Оригінальні дослідження / Original Researches

UDC 616.9:616-092:079 DOI: https://doi.org/10.22141/2224-0551.20.5.2025.1871

V.V. Yevtushenko[1], I.Yu. Seriakova[1], S.O. Kramarov[1], L.O. Palatna[1], I.V. Shpak[1], N.S. Kyrytsia[1], V.O. Shadrin[1], O.O. Voronov[1], M.O. Dudnikova[2]
[1]Bogomolets National Medical University, Kyiv, Ukraine
[2]V.I. Vernadsky Taurida National University, Kyiv, Ukraine

# Correlation of IFABP levels with inflammatory markers in children with COVID-19

For citation: Child`s Health. 2025;20(5):357-362 doi: 10.22141/2224-0551.20.5.2025.1871

**Abstract.** ***Background.*** *The purpose was to study the relationship between intestinal fatty acid-binding protein (IFABP) levels and markers of inflammation and severity to the children with COVID-19.* ***Materials and methods.*** *We conducted a cohort, observational, retrospective study involving 88 patients aged 1 month to 18 years with laboratory-confirmed COVID-19. The children were hospitalized in Kyiv City Children's Clinical Infectious Disease Hospital (Kyiv, Ukraine). They were divided into the study and control groups according to the course of the disease: the study group included 42 patients with complicated COVID-19, and the control group consisted of 46 participants with uncomplicated disease. During a comprehensive examination on the first day of hospitalization, we collected blood serum for further study of IFABP by enzyme-linked immunosorbent assay using the Human IFABP/FABP2 (Intestinal Fatty Acid Binding Protein) ELISA Kit (FineTest, China) with a working measurement range of 0.156–10 ng/ml and a sensitivity of 0.094 ng/ml. The study was performed according to the principles of the Declaration of Helsinki and in compliance with modern principles of evidence-based medicine and bioethics in accordance with the principles of good clinical practice. The study was approved by the Local Ethics Committee of the hospital. Informed consent of parents and children was obtained. Diagnostic measures carried out during this study were not accompanied by risks. We used statistical, analytical methods and the method of empirical research. To calculate the results obtained, we used the statistical software EZR v. 1.54.* ***Results.*** *According to the calculations, IFABP in the control group was 15.1 ± 3.1 ng/ml, while in the study group it was higher, amounting to 21.7 ± 5.5 ng/ml ($p = 0.01$). The results of the study demonstrated a correlation between IFABP level and an increased level of leukocytes ($r = 0.284$, $p < 0.001$), erythrocyte sedimentation rate ($r = 0.56$, $p < 0.001$), D-dimer ($r = 0.259$, $p < 0.001$), C-reactive protein ($\rho = 0.225$, $p = 0.03$) and radiological changes in the lungs ($\rho = 0.355$, $p < 0.001$).* ***Conclusions.*** *We have found a correlation between IFABP level and the COVID-19 inflammation and severity markers in children.*

**Keywords:** *COVID-19; intestinal fatty acid-binding protein; children; biomarker; inflammatory markers*

## Introduction

Fatty acid-binding proteins (FABPs) are a family of highly expressed intracellular proteins that were identified about 50 years ago. Initially thought to bind almost exclusively long-chain fatty acids, a broader spectrum of their actions has now been discovered. FABPs have unique, tissue-specific functions and may exert regulatory effects beyond their tissue expression. Circulating levels of FABPs are considered diagnostic markers of the physiological state of various organs and tissues [1, 2].

To date, 10 genes encoding FABPs have been identified in the human genome (FABP1–9 and FABP12). They were originally named according to the tissue in which were first identified or predominate. However, as many FABPs are expressed in multiple tissues, they are now designated by the following numbers: FABP1 (LFABP, liver), FABP2 (IFABP, intestine), FABP3 (HFABP, muscle and heart), FABP4 (AFABP, adipocyte), FABP5 (EFABP, epidermal), FABP6 (ILBP, ileum), FABP7 (BFABP, brain), FABP8 (PMP2 or P2, myelin), FABP9 (TFABP, testis), and FABP12. Al-



Для кореспонденції: Серякова Ірина Юріївна, доктор філософії з медицини, асистент, кафедра дитячих інфекційних хвороб, Національний медичний університет імені О.О. Богомольця, бульв. Тараса Шевченка, 13, м. Київ, 01601, Україна; e-mail: ikovaliukh@ukr.net; тел.: +380 (63) 100-40-09
For correspondence: Iryna Seriakova, PhD in Medicine, Assistant, Department of Pediatric Infectious Diseases, Bogomolets National Medical University, Taras Shevchenko boulevard, 13, Kyiv, 01601, Ukraine; e-mail: ikovaliukh@ukr.net; phone: +380 (63) 100-40-09
**Full list of authors' information is available at the end of the article.**

though initially described as intracellular proteins, they are also found outside the cell and function via the circulatory system, as well as intracellularly [3].

