ISNN 3030-3907

2026/3
VOLUME 7

DEVELOPMENT OF SCIENCE

ILMIY JURNAL



Development of science

Ilmiy jurnal

2026/3 VOLUME 7

ISSN 3030 -3907

Ilmiy jurnal OAK rayosatining 2024 yil 27 sentabrdagi 361-son qaroriga asosan 02.00.00 kimyo fanlari hamda 2025 yil 12 fevral 367- son qaroriga asosan 05.00.00 texnika fanlari bo‘yicha falsafa doktori (PhD) va fan doktori (DSc) ilmiy darajasiga talabgorlarning dissertatsiya ishlari yuzasidan dissertatsiyalari asosiy ilmiy natijalarini chop etish tavsiya etilgan milliy ilmiy nashrlar ro‘yxatiga kiritilgan.

BOSH MUHARRIR:
Temirov Alisher Hoshim o‘g‘li – texnika fanlari falsafa doktori (PhD),Dotsent.
TAHRIRIYAT KENGASH RAISI:
Fozilov Sadriddin Fayzullayevich – texnika fanlari doktori, professor
TAHRIRIYAT KENGASH A’ZOLARI

TEXNIKA FANLARI/ TECHNICAL SCIENCES/ ТЕХНИЧЕСКИЕ НАУКИ

Bozorov G‘ayrat Rashidovich
Buxoro Davlat Texnika Universiteti, professor
Abdurahmonov Olim Rustamovich
Buxoro Davlat Texnika Universiteti, professor
Adizov Bobur Zamirovich
O‘zbekiston Respublikasi Fanlar akademiyasi Umumiy va noorganik kimyo instituti, professor
Hayitov Ruslan Rustamjonovich
Buxoro Davlat Texnika Universiteti, professor
Jumayev Qayum Karimovich
Buxoro Davlat Texnika Universiteti, professor.
Berdiyev Dorob Murodovich
Islom Karimov nomidagi Toshkent Davlat Texnika Universiteti, professor
Maxmudov Rafiq Amonovich
Buxoro Davlat Texnika Universiteti, professor.
Tilloyev Lochin Ismatilloyevich
Buxoro Davlat Texnika Universiteti, dotsent.
Raxmonov Qahramon Sanakulovich
Buxoro Davlat Texnika Universiteti, dotsent.
Barakayev Nusratullo Rajabovich
Islom Karimov nomidagi Toshkent Davlat Texnika Universiteti, professor.
Jo‘rayev Xayrullo Fayziyevich
Buxoro Davlat Texnika Universiteti, professor.
Panoyev Erali Rajabboyevich
Buxoro Davlat Texnika Universiteti, dotsent.
Ataullayev Sherzod Nabiullyevich
Buxoro Davlat Texnika Universiteti, dotsent.
Murodov Malik Negmurodovich
Buxoro Davlat Texnika Universiteti, dotsent.
Axmedova Ozoda Bahronovna
Islom Karimov nomidagi Toshkent Davlat Texnika Universiteti.
Safarov Bahri Jumayevich
Buxoro Davlat Texnika Universiteti, dotsent.
Xaydarov Axtam Amonovich
Buxoro Davlat Texnika Universiteti, dotsent.
Safarov Jasur Alijon o‘g‘li
Buxoro Davlat Texnika Universiteti, dotsent.
Асадова Раъно Дилмуратовна
Тошкент Давлат техника университети доценти

KIMYO FANLARI/ CHEMICAL SCIENCES/ ХИМИЧЕСКИЕ НАУКИ

Axmedov Voxid Nizomovich
Buxoro Davlat Texnika Universiteti, professor
Umarov Baqo Bafoyevich
Buxoro Davlat Universiteti, professor
Kodirov Abduaxad Abduraximovich
Qarshi davlat Universiteti, professor
Qurbonov Mingniqul Jumagulovich
Qarshi davlat Universiteti, dotsent
Turemuratov Sharibay Naurizbaevich
O‘zbekiston Respublikasi Fanlar akademiyasi Qoraqalpog‘iston bo‘limi Bosh ilmiy kotibi, professor
Tursunov Kaxor Shonazarovich
Qarshi davlat Universiteti, professor
Do‘stov Hamro
Buxoro Davlat Texnika Universiteti, professor
Panoyev Nodir Shavkatovich
Buxoro Davlat Texnika Universiteti, dotsent.
Olimov Bobur Bahodir o‘g‘li
Buxoro Davlat Texnika Universiteti, dotsent.
Kasimov Sherzod Abduazimovich
Termiz Davlat Universiteti, professor.
Aliqulov Rustam Valiyevich
Termiz Davlat Universiteti, professor
Tropov Xamza Tursunovich
Samarqand Davlat Universiteti, professor

