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CORRESPONDENCE

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CRP Albumin Ratio: A novel noninvasive and cost-effective method for assessing the severity of acute pancreatitis

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Abstract

Introduction: Acute pancreatitis is a significant and potentially life-threatening gastrointestinal disorder that requires prompt and accurate diagnosis for effective treatment. Current diagnostic methods often involve expensive and inaccessible imaging studies, such as CT scans, limiting their utility in emergency settings and underserved areas.

Aim: This correspondence discusses an innovative and cost-effective approach to assessing the severity of acute pancreatitis, focusing on the C-Reactive Protein-Albumin Ratio (CAR).

Methodology: We searched relevant articles and studies from 2015 till date on PubMed, Web of Science, and Google Scholar using these keywords: "C-Reactive Protein", "Albumin Ratio", "Acute pancreatitis", "Cost-effective", "Non-invasive", and "Severity".

Result: The CAR diagnostic method involves a simple blood test that measures the levels of C-Reactive Protein (CRP) and albumin, both commonly used markers for assessing inflammation. Elevated CRP and decreased albumin levels are indicative of inflammation, and the CAR has shown a strong positive correlation with the severity of acute pancreatitis. This method offers a non-invasive, time-efficient, and cost-friendly alternative to traditional diagnostic techniques.

Conclusion: The potential of CAR as an assessment tool for the severity of acute pancreatitis is highlighted, especially in resource-limited settings. This innovation holds promise for improving the timely and accurate diagnosis of acute pancreatitis, ultimately enhancing patient outcomes and reducing mortality rates.

KEYWORDS

acute pancreatitis, Albumin Ratio, cost-effective, C-Reactive Protein, non-invasive, severity

Dear Editor,

Acute pancreatitis (AP) is a sudden onset inflammation of the pancreas involving pancreatic parenchyma and surrounding peri-pancreatic tissues. It is one of the most prevailing gastrointestinal diseases around the world with age-standardized prevalence rate of 76.2 per 100,000 population as recorded in 2017.[1] The underlying mechanism of acute pancreatitis is rooted in the early activation of zymogen and trypsinogen enzymes, which leads to the destruction of the pancreas in the surrounding area and triggers the inflammatory cascade, ultimately resulting in the onset of acute pancreatitis.[2] Gallstones, alcohol consumption, hypercalcemia, hypertriglyceridemia, and idiopathic reasons are the most common causes of acute pancreatitis.[2] Since the initial stage of manifestation is critical for the patient's prognosis, it is key to identify the severity of the disease in the first 24–48 h for a better treatment plan. Timely diagnosis can significantly improve the prognosis of a disease, reducing mortality rates to as low as 1–5%. Conversely, a delayed or misdiagnosis can be perilous, potentially increasing the mortality rate by as much as 30%.[3]

There are various diagnostic measures available for acute pancreatitis, including blood tests, imaging studies, and clinical assessments. Blood tests can determine levels of pancreatic enzymes and other indicators of inflammation. Imaging studies such as computed tomography (CT) scans and magnetic resonance imaging can help visualize the pancreas and detect any abnormalities. Additionally, clinical assessments can aid in determining the severity of the disease and predicting its outcome.[1] An accurate and timely diagnosis of acute pancreatitis is crucial for the management and treatment of this potentially life-threatening condition. Different scales have been devised to scale the results of different diagnostic tests to grade the severity of acute pancreatitis. The Ranson criteria, Glasgow scoring systems, Acute Physiology and Chronic Health Evaluation (APACHE) II score, and the Balthazar scoring system are commonly used.[4] Recently, advancements have been made in exploring the potential of novel biomarkers in assessment of acute pancreatitis. C-Reactive Protein (CRP)-Albumin Ratio (CAR) is one such biomarker that has displayed promising results as a noninvasive, cost-effective, and efficient diagnostic tool for acute pancreatitis. In this correspondence, we highlight the potential of CAR to aid in the timely and accurate assessment of the severity of acute pancreatitis, especially in low-income countries, ultimately improving patient outcomes and reducing mortality rates in the field of surgery.

The Balthazar score is a gold standard grading system used to assess the severity of acute pancreatitis. The score was first proposed by Dr. Emil Balthazar in 1985 and is based on the results of a CT scan of the pancreas. The Balthazar score ranges from A to E and is determined by the amount of inflammation and damage seen on the CT scan. A represents no inflammation to E meaning complete necrosis.[5] One major drawback of the Balthazar score is its reliance on CT scans, which can be expensive, time-consuming, laborious to obtain, and are typically only available in ICU settings. Furthermore, the destructive effects of CT radiation on patients suffering from acute pancreatitis, combined with the fact that a CT scan can appear normal during the first 48 h of the condition, make it an inefficient tool for emergency diagnosis.[6] Moreover, the accessibility of CT scans is a concern in rural areas where basic medical equipment is often scarce, making it challenging for patients to receive a timely and accurate diagnosis of acute pancreatitis.[5]

Fortunately, simpler and more accessible methods for assessing severity of acute pancreatitis have been emerging in the latest years. One such method is to measuring the CAR of the suspected patient.[7] This noninvasive technique has been proven to be highly predictive and cost-effective, with a core line of action that involves measuring the levels of two blood markers—CRP and albumin—which are commonly used to assess inflammation in the body. To conduct the CAR test, a blood sample is taken from the patient and the levels of CRP and albumin are measured. CRP levels increase during inflammation, while albumin levels decrease. The CAR has significantly been reported to have a positive correlation with the severity of acute pancreatitis. Elevated CAR values have also been correlated with an increased risk of organ failure and the development of severe acute pancreatitis.[7,8] The values of the CAR test also show a positive correlation with standard scoring systems like the Balthazar score and Ranson score.[9] Where the mean expense for a CT scan averages around $3000,[10] Albumin test expenditures exhibit a range from mere $7–$39,[11] and the CRP test is priced between $33.00 and $67.00.[12] This cost variability imbues the CAR test with the potential to significantly transform the landscape of assessing and managing acute pancreatitis. This holds particular promise in underserved regions such as rural areas and developing nations, where the scarcity of medical equipment and financial constraints pose substantial challenges. CAR diagnosis of acute pancreatitis is time effective, cost-friendly, and very convenient as a simple blood test can diagnose acute pancreatitis with great accuracy and precision.[9]

This correspondence highlights the potential of CAR test as a noninvasive, cost-effective, and efficient diagnostic tool for assessing the severity of acute pancreatitis, which can aid in the timely and accurate assessment of the condition, ultimately improving patient outcomes and reducing mortality rates in the field of surgery. In the field of medicine, exploring innovations for the assessment of medical conditions is of paramount importance. CAR test offers a promising noninvasive method for assessing the severity of acute pancreatitis, without the need for costly and time-consuming imaging studies. Further advanced research should be executed to fully explore its efficacy and potential use as a diagnostic tool in clinical settings.

AUTHOR CONTRIBUTIONS

Sania Ghaffar: Conceptualization; investigation; writing—original draft. **Syeda Shahnoor**: Investigation; methodology; writing—review and editing. **Abdul Moiz Khan**: Writing—review and editing; methodology; investigation. **Aimen Asif**: Writing—original draft; project administration. **Maryam Fida**: Data curation; writing—original draft. **Malik Olatunde Oduoye**: Validation; supervision; writing—review and editing. **Wechuli Polyne Nafula**: Investigation; formal analysis; supervision.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

TRANSPARENCY STATEMENT

The lead author Wechuli Polyne Nafula affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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