Our study aimed to examine the intestinal fatty acid-binding protein, which is expressed in the small intestine. IFABP transports lipids and binds excess fatty acids to maintain a constant level of fatty acids in the epithelium. When the integrity of the intestinal epithelium is disrupted, IFABP is released into the bloodstream, which confirms its significance as a clinical marker. Thus, the use of IFABP as a biomarker for detecting epithelial permeability may be useful for assessing the integrity of the intestinal mucosa in various pathologies [4].

The effectiveness of the marker has been described in the literature in gastrointestinal dysfunction, sepsis, cardiovascular pathology, obesity, insulin resistance, and polytrauma. In all these conditions, the authors indicate that IFABP is a promising parameter in the diagnosis of intestinal damage and can serve as an early biomarker for the detection of the above-mentioned conditions [5–9].

In the diagnostic search for relevant research methods, coronavirus infection (COVID-19) was no exception, it has been disturbing scientists around the world for more than 5 years. The spectrum of clinical manifestations in COVID-19 can be varied, including gastrointestinal dysfunction. Since IFABP is able to reflect damage to the intestinal mucosa, it can also be potentially useful in the diagnosis of this disease. In particular, Tyszko M. et al. (2022) suggest using IFABP in COVID-19 to predict the severe course of the disease. The authors found that higher levels of the marker in critically ill and fatal patients were associated with a poor outcome according to multivariate logistic regression analysis, which proved the prognostic aspect of the marker [10].

IFABP has not been studied enough in the pediatric cohort, especially in COVID-19. We decided to investigate the level of this marker in children with COVID-19 who underwent inpatient treatment at the Kyiv City Children's Clinical Infectious Disease Hospital (Kyiv, Ukraine) and to determine the relationship of inflammation indicators and COVID-19 severity with IFABP.

**The purpose** was to study the relationship between IFABP levels and the COVID-19 inflammation and severity markers in children.

## Materials and methods

### *Study design and data gathering*

We conducted an observational, cohort, retrospective study involving 88 children with laboratory-confirmed COVID-19 aged from 1 month to 18 years who underwent inpatient treatment at the Kyiv City Children's Clinical Infectious Disease Hospital.

According to the International Statistical Classification of Diseases, Tenth Revision, all patients were assigned a final diagnosis code of U07.1. The diagnosis was confirmed in the hospital using a single polymerase chain reaction (PCR) test of a nasopharyngeal swab, according to the current protocol. A case was considered confirmed if there was a positive PCR test for SARS-CoV-2.

According to the course of the disease, patients were divided into study and control groups. The study group included 42 patients with a complicated course of COVID-19, the control group included 46 patients with an uncomplicated course of the disease. Patients in both groups had moderate severity of COVID-19. There were no cases of severe and critical disease.

During the first day of hospitalization, blood serum was collected from all patients for routine hematological examinations and determination of IFABP level by enzyme-linked immunosorbent assay (ELISA). The laboratory stage of the biomarker study was carried out in the immunological laboratory of the Scientific Research Institute of Experimental and Clinical Medicine of the Bogomolets National Medical University using the Human IFABP/FABP2 (Intestinal Fatty Acid-Binding Protein) ELISA Kit (FineTest, China) with a working measurement range of 0.156–10 ng/ml and a sensitivity of 0.094 ng/ml.

### *Eligibility criteria*

Inclusion criteria: age of children under 18 years, laboratory-confirmed COVID-19, the presence of informed consent of the child's parents or legal representatives to participate in the study.

Exclusion criteria: age over 18 years, unconfirmed or denied diagnosis of COVID-19, refusal of the child or his/her parents/legal representatives to participate in the study. Patients with concomitant chronic gastrointestinal diseases and gastrointestinal symptoms that occurred before hospitalization were not included, since these conditions could affect the results of the marker study.

### *Ethical clearance*

The study was conducted according to the principles of the Declaration of Helsinki and in compliance with modern principles of evidence-based medicine and bioethics in accordance with the principles of good clinical practice. The protocol of the research was approved by the Biomedical Ethics Committee of the Kyiv City Children's Clinical Infectious Disease Hospital (ethical approval No. 26 dated December 1, 2023).

