card of the pregnant and postpartum women) was carried out for 203 women who gave birth in an obstetric hospital of the second group (level) where medical care was available (GBUZ TO "Materni-

Table 1

Characteristics of the obstetric history of postpartum women, n (%)

Study criterion	1 group, control (n=36)	2 group (n=167)	P
Primigravidae	1 (2.78%)	91 (54.49%)*	p<0.001
Multipregnant women / - number of pregnancies in history (M±SD)	35 (97.22%) / 1.97±0.92	76 (45.51%)* / 2.59±1.82*	p<0.001
- 1 / 2 pregnancy	14 (38.89%) / 9 (25.00%)	30 (17.96%)* / 16 (9.58%)*	p=0.01 / p=0.03
- 3 / 4 pregnancy	11 (30.56%) / 1 (2.78%)	9 (5.39%)* / 8 (4.79%)	p=0.002 / p=0.27
- 5 / 6 pregnancy	0 (0%) / 0 (0%)	6 (3.59%)* / 4 (2.40%)*	p=0.007 / p=0.02
- 7 / 8 pregnancy	0 (0%) / 0 (0%)	2 (4.19%) / 1 (0.60%)	p=0.08 / p=1.16
Primipara	5 (13.89%)	102 (61.08%)*	p<0.001
Multiparous	31 (86.11%)	65 (38.92%)*	p<0.001
- number of births in history (M±SD)	1.69±0.78	1.75±1.03	
- 1 / 2 st births	13 (36.11%) / 13 (36.11%)	36 (21.56%)* / 16 (9.58%)*	p=0.04 / p=0.002
- 3 / 4 or more births	5 (13.89%) / 0 (0%)	7 (4.19%)* / 6 (3.79%)	p=0.04 / p=0.06
Complicated obstetric history:			
Medical abortion / Number of abortions in history (M±SD)	6 (16.67%) / 1.17±0.41	33 (19.76%) / 1.82±1.29	p=0.33
Spontaneous miscarriage	3 (8.34%)	14 (8.38%)	p=0.49
Regressive pregnancy	2 (5.56%)	9 (5.38%)	p=0.37
Ectopic pregnancy	2 (5.56%)	4 (2.39%)	p=0.18

Note: * – p < 0.05 when comparing the 1st and 2nd groups.

ty Hospital No. 3", Tyumen). Depending on the presence of fetal hypoxia during childbirth (FH), postpartum women were divided into 2 groups: group 1 (control) - 36 women (17.73%) without intrauterine fetal hypoxia during childbirth (average gestational age at the time of birth - 39.4 weeks), group 2 (main) - 167 pregnant women (82.27%) with a diagnosis: Labor and delivery complicated by fetal stress [distress] (O68 (Labor and delivery complicated by abnormality of fetal acid-base balance) – code: International Statistical Classification of Diseases and Related Health Problems - ICD-10) (average period - 40.4 weeks). Participants in group 1 were selected by using systematic random sampling method.

Type of study: continuous cross-section of all postpartum women diagnosed

with: O68 Labor and delivery complicated by abnormality of fetal acid-base balance for 2021. (total births - 3482 cases, the frequency of this pathology during this period was 4.8%). There were no perinatal deaths in either group during the study period. Criteria for inclusion in the main group: availability of medical documentation on clinical observation for pregnancy in the antenatal clinic (exchange card of a pregnant woman, parturient woman and postpartum woman (form N 113/u-20)) and birth history (medical record of a pregnant woman, parturient woman and postpartum woman receiving medical care in a hospital setting (form N 096/1y-20)). Criteria for non-inclusion in both groups: multiple pregnancy.

Statistical processing of the research results was carried out using software

packages: Microsoft Excel 2010, SPSS 25.0. Statistical analysis included univariate analysis with Student's t test and Fisher's exact test, and p < 0.05 was considered significant.

Results and Discussion. When analyzing the age of postpartum women, a significantly younger age was revealed in patients of group 2 (with IHF) 28,16±5,52 years. Women whose births occurred without IHF (control groups) were on average 2 years older (30.25±4.94 years, p = 0,01) and had a history of childbirth 2.2 times more often. When studying the social characteristics of postpartum women of both groups, no static differences were revealed: a greater number of women were employed (group 1 - 66.67%, group 2 - 67.07%) and were urban residents (group 1 - 69.44%, group 2 - 77.84%).

