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Role of Biomarkers in Diagnosis and Prognostic Evaluation of Acute Pancreatitis

Diogo Rafael*

Department of Upper Gastrointestinal Surgical, University of Sydney, Australia

DESCRITPION

Biomarkers are defined as measurable indicators of biological processes or disease states. However, a clearer delineation between types of biomarkers relevant to acute pancreatitis, such as diagnostic, prognostic, and therapeutic biomarkers, is warranted. Diagnostic biomarkers aid in confirming the presence of acute pancreatitis. For example, elevated serum amylase and lipase levels remain gold-standard diagnostic biomarkers. Prognostic biomarkers are indicators such as C-Reactive Protein (CRP) levels or cytokines like interleukin-6 (IL-6) help assess disease severity and potential complications. Therapeutic biomarkers are although not extensively covered in the original article, markers predicting response to specific interventions, such as fluid therapy, are an emerging focus of research. Significant progress in the field of acute pancreatitis biomarker research has emerged since the publication. Technologies like proteomics and metabolomics are uncovering novel biomarkers with higher specificity and sensitivity. Procalcitonin, a promising marker for predicting infection-related complications. MicroRNAs (miRNAs) are small, non-coding RNAs like miR-21 and miR-122 are being explored for their role in early diagnosis and prognostication. Extracellular vesicles carry biomolecules that reflect pancreatic damage, opening avenues for non-invasive diagnostic approaches. Biomarkers such as CRP and IL-8 facilitate stratification into mild, moderate, or severe acute pancreatitis, aiding in tailored management strategies. Continuous measurement of biomarkers can provide insights into disease evolution and response to therapy, allowing real-time adjustments to treatment. Emerging biomarkers may soon guide therapeutic decisions, such as selecting patients for early nutritional support or invasive interventions, ensuring precision in clinical care. Certain biomarkers, like IL-10 and soluble E-selectin, could serve as early indicators of pancreatic necrosis or systemic inflammatory response syndrome. While biomarkers hold immense potential, the corrigendum underscores the limitations previously understated. Biomarker levels can vary due to external factors such as concurrent infections, age, or genetic predispositions, complicating their interpretation. Assay techniques for newer biomarkers like miRNAs lack uniformity, hindering their clinical utility and reproducibility across studies and institutions. High costs and limited availability of advanced biomarker assays restrict their widespread application, particularly in resource-constrained settings. Combining genomics, proteomics, and metabolomics will enhance the discovery of robust biomarkers and offer a holistic view of disease mechanisms. Machine learning models can analyze large biomarker datasets to improve predictive accuracy and identify novel patterns, fostering innovation in early detection. Biomarkers hold the promise of personalizing acute pancreatitis management by identifying high-risk patients, tailoring interventions accordingly, and predicting treatment outcomes. Rigorous validation of biomarkers across diverse populations and clinical settings is necessary to establish their global applicability and reliability. This corrigendum underscores the evolving landscape of biomarker research in acute pancreatitis. By addressing the gaps and integrating recent advancements, we aim to provide a more comprehensive perspective on their diagnostic and prognostic potential. Continuous research and technological innovation will be pivotal in translating these biomarkers into routine clinical practice, ultimately improving patient outcomes and healthcare efficiency. Further innovation in liquid biopsy techniques and biosensors could enable easier, faster, and safer biomarker analysis, reducing patient discomfort.

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CONFLICT OF INTEREST

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Corresponding author Diogo Rafael, Department of Upper Gastrointestinal Surgical, University of Sydney, Australia, E-mail: diogo_rafael@gmail.com

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