### *Statistical analysis*

The obtained numerical data were checked for normality of distribution using the Shapiro-Wilk W criterion and, depending on its result, are presented as the mean value and its standard deviation (SD), or the median with the interquartile range (25–75 quartile). Categorical data are given as a quantity value with a percentage. To determine the difference in the indicators of the compared groups, the parametric Student's t-test, nonparametric Mann-Whitney tests, chi-square, Fisher's exact test were used. The Spearman rank correlation test (ρ) was applied to assess the relationship. The significance of the type I error was selected at the level of 5 % ($p < 0.05$), the confidence interval (CI) at the level of 95 %. For statistical processing, the licensed statistical software EZR v. 1.54 was used.

## Results

There was no significant difference in gender and age characteristics between the study and control groups. The average age of the patients of the study group was $5.50 \pm 1.17$ years, the control group — $5.30 \pm 0.97$ years.

Most participants were admitted for inpatient treatment during the first day of the disease. The duration of inpatient treatment ranged from 2 to 11 days and was significantly longer in the study group ($p < 0.05$). Among the symptoms, fever, cough, runny nose, headache were most often observed. More than a third of patients had gastrointestinal symptoms (diarrhea, vomiting), which were relatively more common in the study group. Symptoms of impaired smell and taste perception (anosmia, ageusia) and febrile seizures were also relatively more common in this group ($p < 0.05$).

The distribution of patients in the groups was carried out according to the presence of complicated COVID-19. Complications were observed only in the study group (47.7 % of the total sample), they were respiratory and neurological. Bacterial pneumonia was detected in 20 (47.6 %) patients, stenosing laryngotracheitis — in 9 (21.4 %) cases, purulent tubootitis — in 1 case (2.4 %). Encephalopathy with convulsive syndrome was diagnosed in 4 (9.5 %) children and lesions of the I and IX pairs of cranial nerves — in 8 (19.1 %).

We also analyzed the results of laboratory and instrumental studies in both groups (Table 1).

According to most indicators, the results did not differ significantly between the groups. However, the patients of the study group had a significantly higher level of erythrocytes ($p = 0.011$) and more often an increased level of C-reactive protein ($p = 0.002$) compared to the control group.

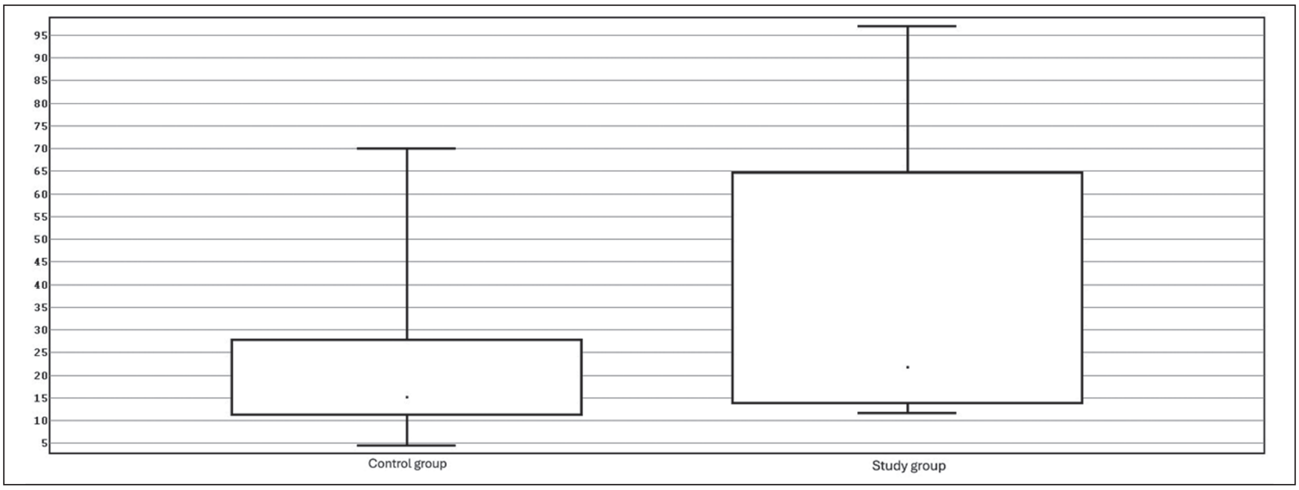


***Figure 1. Interval estimate of the mean value of serum IFABP in children with COVID-19 (median, standard deviation, 95% CI are indicated)***