IQTISODIYOT FANLARI/ ECONOMICS/ ЭКОНОМИЧЕСКИЕ НАУКИ

Nizamov Aslitdin Badreddinovich
Buxoro Davlat Texnika Universiteti, professor.
Boboyev Akmal Choriyevich
Buxoro Davlat Texnika Universiteti, professor.
Ergashxojayeva Shaxnoza Djasurovna
Toshkent davlat iqtisodiyot universiteti, professor
Saidaxmedova Nodira Ilxomovna
Toshkent davlat iqtisodiyot universiteti, professor
Muxsinov Bekzod Toxirovich
Buxoro Davlat Texnika Universiteti, dotsent.
Shakarov Qulmat Ashirovich
Renessans ta'lim universiteti,dotsent.
Jumaeva Zulfiya Qayumovna
Buxoro Davlat Texnika Universiteti, dotsent.
Norova Salomat Yusupovna
Buxoro Davlat Texnika Universiteti, dotsent.
Avezova Shaxnoza Maxmudjonovna
Buxoro Davlat Texnika Universiteti, dotsent.
Jalilov Jamshid G‘anijonovich
Toshkent davlat iqtisodiyot universiteti, dotsent
Xasanova Gulruh Djumanazarovna
Buxoro Davlat Texnika Universiteti, dotsent.

PEDAGOGIKA FANLARI/ PEDAGOGICAL SCIENCES / ПЕДАГОГИЧЕСКИЕ НАУКИ

Siddiqova Sadoqat G‘afforovna
Buxoro Davlat Texnika Universiteti, dotsent.
Zoyirov Erkin Xalilovich
Buxoro Davlat Texnika Universiteti, DSc, professor
Gaffarov Feruz Hasanovich
Puchon Universiteti, *professor*
Ruziyev Davron Yuldashevich
Buxoro Davlat Universiteti, professor
Muradova Firuza Rashidovna
Buxoro Davlat Texnika Universiteti, professor.
Yunusova Gulandon Samiyevna
Buxoro Davlat Texnika Universiteti, professor.
To‘xtayeva Zebo Sharifovna
Buxoro Davlat Texnika Universiteti, professor.
Navro‘zova Gulchixra Nigmatovna
Buxoro Davlat Texnika Universiteti, dotsent.
Uzoqova Laylo Polvonovna
Buxoro muhandislik – texnologiya instituti, dotsent.
To‘raqulova Marjona Qiyom qizi
Buxoro Davlat Texnika Universiteti, dotsent.
Muradova Zarina Rashidovna
Buxoro Davlat Texnika Universiteti, dotsent.
Murodov Sanjar Aslonovich
Buxoro Davlat Texnika Universiteti, dotsent.
Shodiyev Jahongir Jo‘raqulovich
Buxoro Davlat Texnika Universiteti, dotsent
Gaffarov Laziz Hasanovich
Buxoro muhandislik – texnologiya instituti, dotsent.

Tahririyat a’zolarning to‘liq ro‘yxati jurnalning www.devos.uz saytida keltirilgan.

Tahririyat hay’ati a’zolarining tarkibini o‘zgartirish hamda qo‘shimcha kiritish yoki tahririyat a’zoligidan chiqarish bosh muharrir tomonidan amalga oshiriladi.

ISSN 3030-3907

Development of science ilmiy jurnali 2024 yil 15 aprel kuni №256445 sonli guvohnoma bilan Davlat ro‘yxatidan o‘tgan.

To‘plam elektron ko‘rinishda (pdf formatida) mualliflarga taqdim etiladi. To‘plamga kiritiladigan maqolalarning mazmuni, ulardagi statistik ma’lumotlar va me’yoriy hujjatlarning to‘g‘riligiga hamda har qanday fikr - mulohazalarga mualliflarning o‘zlari mas’ul hisoblanadilar. Talablarga javob bermaydigan maqolalar to‘plamga kiritilmaydi. Tashkiliy qo‘mita maqola matnini qisqartirish, qisman tuzatish kiritish, seksiyalarga joylashtirish huquqiga ega.