Table 2

Characteristics of gynecological pathology experienced by postpartum women, n (%)

Gynecological pathology	1 group, control (n=36)	2 group (n=167)	P
Vaginitis / Inflammatory diseases of the cervix	2 (5.56%) / 5 (13.89%)	22 (13.17%) / 46 (27.54%)*	p=0.05 / p=0.02
Endometrial polyp / Uterine fibroids	0 (0%) / 0 (0%)	4 (2.40%)* / 15 (8.98%)*	p=0.02 / p<0.001
Polycystic ovary syndrome	0 (0%)	7 (4.19%)*	p<0.001

Table 3

Characteristics of somatic pathology of postpartum women, n (%)

Extragenital pathology	1 group, (n=36)	2 group (n=167)	P
Diseases of the respiratory system	1 (2.78%)	36 (21.4%)*	p<0.001
Somatization disorder (neurocirculatory dystonia)	2 (5.56%)	35 (20.96%)*	p=0.001
Obesity and other hyperalimentation	0 (0%)	31 (18.56%)*	p<0.001
Subclinical hypothyroidism	0 (0%)	23 (13.77%)*	p<0.001
Myopia	5 (13.89%)	52 (31.14%)*	p=0.007
Pathology of the kidneys, ureters, bladder	0 (0%)	20 (11.98%)*	p<0.001
Diseases of the musculoskeletal system	0 (0%)	9 (5.39%)*	p=0.001
Atrioventricular block, first degree (tachycardia, arrhythmias)	0 (0%)	5 (2.99%)*	p=0.01
Essential (primary) hypertension	0 (0%)	3 (1.80%)*	p=0.04
Chronic viral diseases (HIV / hepatitis)	0 (0%)	7 (4.19%)*	p=0.004
Nicotine addicts / Drug addicts	0 (0%) / 0 (0%)	13 (7.78%)* / 1 (0.60%)	p=0.0001 / p=0.16

The number of primigravidas in group 2 (patients with intrauterine fetal hypoxia) is 19.6 times greater than in postpartum women without IHF ($p < 0,001$). Also in group 2 there was a 31.47% greater number of pregnancies in the anamnesis compared to group 1 (puerperas without IHF) ($p < 0,001$). The proportion of primiparous women in group 2 was significantly higher by 4.7 times compared to group 1 (61.08% and 13.89%, respectively). The proportion of primiparous women in group 2 was significantly higher by 4.7 times (table 1).

Intrapartum hypoxia during full-term pregnancy more often occurred in younger parturients and, in most cases, primigravidas, which has been repeatedly noted in various studies, including analyzes of the consequences of severe fetal asphyxia and long-term neurological disorders in children [4, 10, 14].

Gynecological pathology (table 2) in the anamnesis was 2.4 times more likely to be detected in patients of group 2 with a significant predominance in the structure of inflammatory diseases of the cervix, uterine fibroids, endometrial polyp, and polycystic ovary syndrome. Other gynecological diseases did not differ in frequency. Infertility was noted in 3 patients of the main group ($p = 0,04$); assisted reproductive technologies were not used in patients of both groups.

An important fact, from our point of view, is the large number of primiparous women with IHF (group 2), which is 4.7 times higher than in group 1, with simultaneously high rates reflecting a burdened obstetric and gynecological history: multipregnant women with no birth in history (61.08%), having had medical abortions, inflammatory diseases of the cervix, uterine fibroids, endometrial polyp, polycystic syndrome ovaries. Many

authors who previously searched for risk factors for fetal distress and hypoxic-ischemic encephalopathy of newborns associated the absence of a history of childbirth with an increased incidence of placental disorders that develop against the background of pre-existing gynecological pathology and a history of induced abortions [4, 6, 10, 12, 14].

When analyzing chronic extragenital pathology (table 3), it was revealed that in patients of group 2, respiratory diseases (21.4%), somatization disorder (F45 - neurocirculatory dystonia) (20.96%), obesity and overweight were diagnosed significantly more often than in the control group body (18.56%), subclinical hypothyroidism (13.77%). These extragenital diseases differ from the average population and can be caused by women living in a sharply continental climate and a moderate iodine deficiency zone (southern Western Siberia) [11]. The influence of nicotine addiction on the development of respiratory diseases is undeniable (7.7% of women in group 2 noted a history of smoking), therefore, this pathology is diagnosed 8.6 times more often in postpartum women with IHF.