***Table 1. The results of laboratory and instrumental research in patients of the study and control groups***

| Indicator | All patients | Control group | Study group | P |
|---|---|---|---|---|
| Leukocytes (G/L)* | 6.85 (5.28–9.03) | 7 (5.78–8.55) | 6.65 (5.2–10.08) | 0.973 |
| Neutrophils (G/L)* | 3.32 (2.04–6.05) | 3.32 (1.83–5.26) | 3.32 (2.12–6.51) | 0.387 |
| Lymphocytes (G/L)* | 2.53 (1.49–3.28) | 2.43 (1.45–3.67) | 2.58 (1.57–3.22) | 0.951 |
| Erythrocytes (T/L)** | 4.57 ± 0.54 | 4.39 ± 0.49 | 4.68 ± 0.55 | 0.011 |
| Color index** | 0.83 ± 0.07 | 0.84 ± 0.07 | 0.83 ± 0.07 | 0.521 |
| Platelets (G/L)* | 232 (184–288) | 243 (187–305) | 226 (184–270) | 0.248 |
| ESR (mm/h)* | 5 (4–7) | 5 (4–7) | 5 (4–7) | 0.403 |
| Fibrinogen (g/L)** | 3.1 ± 0.8 | 3.3 ± 0.9 | 3.1 ± 0.8 | 0.389 |
| D-dimer (mg/L)* | 1.02 (0.42–3.45) | 1.01 (0.43–2.52) | 1.02 (0.36–3.61) | 0.87 |
| ALT (IU/L)* | 25 (20–36.25) | 33.5 (23–37.75) | 24 (18.85–30.25) | 0.059 |
| AST (IU/L)* | 41 (31.6–47.85) | 44.3 (39.78–49.7) | 39.35 (29.15–44.08) | 0.01 |
| CRP level above normal*** | 34 (38.6 %) | 6 (6.8 %) | 28 (31.8 %) | 0.002 |
| Procalcitonin (μg/L)* | 0.23 (0.18–0.3) | 0.18 (0.12–0.28) | 0.25 (0.2–0.3) | 0.327 |
| Creatinine (mmol/L)* | 40 (33.9–48.4) | 40.4 (31.8–44.4) | 40 (35–55) | 0.331 |
| IFABP (ng/mL)* | 18.7 (12.3–43.7) | 15.1 (12.3–20.4) | 21.7 (14.1–43.7) | 0.01 |
| Focal radiological changes in the lungs*** | 42 (47.7 %) | 0 (0 %) | 42 (47.7 %) | 0.01 |

***Notes: * — median (interquartile range); ** — mean ± SD; *** — number (%); ESR — erythrocyte sedimentation rate; ALT — alanine aminotransferase; AST — aspartate aminotransferase; CRP — C-reactive protein.***

On the other hand, the patients of the control group had a higher level of AST (p = 0.01). According to the results of the chest X-ray, all patients of the study group had changes in the lungs, which included areas of consolidation, interstitial changes and ground glass opacity (p = 0.01). In patients of the control group, IFABP was observed at a level of 15.1 ng/ml, while in the study group, the indicator was higher, amounting to 21.7 ng/ml (p = 0.01). These data are also shown in Fig. 1.

We decided to check whether IFABP levels and severity of the condition are related. To test this hypothesis, the relationships between biomarker levels and indicators of inflammation and severity (leukocyte count, ESR, C-reactive protein, D-dimer, and lung radiographic findings) were analyzed by calculating Pearson's linear correlation coefficient for parametric measures and Spearman's rank correlation coefficient for nonparametric measures. The data are presented in Fig. 2–6.

When conducting a study of the correlation between IFABP and D-dimer (Fig. 2), we found a linear correlation of medium significance (p < 0.01). The value of the correlation coefficient (r = 0.259; 95% CI 0.05–0.45) is statistically significantly different from 0.

The study of IFABP correlation with leukocytes (Fig. 3) has shown a linear correlation of high significance (p < 0.001). The value of the correlation coefficient (r = 0.284; 95% CI 0.07–0.47) is statistically significantly different from 0.

When conducting a study of the correlation of IFABP with ESR (Fig. 4), we found a linear correlation of high sig-