ISSN 3030-3907

PROGNOSTIC VALUE OF CLINICAL AND LABORATORY PARAMETERS IN NEWBORNS WITH INTRAUTERINE GROWTH RESTRICTION

Kobulova Madina Baxadirovna
Navoi regional branch of the Republican specialized scientific practical Medical Center for maternal and Child Health
Fayzullaeva Xilola Baxronovna
Samarkand State Medical University
E-mail: khilola.fayzullayeva@gmail.com

Abstract This study aimed to evaluate the prognostic significance of clinical and laboratory parameters in newborns with intrauterine growth restriction (IUGR). A total of 120 newborns were examined, including 90 with IUGR and 30 healthy controls. Significant differences were identified in IGF-1 levels, liver enzymes, and neurobiomarkers. Reduced IGF-1 levels were strongly associated with the risk of multiple organ dysfunction. The findings highlight the importance of early diagnostic assessment using integrated biomarkers to improve neonatal outcomes.

Keywords: IUGR, IGF-1, newborns, biomarkers, neonatal outcomes, liver function, neurodevelopment

Annotatsiya. Ushbu tadqiqotning maqsadi intrauterin o‘sishdan ortda qolgan (IUGR) yangi tug‘ilgan chaqaloqlarda klinik va laborator ko‘rsatkichlarning prognostik ahamiyatini baholashdan iborat. Jami 120 nafar yangi tug‘ilgan chaqaloq tekshirildi, shundan 90 nafari IUGR bilan, 30 nafari esa sog‘lom nazorat guruhini tashkil etdi. IGF-1 darajasi, jigar fermentlari va neyrobiomarkerlar bo‘yicha sezilarli farqlar aniqlandi. IGF-1 darajasining pasayishi ko‘p a’zoli disfunktsiya rivojlanish xavfi bilan kuchli bog‘liqligi kuzatildi. Olingan natijalar yangi tug‘ilgan chaqaloqlarda natijalarni yaxshilash uchun integratsiyalashgan biomarkerlar asosida erta diagnostik baholash muhimligini ko‘rsatadi.

Kalit so‘zlar: IUGR, IGF-1, yangi tug‘ilgan chaqaloqlar, biomarkerlar, neonatal natijalar, jigar faoliyati, neyro rivojlanish

Аннотация. Целью данного исследования было оценить прогностическое значение клинических и лабораторных показателей у новорождённых с задержкой внутриутробного развития (IUGR). Было обследовано 120 новорождённых, из них 90 с IUGR и 30 здоровых в контрольной группе. Были выявлены значительные различия в уровнях IGF-1, печёночных ферментов и нейробиомаркеров. Снижение уровня IGF-1 было тесно связано с риском развития полиорганной дисфункции. Полученные результаты подчеркивают важность ранней диагностической оценки с использованием интегрированных биомаркеров для улучшения неонатальных исходов.

ISSN 3030-3907

Ключевые слова: IUGR, IGF-1, новорождённые, биомаркеры, неонатальные исходы, функция печени, нейроразвитие

INTRODUCTION.

Intrauterine growth restriction (IUGR) remains one of the leading problems in neonatology and perinatal medicine [1,6]. It is associated with increased risk of neonatal morbidity and mortality, as well as long-term metabolic and neurological disorders [2,5]. Recent studies emphasize the role of biochemical markers such as IGF-1, liver enzymes, and neuro-specific proteins in predicting adverse outcomes [3,4]. However, comprehensive data integrating these markers remain limited, particularly in developing countries. The aim of this study was to assess the prognostic value of clinical and laboratory indicators in newborns with IUGR. Intrauterine growth restriction (IUGR) remains one of the most critical problems in modern neonatology, as it is closely associated with increased neonatal morbidity and mortality. The prognostic assessment of newborns with IUGR largely depends on the evaluation of both clinical and laboratory parameters, which allow early identification of high-risk infants, timely intervention, and improved outcomes. Newborns affected by IUGR typically present with characteristic clinical features, including low birth weight (below the 10th percentile for gestational age), decreased subcutaneous fat, and a relatively large head compared to body size, commonly referred to as the “head-sparing effect.” These anthropometric indicators are essential for the early recognition of growth restriction. Gestational age is another crucial prognostic factor, as preterm IUGR infants have a significantly higher risk of complications compared to term infants. Common clinical complications observed in these newborns include respiratory distress, hypothermia, hypoglycemia, and feeding difficulties, all of which contribute to adverse neonatal outcomes. The Apgar score, assessed at 1 and 5 minutes after birth, serves as an important immediate prognostic indicator. Low Apgar scores are often associated with perinatal asphyxia and indicate the need for resuscitation and intensive care. Additionally, signs of fetal distress during labor, such as abnormal fetal heart rate patterns, reflect chronic intrauterine hypoxia and are strongly linked to poor neonatal prognosis. Laboratory parameters provide objective and quantitative data that complement clinical findings in assessing the severity of IUGR. One of the most important laboratory indicators is blood glucose level. Due to limited glycogen stores and impaired metabolic adaptation, IUGR newborns are highly susceptible to hypoglycemia. Persistent or severe hypoglycemia can lead to serious neurological damage and long-term developmental impairment. Blood gas analysis is another key diagnostic tool. The presence of metabolic acidosis, characterized by decreased blood pH and

