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THE INFORMATIVE BIOMARKERS OF BACTERIAL PERITONITIS

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For practical healthcare, the hunt for novel biomarkers of bacterial peritonitis with high diagnostic and prognostic value is crucial. Clinical investigations have shown that several amino acids, proteins, enzymes, and bacterial lipopolysaccharide are among the most informative biomarkers.

C-reactive protein levels and the quantity of polymorphonuclear leukocytes have been found to be directly correlated with serum or ascitic homocysteine levels. A considerable drop in this amino acid's serum levels throughout treatment confirms its diagnostic relevance in the inflammatory process in the abdominal cavity [Abdel-Razik A, 2018]. Certain enzymes, such as catalase, which has anti-inflammatory qualities [Yuzbasioglu MF, 2008], and aryl esterase and paraoxonase, which have antioxidant qualities and the capacity to inactivate bacterial lipopolysaccharides [Bacchetti T., 2017], are useful for both diagnosis and prognosis in peritonitis. The amount of these enzymes in the blood serum decreases as the inflammatory process in the abdominal cavity progresses. Conversely, under the circumstances of the infectious process, the activity of myeloperoxidase, an enzyme released by neutrophils with prooxidant-proinflammatory effects, increases [Karahocagil M.K., 2012]. It should be mentioned, however, that while catalase and myeloperoxidase are more concentrated in tissues than in bodily fluids, their content is determined less frequently [Kaplan M., 2020]. Microsomal heme oxygenase-1, whose level rises in response to cytokines and reactive oxygen species generated during inflammation, is another enzyme biomarker for the early prediction of bacterial peritonitis [Meng D., 2023]. While the proinflammatory cytokine IL-6 was within the normal range, children who died from peritonitis also had a considerable rise in the N-terminal prohormone of brain natriuretic peptide (NT-proBNP) [Vibhash C., 2025]. These findings point to the possibility of using this metric as a predictor of peritoneal inflammation mortality and inflammatory severity.

Additionally, it has been demonstrated that patients with peritonitis receiving peritoneal dialysis have markedly elevated levels of bacterial lipopolysaccharide in both peritoneal fluid and blood plasma. This substance is a part of the cell wall of gram-negative bacteria. This fact highlights the significant informational usefulness of bacterial lipopolysaccharide level testing for peritonitis diagnosis and treatment efficacy monitoring [Milan Manani S., 2020].

Clinical research indicates that the enzymes arylesterase, paraoxonase, and heme-oxygenase-1 are among the most informative indicators. Homocysteine levels are another reliable and noninvasive diagnostic indicator of peritonitis. C-reactive protein levels can also be used as further indicators of peritonitis. Another trustworthy and noninvasive diagnostic marker for spontaneous bacterial peritonitis is serum homocysteine.