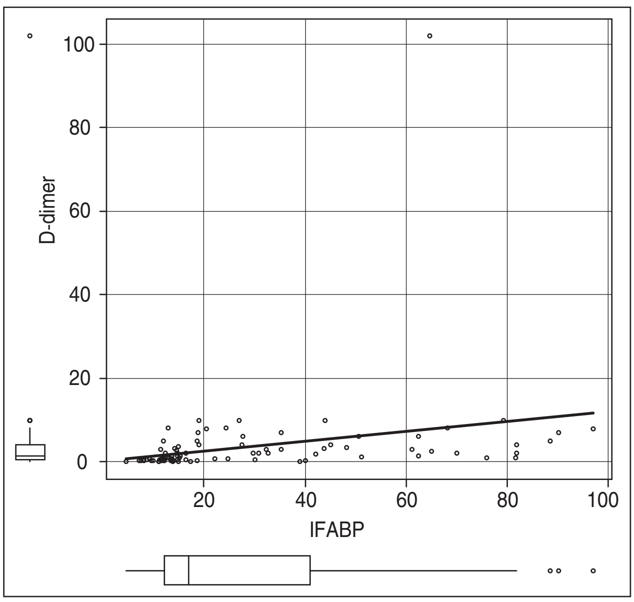


***Figure 2. Correlation field for IFABP and D-dimer indicators (r = 0.259, p < 0.001)***

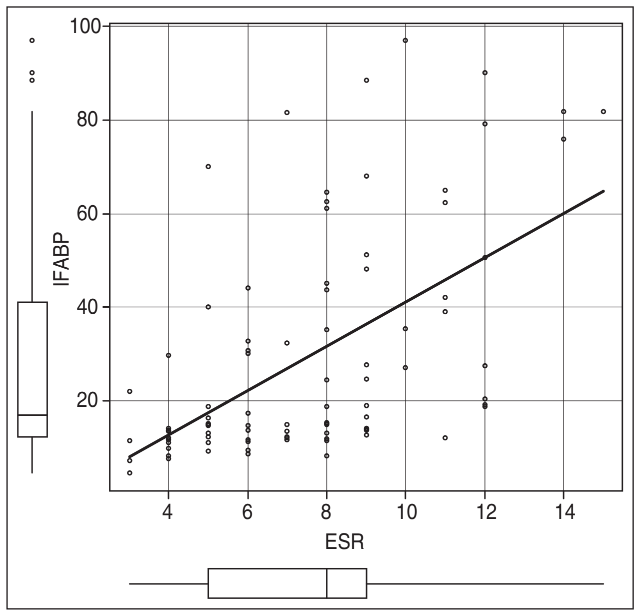


***Figure 4. Correlation field for IFABP and ESR (r = 0.56, p < 0.001)***

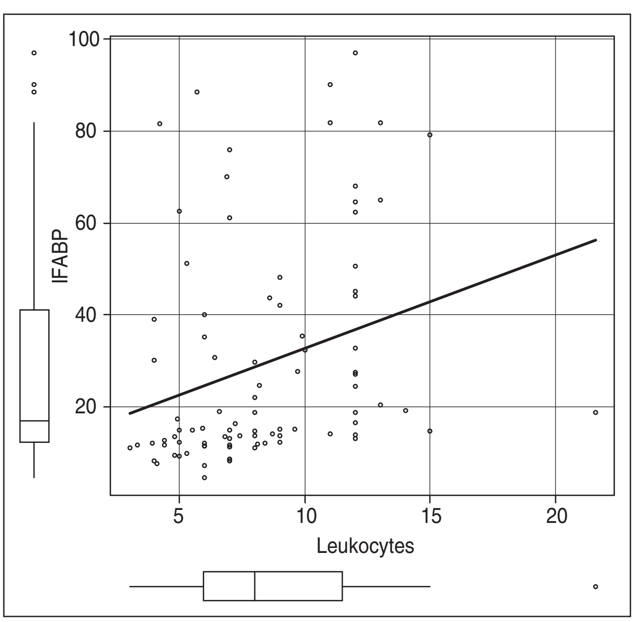


***Figure 3. Correlation field for IFABP and leukocyte indices (r = 0.284, p < 0.001)***

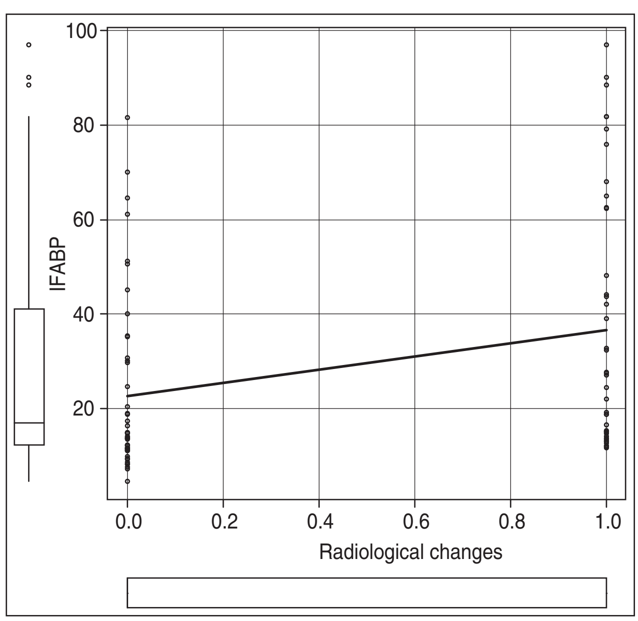


***Figure 5. Correlation field for IFABP and radiological changes (ρ = 0.355, p < 0.001)***

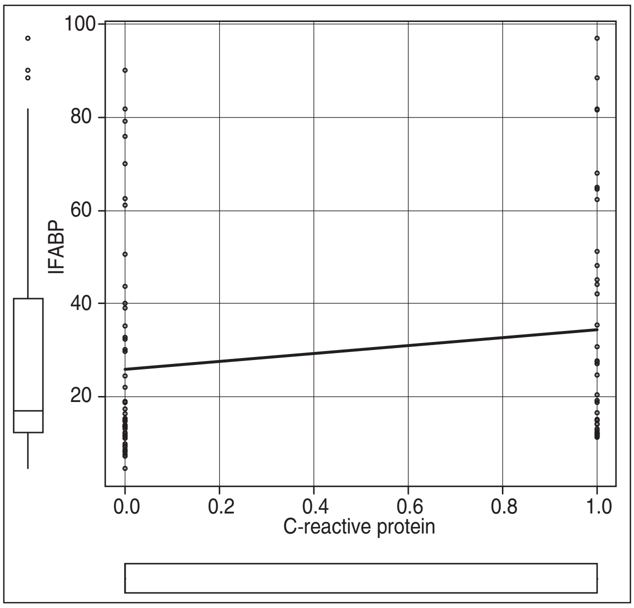


***Figure 6. Correlation field for IFABP and C-reactive protein indicators (ρ = 0.225, p = 0.03)***

nificance ($p < 0.0001$). The value of the correlation coefficient ($r = 0.56$; 95% CI 0.39–0.68) is statistically significantly different from 0.

The correlation was found between IFABP and radiological changes in the lungs (Fig. 5). Radiological changes included areas of consolidation, interstitial changes, and ground glass opacity. The value of the rank correlation coefficient: $\rho = 0.355$, $p < 0.001$.

We have found a correlation between IFABP and C-reactive protein (Fig. 6). The value of the rank correlation coefficient: $\rho = 0.225$, $p = 0.03$.

## Discussion

Due to the continued spread of SARS-CoV-2 among children, we decided to conduct a single-center pilot study aimed at finding correlations between the level of IFABP and indicators of inflammation and severity of COVID-19.

We divided patients into the study and control groups by the presence of a complicated course and compared their IFABP levels. According to the results of the work, IFABP was higher in the study group (21.7 ± 5.5 ng/ml vs. 15.1 ± 3.1 ng/ml, $p = 0.01$).

We have suggested that IFABP levels may correlate with markers of inflammation and severity. By determining the Pearson linear correlation coefficient for leukocyte counts, ESR, and D-dimer, and the Spearman rank correlation coefficient for C-reactive protein and lung radiographic changes, we found a relationship between an increase in the marker and the above-mentioned indicators.