ISSN 3030-3907

bicarbonate levels, indicates intrauterine hypoxia and inadequate tissue perfusion. The severity of acidosis is directly correlated with the degree of fetal compromise and can serve as a reliable prognostic marker. Complete blood count findings also have important prognostic value. Polycythemia, defined by elevated hematocrit levels, is frequently observed in IUGR infants as a compensatory response to chronic hypoxia. However, increased blood viscosity may impair microcirculation and increase the risk of thrombosis and organ dysfunction. Markers of inflammation and infection, such as C-reactive protein (CRP) and procalcitonin, are essential for the early detection of neonatal sepsis. Due to the immaturity of the immune system, IUGR newborns are more vulnerable to infections, which significantly worsen their prognosis. Elevated levels of these markers are often associated with increased morbidity and mortality.

MATERIALS AND METHODS. A total of 120 newborns were included in the study. The main group consisted of 90 newborns with IUGR (45 with symmetrical and 45 with asymmetrical forms), while the control group included 30 healthy newborns. Clinical, laboratory, and instrumental methods were applied. Laboratory tests included complete blood count, biochemical analysis (bilirubin, ALT, AST, creatinine, urea), and IGF-1 levels measured by ELISA. Neurobiomarkers (S100 protein, NSE) were also assessed. Instrumental studies included neurosonography and ultrasound examinations. Statistical analysis was performed using standard methods, with significance set at $p<0.05$. This study was conducted to evaluate the prognostic value of clinical and laboratory parameters in newborns diagnosed with intrauterine growth restriction (IUGR). A prospective observational study design was used, carried out in the neonatal intensive care unit (NICU) of a specialized perinatal center over a defined study period. The study included a total of newborns diagnosed with IUGR based on standard diagnostic criteria, specifically birth weight below the 10th percentile for gestational age according to international growth charts. Both term and preterm infants were included in the study. Exclusion criteria comprised newborns with major congenital anomalies, chromosomal abnormalities, intrauterine infections, and those born to mothers with incomplete medical records. All enrolled newborns underwent a comprehensive clinical assessment immediately after birth. Clinical parameters recorded included gestational age, birth weight, sex, Apgar scores at 1 and 5 minutes, mode of delivery, and the presence of complications such as respiratory distress, hypoglycemia, hypothermia, and signs of perinatal asphyxia. Anthropometric measurements such as head circumference, body length, and weight-to-length ratio were also documented. Laboratory investigations were performed within the first hours of life and included blood glucose levels, arterial

ISSN 3030-3907

blood gas analysis, complete blood count (CBC), and biochemical tests. Blood glucose was measured using standard enzymatic methods, and hypoglycemia was defined according to established neonatal thresholds. Blood gas analysis was conducted to assess pH, partial pressure of oxygen (PaO_2), partial pressure of carbon dioxide ($PaCO_2$), and bicarbonate levels, allowing identification of metabolic acidosis. Complete blood count analysis included hemoglobin concentration, hematocrit levels, and red blood cell indices, with particular attention to the presence of polycythemia. Inflammatory markers such as C-reactive protein (CRP) and, where available, procalcitonin levels were measured to evaluate the presence of infection or systemic inflammation. Additional biochemical parameters, including serum electrolytes and liver function tests, were assessed to identify metabolic and organ function disturbances.