Diseases such as allergies, anemia, varicose veins of the lower extremities, pathology of the liver, stomach and intestines did not have significant differences in the studied groups.

Among the patients in group 2, the history significantly indicated more often chronic respiratory diseases (by 8.6 times), myopia (by 2.24 times), diseases of the musculoskeletal system (by 5.39%), which is not described in the literature data. Predictable risk factors were identified: nicotine addiction in women of group 2 (7.78%, $p = 0,0001$) and chronic viral diseases (HIV/hepatitis) (4.19%, $p = 0,004$) [3, 4, 5, 9]. In a study that studied

the group of fetal asphyxia during childbirth at gestational ages of 27–39 weeks (Taranushenko T.E. et al. (Krasnoyarsk)), the proportion of women who smoked was even higher than 18% [5].

Thus, a detailed maternal history is important and may provide a pathway to preventative strategies for future fetal distress.

Conclusion. Analyzing the above, we came to the following conclusions. In women whose childbirth was complicated by intranatal fetal hypoxia:

1. in the obstetric and gynecological history, primiparous women (61%) with a large number of previous pregnancies (2.59) were noted with greater frequency;

2. gynecological pathology in the anamnesis was 2.4 times more likely to be detected in patients of group 2 with a significant predominance in the structure of inflammatory diseases of the cervix, uterine fibroids, endometrial polyp, and polycystic ovary syndrome;

3. extragenital pathology is most often represented by respiratory diseases (21.4%), somatization disorder (F45 - neurocirculatory dystonia) (20.96%), obesity and other hyperalimentation (18.56%), subclinical hypothyroidism (13.77%). Myopia from childhood is 2.24 times more likely to be established as a concomitant diagnosis in group 2 of postpartum women;

4. in the main group, there were significantly more nicotine-dependent pregnant women (7.78%).

Potentially modifiable preconception risk factors include medical abortion, chronic inflammatory diseases of the genitals, diseases of the lungs and airways, obesity and overweight, thyroid disease, and maternal smoking. Our data are consistent with domestic and foreign

studies and indicate that further systematic study of pre-conceptual maternal prognostic factors of fetal distress in labor is required in order to develop preventive pregravidaral programs.