According to the results of the study, IFABP levels in children with COVID-19 correlate with markers of inflammation, such as leukocyte counts ($r = 0.284$, $p < 0.001$), ESR ($r = 0.56$, $p < 0.001$), D-dimer ($r = 0.259$, $p < 0.001$), C-reactive protein ($\rho = 0.225$, $p = 0.03$), and lung radiographic changes ($\rho = 0.355$, $p < 0.001$).

Our study is pilot and has no analogues for comparison in children. Regarding adult COVID-19 patients, Brazilian researchers conducted a study, but it involved patients with severe and critical COVID-19 who showed ≈ 48-, 74- and 125-fold increases in IFABP levels. They were significantly higher in patients who died of COVID-19 compared to those who recovered. Based on the results of the performance curve analysis, IFABP was proposed as a biomarker of COVID-19 severity ($p < 0.0001$; Youden index = 6.89; area under the curve = 0.699) [11].

**Limitations of this work.** This study has limitations, since it was conducted in a single clinical center and was retrospective. The lack of similar studies on COVID-19, especially in the pediatric population, is also one of the limiting factors.

## Conclusions

In this study, compared to the works of our colleagues, there were no fatalities, and the goal was to investigate the relationship between IFABP and markers of inflammation and complicated course of COVID-19 in children, not mortality, which explains the significantly lower rates obtained.

An increase in IFABP levels is associated with activation of the immune response and can serve as a marker of an unfavorable course and an increased risk of complications. The use of IFABP allows for the diagnosis of gastrointestinal lesions in patients with COVID-19, which expands the possibilities of timely identification of groups at risk for the progression of a complicated course and the application of measures to prevent them.