RESULTS. Newborns with IUGR demonstrated significantly reduced IGF-1 levels compared to controls (mean 32.4±5.6 ng/mL vs 68.7±7.2 ng/mL, $p<0.001$). ALT and AST levels were elevated in the IUGR group (ALT: 68.2±10.4 U/L vs 32.5±6.3 U/L; AST: 74.1±11.2 U/L vs 35.8±7.1 U/L, $p<0.001$), indicating hepatic dysfunction. Neurobiomarkers were also significantly altered: NSE levels were increased by 2.1 times and S100 protein by 1.8 times compared to controls ($p<0.01$), suggesting hypoxic-ischemic damage to the central nervous system. A strong negative correlation was found between IGF-1 levels and severity of organ dysfunction ($r = -0.72$, $p<0.001$). Additionally, positive correlations were identified between liver enzymes and neurobiomarkers ($r = 0.65–0.70$), indicating systemic involvement. Dynamic monitoring showed that newborns receiving corrective therapy (nutritional support and hepatoprotectors) had a 35% increase in IGF-1 levels by day 10 of life ($p<0.01$), along with normalization of liver function tests. The incidence of complications such as hypoglycemia, respiratory distress, and infections was significantly higher in the IUGR group (62% vs 18%, $p<0.001$). These findings confirm the high prognostic value of combined laboratory markers in predicting adverse neonatal outcomes. A total of newborns diagnosed with intrauterine growth restriction (IUGR) were included in the study and analyzed to determine the prognostic significance of clinical and laboratory parameters. The study population consisted of both term and preterm infants, with a predominance of moderate to severe growth restriction cases. Analysis of clinical characteristics revealed that the majority of IUGR newborns had significantly low birth weight relative to their gestational age. Preterm infants demonstrated a higher incidence of complications compared to term infants. Low Apgar scores at 1 and 5 minutes were observed in a considerable proportion of cases and were significantly associated

ISSN 3030-3907

with adverse neonatal outcomes, including the need for resuscitation and admission to the neonatal intensive care unit.

Among the early clinical complications, respiratory distress syndrome was one of the most frequently observed conditions, particularly in preterm IUGR infants. Hypoglycemia was also highly prevalent, especially within the first 24 hours of life, and was strongly associated with lower birth weight and poor nutritional reserves. Additionally, hypothermia and feeding intolerance were commonly noted and contributed to prolonged hospitalization.

CONCLUSION. IGF-1, liver enzymes, and neurobiomarkers demonstrate high prognostic significance in newborns with IUGR. Their combined assessment allows early identification of infants at risk for multiple organ dysfunction and poor outcomes. Implementation of these markers in clinical practice can improve diagnosis, monitoring, and treatment strategies. Intrauterine growth restriction (IUGR) remains a significant contributor to neonatal morbidity and mortality, requiring careful evaluation and management. The findings of this study demonstrate that both clinical and laboratory parameters have substantial prognostic value in assessing the condition and outcomes of newborns affected by IUGR. Clinical indicators such as low birth weight, reduced gestational age, and low Apgar scores are strongly associated with an increased risk of early neonatal complications. These parameters provide essential initial information for identifying high-risk infants immediately after birth. At the same time, laboratory findings, including hypoglycemia, metabolic acidosis, polycythemia, and elevated inflammatory markers, offer objective and quantifiable evidence of physiological disturbances and underlying pathological processes.

REFERENCES

1. World Health Organization. Global report on low birth weight. Geneva; 2023.
2. UNICEF. Neonatal health statistics report. New York; 2023.
3. Bakhronovna K. F. THE SIGNIFICANCE OF CLINICAL AND LABORATORY CRITERIA IN THE EARLY DIAGNOSIS OF POSTHYPOXIC COMPLICATIONS IN NEWBORNS BORN WITH HYPOXIA //World of Scientific news in Science. – 2024. – Т. 2. – №. 3. – С. 258-263.
4. Fayzullayeva K. The role of clinical and laboratory criteria in the early diagnosis of posthypoxic complications in newborns undergoing asphyxiation //Интернаука. – 2020. – №. 10-2. – С. 49-50.
5. Fayzullayeva X. B., Nazarova G. S., Kim O. V. Biochemical Changes in Newborns with Intrauterine Hypoxia Born by Caesarean Section //SCHOLAR. – 2023. – Т. 1. – №. 29. – С. 173-181.

ISSN 3030-3907

6. Hay, W.W. (2006). Placental-Fetal Glucose Exchange and Fetal Glucose Metabolism. *Transactions of the American Clinical and Climatological Association*, 117, 321-340.

ISSN 3030-3907