References

1. Zdravoohranenie v Rossii. 2023: Statisticheskij sbornik [Healthcare in Russia. 2023: Statistical Digest. M.: Rosstat, 2023. 179 p. (In Russ.).]
2. Medvedeva I.N., Davydova A.V. Optimal'nyj vybor diagnostiki gipoksii ploda v rodah [The optimal choice for diagnosing fetal hypoxia during labor]. Russian Rossijskij vestnik akushera-ginekologa [Bulletin of Obstetrician-Gynecologist. 2021;21(4):54-60 (In Russ.).] <https://doi.org/10.17116/rosakush20212104154>.
3. Kazakova A.V., Lineva O.I., Kiyashko I.S. [et al.] Ocenka faktorov riska razvitiya distressa ploda v rodah [Assessment of risk factors for fetal distress in childbirth]. Astrahanskij medicinskij zhurnal [Astrakhan medical journal. 2024;19(2):62-68 (In Russ.).] <https://doi.org/10.17021/1992-6499-2024-2-62-68>.
4. Prihodko A.M. Sovremennye tekhnologii ocenki sostoyaniya ploda v rodah. Prognozirovaniye gipoksii ploda i iskhoda dlya novorozhdenno: special'nost' 3.1.4. – «Akusherstvo i ginekologiya»: avtoref. dis. ... d-ra med. nauk. [Modern technologies for assessing the condition of the fetus during childbirth. Prediction of fetal hypoxia and outcome for the newborn: specialty 3.1.4. "Obstetrics and gynecology": abstract of the dissertation for the degree of Doctor of Medical Sciences. M., 2022. 41 p. (In Russ.).]
5. Taranushenko T.E., [et al.] Faktory riska razvitiya asfiksii pri rozhdenii [Risk factors for the development of asphyxia at birth]. Medicinskij sovet [Medical advice. 2022;16(19):21-28 9 (In Russ.).] <https://doi.org/10.21518/2079-701X-2022-16-19-21-28>.
6. Addisu D., Asres A., Gedefaw G., Asmer S. Prevalence of meconium stained amniotic fluid and its associated factors among women who gave birth at term in Felege Hiwot comprehensive specialized referral hospital, North West Ethiopia: a facility based cross-sectional study. BMC Pregnancy Childbirth. 2018 Oct 30;18(1):429. doi: 10.1186/s12884-018-2056-y.
7. Aslam S, Strickland T, Molloy EJ. Neonatal Encephalopathy: Need for Recognition of Multiple Etiologies for Optimal Management. Front Pediatr. 2019 Apr 16;7:142. doi: 10.3389/fped.2019.00142.
8. Hussain NM, O'Halloran M, McDermott B, Elahi MA. Fetal monitoring technologies for the detection of intrapartum hypoxia - challenges and opportunities. Biomed Phys Eng Express. 2024;10(2):10.1088/2057-1976/ad17a6. <https://doi.org/10.1088/2057-1976/ad17a6>.
9. Liljestrom L, Wikstrom AK, Jonsson M. Obstetric emergencies as antecedents to neonatal hypoxic ischemic encephalopathy, does parity matter? Acta Obstet Gynecol Scand. 2018 Nov;97(11):1396-1404. doi: 10.1111/aogs.13423.
10. Locatelli A, Lambicchi L, Incerti M, et al. Is perinatal asphyxia predictable? BMC Pregnancy Childbirth. 2020 Mar 30;20(1):186. doi: 10.1186/s12884-020-02876-1.
11. Makarova O., Suplotova L. Monitoring iodine deficiency in Western Siberia. Thyroid. 2019. Vol. 29, suppl. 1. P. 75. DOI: 10.1089/thy.2019.29085.abstracts
12. Monfredini C, Cavallin F, Villani PE, et al. Meconium Aspiration Syndrome: A Narrative Review. Children (Basel). 2021 Mar 17;8(3):230. doi: 10.3390/children8030230.
13. Park J, Park SH, Kim C, et al. Growth and developmental outcomes of infants with hypoxic ischemic encephalopathy. Sci Rep. 2023 Dec 28;13(1):23100. doi: 10.1038/s41598-023-50187-0
14. Shekari M, Jahromi MS, Ranjbar A, et al. The incidence and risk factors of meconium amniotic fluid in singleton pregnancies: an experience of a tertiary hospital in Iran. BMC Pregnancy Childbirth. 2022 Dec 12;22(1):930. doi: 10.1186/s12884-022-05285-8.

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OPTIMIZING EARLY DETECTION OF UTERINE CANCER IN WOMEN WITH RISK FACTORS

The article describes the stages of early detection of uterine body cancer in patients with morbid obesity. It has been proven that genetic testing for oncogenic mutations of endocervical canal scrapings with a negative cytological conclusion regarding cervical cancer is effective for subsequent screening of uterine body cancer. In morbid obesity, the diagnostic sensitivity of mutation screening for uterine body cancer increases when examining endocervical canal scrapings. When oncogenic mutations are detected in samples from the endocervical canal, the next step is recommended to conduct a cytological examination of endometrial biopsies with sampling using brush technology.

Keywords: uterine body cancer, morbid obesity, oncogenic mutations, liquid cytology, endometrial biopsy.

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Introduction. Among oncogynecological diseases, uterine cancer is the most common in countries with a high level of economic development and the second most common worldwide [1]. At the same time, there is a steady trend of constant growth in the prevalence of uterine cancer in the world, despite the improvement of the preventive and diagnostic system for timely detection of endometrial tumor pathology [4].

Obesity is a recognized risk factor for uterine cancer. The correlation between obesity and cancer of the uterine body is the closest in comparison with malignant diseases of other localization [2]. Based on a meta-analysis of thirty randomized prospective studies, each increase in body mass index (BMI) by 5 kg/m² is associated with a 54% increased risk of developing uterine cancer with a 95% confidence interval of 47 to 61% [7]. Given that