## References

1. *Xu H, Diolintzi A, Storch J. Fatty acid-binding proteins: functional understanding and diagnostic implications. Curr Opin Clin Nutr Metab Care. 2019 Nov;22(6):407-412. doi: 10.1097/MCO.0000000000000600.*

2. *Storch J, Corsico B. The emerging functions and mechanisms of mammalian fatty acid-binding proteins. Annu Rev Nutr. 2008;28:73-95. doi: 10.1146/annurev.nutr.27.061406.093710.*

3. *Storch J, Corsico B. The Multifunctional Family of Mammalian Fatty Acid-Binding Proteins. Annu Rev Nutr. 2023 Aug 21;43:25-54. doi: 10.1146/annurev-nutr-062220-112240.*

4. *Huang X, Zhou Y, Sun Y, Wang Q. Intestinal fatty acid binding protein: A rising therapeutic target in lipid metabolism. Prog Lipid Res. 2022 Jul;87:101178. doi: 10.1016/j.plipres.2022.101178.*

5. *Martinez J, Rodriguez Hovnanian KM, Martinez EE. Biomarkers and Functional Assays of Epithelial Barrier Disruption and Gastrointestinal Dysmotility in Critical Illness-A Narrative Review. Nutrients. 2023 Sep 19;15(18):4052. doi: 10.3390/nu15184052.*

6. *Yokoyama H, Sekino M, Funaoka H, et al. Association between enterocyte injury and fluid balance in patients with septic shock: a post hoc exploratory analysis of a prospective observational study. BMC Anesthesiol. 2021 Nov 23;21(1):293. doi: 10.1186/s12871-021-01515-2.*

7. *Typpo KV, Larmonier CB, Deschenes J, Redford D, Kiela PR, Ghishan FK. Clinical characteristics associated with postoperative intestinal epithelial barrier dysfunction in children with congenital heart disease. Pediatr Crit Care Med. 2015 Jan;16(1):37-44. doi: 10.1097/PCC.0000000000000256.*

8. *Vollrath JT, Klingebiel F, Bl sius F, et al. I-FABP as a Potential Marker for Intestinal Barrier Loss in Porcine Polytrauma. J Clin Med. 2022 Aug 7;11(15):4599. doi: 10.3390/jcm11154599.*

*9. Lau E, Marques C, Pestana D, et al. The role of I-FABP as a biomarker of intestinal barrier dysfunction driven by gut microbiota changes in obesity. Nutr Metab (Lond). 2016 Apr 30;13:31. doi: 10.1186/s12986-016-0089-7.*

*10. Tyszko M, Lipińska-Gediga M, Lemańska-Perek A, Kobylińska K, Gozdzik W, Adamik B. Intestinal Fatty Acid Binding Protein (I-FABP) as a Prognostic Marker in Critically Ill COVID-19 Patients. Pathogens. 2022 Dec 13;11(12):1526. doi: 10.3390/pathogens11121526.*

*11. Saia RS, Giusti H, Luis-Silva F, et al. Clinical investigation of intestinal fatty acid-binding protein (I-FABP) as a biomarker of SARS-CoV-2 infection. Int J Infect Dis. 2021 Dec;113:82-86. doi: 10.1016/j.ijid.2021.09.051.*



*Received 20.06.2025*
*Revised 29.06.2025*
*Accepted 17.07.2025*



**Information about authors**

Vitalii Yevtushenko, PhD in Medicine, Associate Professor, Department of Pediatric Infectious Diseases, Bogomolets National Medical University, Kyiv, Ukraine; e-mail: evv1972@gmail.com; https://orcid.org/0000-0002-6610-8394

Iryna Seriakova, PhD in Medicine, Assistant, Department of Pediatric Infectious Diseases, Bogomolets National Medical University, Kyiv, Ukraine; e-mail: ikovaliukh@ukr.net; phone: +380 (63) 100-40-09; https://orcid.org/0000-0002-2793-6584

Serhii Kramarov, MD, DSc, PhD, Professor, Head of the Department of Pediatric Infectious Diseases, Bogomolets National Medical University, Kyiv, Ukraine; e-mail: skramarev@ukr.net; https://orcid.org/0000-0003-2919-6644

Liudmyla Palatna, PhD in Medicine, Associate Professor, Department of Pediatric Infectious Diseases, Bogomolets National Medical University, Kyiv, Ukraine; e-mail: doctorluda@ukr.net; https://orcid.org/0009-0000-7118-508X

Iryna Shpak, PhD in Medicine, Associate Professor, Department of Pediatric Infectious Diseases, Bogomolets National Medical University, Kyiv, Ukraine; e-mail: shpak_iv@meta.ua; https://orcid.org/0009-0006-9375-1234

Nataliia Kyrytsia, PhD in Medicine, Assistant, Department of Pediatric Infectious Diseases, Bogomolets National Medical University, Kyiv, Ukraine; e-mail: dr.tashakyrytsia@gmail.com; phone: +380 (93) 500-47-46; https://orcid.org/0009-0006-5079-0292

Valerii Shadrin, PhD in Medicine, Associate Professor, Department of Pediatric Infectious Diseases, Bogomolets National Medical University, Kyiv, Ukraine; e-mail: valera190f116@gmail.com; https://orcid.org/0009-0001-1228-9484

Oleksandr Voronov, PhD in Medicine, Associate Professor, Department of Pediatric Infectious Diseases, Bogomolets National Medical University, Kyiv, Ukraine; e-mail: dok_voronov@ukr.net; https://orcid.org/0009-0003-3637-9956

Mariia Dudnikova, PhD in Medicine, Associate Professor, Department of Physical Education, Sports and Human Health, V.I. Vernadsky Taurida National University, Kyiv, Ukraine; e-mail: mdudnikoffa@gmail.com; https://orcid.org/0000-0002-0768-2601



**Conflicts of interests.** Authors declare the absence of any conflicts of interests and own financial interest that might be construed to influence the results or interpretation of the manuscript.

**Information about funding.** This study has not received any external funding.

**Authors' contribution.** V. Yevtushenko, S. Kramarov — research concept and design; I. Seriakova — research concept and design, analysis of the data obtained; I. Shpak, L. Palatna, O. Voronov — collection and processing of materials; N. Kyrytsia, V. Shadrin, M. Dudnikova — analysis of the data obtained, writing the text.



*Євтушенко В.В.[1], Серякова І.Ю.[1], Крамарьов С.О.[1], Палатна Л.О.[1], Шпак І.В.[1], Кириця Н.С.[1], Шадрін В.О.[1], Воронов О.О.[1], Дуднікова М.О.[2]*

*[1]Національний медичний університет імені О.О. Богомольця, м. Київ, Україна*

*[2]Таврійський національний університет імені В.І. Вернадського, м. Київ, Україна*


## Кореляція IFABP із маркерами запалення в дітей із COVID-19


**Резюме. Мета:** вивчити зв'язок між показниками білка IFABP та маркерами запалення і тяжкості при COVID-19 у дітей. **Матеріали та методи.** Проведено когортне обсерваційне ретроспективне дослідження із залученням 88 пацієнтів віком від 1 місяця до 18 років із COVID-19, що був лабораторно підтверджений методом полімеразної ланцюгової реакції. Діти були госпіталізовані в КНП «Київська міська дитяча клінічна інфекційна лікарня» (м. Київ, Україна). За перебігом захворювання їх розподілили на основну та контрольну групу: до основної увійшли 42 дитини з ускладненим COVID-19, до контрольної — 46 із неускладненим. Під час комплексного обстеження протягом першої доби перебування в стаціонарі була зібрана сироватка крові пацієнтів для подальшої оцінки біомаркера IFABP методом імуноферментного аналізу з використанням наукового набору Human IFABP/FABP2 (Intestinal Fatty Acid Binding Protein) ELISA Kit (FineTest, Китай) із робочим діапазоном вимірювань 0,156–10 нг/мл та чутливістю 0,094 нг/мл. Дослідження виконано згідно з принципами Гельсінської декларації та з дотриманням сучасних принципів доказової медицини й біоетики відповідно до принципів належної клінічної практики. Виконання роботи схвалене локальним етичним комітетом лікарні. Була отримана інформована згода батьків та дітей. Діагностичні заходи, що проводились під час цього дослідження, не супроводжувались ризиками. У роботі використано статистичні, аналітичні методи й метод емпіричного дослідження. Розрахунок отриманих результатів виконували за допомогою статистичної програми EZR v. 1.54. **Результати.** У контрольній групі рівень IFABP становив 15,1 ± 3,1 нг/мл, тоді як в основній показник був вищим — 21,7 ± 5,5 нг/мл ($p = 0,01$). За результатами дослідження виявлений кореляційний зв'язок між IFABP та підвищеним рівнем лейкоцитів ($r = 0,284$, $p < 0,001$), швидкістю осідання еритроцитів ($r = 0,56$, $p < 0,001$), умістом D-димера ($r = 0,259$, $p < 0,001$), С-реактивного білка ($\rho = 0,225$, $p = 0,03$) та рентгенологічними змінами в легенях ($\rho = 0,355$, $p < 0,001$). **Висновки.** Виявлено кореляційний зв'язок між показниками IFABP та маркерами запалення й тяжкості при COVID-19 у дітей.


**Ключові слова:** COVID-19; IFABP; діти; біомаркер; маркери запалення