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C-Reactive protein role in assessing COVID-19 deceased geriatrics and survivors of severe and critical illness

Wassan Nori

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Abstract

Numerous risk variables, including age, medical co-morbidities, and deranged inflammatory response, lead to higher mortality in a senior population with coronavirus disease 2019. C-reactive protein (CRP), an acute phase inflammatory protein secreted by the liver, was tested in the elderly, showing a diagnostic and prognostic role. However, recent research has shed light on new applications for CRP in geriatrics. It was used as a follow-up marker and as a therapeutic target. Early and accurate identification of patients' risks may mitigate the devastation of the invading virus in older cases and permit the implementation of a quick treatment plan for those most likely to deteriorate.

Key Words: COVID-19; Geriatrics; Deceased; Severe infection; C-reactive protein; Age

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Core Tip: Elderly patients suffer higher morbidity and mortality rates. The elderly are a high-risk group due to their deranged immune responses, associated medical illnesses, and poor responses to supportive treatment. C-Reactive protein (CRP) is an inflammatory marker used in the investigation panel of coronavirus disease 2019. CRP distinguished severe infections and predicted deleterious outcomes. Increased levels were reported in the deceased, critically ill, and elderly with respiratory failure underlying exaggerated inflammatory response and overactive cytokines production. Recent studies have discussed a therapeutic avenue for the elderly. CRP may help guide clinical decisions and patient follow-up, ultimately improving outcomes.

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TO THE EDITOR

With interest, we read Wang *et al*'s study published in *World J Clin Cases* 2022, which discussed differences in lab biomarkers and patient risk factors linked to fatal outcomes in elderly patients following the acquisition of coronavirus disease 2019 (COVID-19)[1]. Advanced life expectancy and improved medical services have increased the number of geriatrics in the community, who represent a critical vulnerable group for COVID-19[2].

Geriatric vulnerability to severe COVID-19 can be attributed to aging, which renders immunity in more than one way. Aging increases inflammatory responses to pathogens and reduces the efficacy of suppressing infections. A positive correlation was confirmed between older ages and increased mortality rates (MR); sixty-year-old patients had mortality rates of 4.5% *vs* 1.4% for patients under sixty years[3,4]. Recinella *et al*[5] study declared a one-and-a-half-fold increase in MR for every five years of a patient's age. In addition, many geriatrics suffer from chronic illnesses such as diabetes and hypertension, making them more likely to have severe COVID-19[6]. Finally, many COVID-19 treatment approaches have been less effective in older patients[7]. Understanding indicators for ominous COVID-19 in the elderly is vital for an optimum and quick treatment strategy.

C-reactive protein (CRP) is a hepatic protein produced in response to inflammation. It defends the body against injury or infection by activating the immune system. CRP serum levels were linked to respiratory functions and were used to predict respiratory failure. It was widely used in the COVID-19 investigation panels[8].

CRP showed a meaningful high level in COVID-19 cases; a more significant rise was reported in severe forms of the infection, which served as a marker of severe infection[9]. In cases with a rapidly progressive course, cases that suffered from significant lung damage; and cases that ended in patient death, a CRP > 100 mg/L was reported; thus, CRP was used as a prognostic marker to predict aggravating of current infection and worse prognosis[9].

The Wang *et al*[1] study demonstrated a strong significant correlation between CRP in the sera of geriatric patients ($r = 0.67$; $P = 0.023$) and the fatality rates among cases, which was consistent with previous studies[3,10].

Inflammatory cytokine overproduction contributes to higher levels of CRP among severe COVID-19 cases. Overactive cytokines can damage lung tissue, increasing CRP levels even more[9].

What is new about CRP in geriatrics is that its levels were used to follow recovered patients post-COVID-19. Interestingly, higher CRP values were associated with higher scores in High-Resolution Computed Tomography, which implies the benefit of CRP as a follow-up biomarker in tracking complete recovery in older patients[11].

Many agreed that serum CRP increased dramatically in the progressing COVID-19 infection, and its concentration is positively associated with poor outcomes[8,9]. Esposito *et al*[12] used selective CRP apheresis to quickly and effectively reduce CRP among cases with severe COVID-19 complicated with respiratory failure and 100 mg/L. The mean age of those cases was 62 years old, and all had medical comorbidities. Those patients had multiple sessions of apheresis based on the severity of their CRP levels. The mortality rates were 14 percent, and the rest had a reduced CRP that exceeded 83 percent of the initial reading with a negligible side effect.

A comparable improvement was noticed in the radiological exam following apheresis, and the cases were discharged well. Esposito *et al*[12] recommended targeting CRP as a therapeutic approach in severe COVID-19 cases.

CRP is a rapid, low-cost, reproducible inflammatory biomarker that has been proven valuable in other vulnerable groups[8,9,13], including pregnant women and newborns, with good diagnostic potential in categorizing patients' risk added to its prognostic value[14,15].

CONCLUSION

CRP assessed infection severity, predicted progressive course, and mortality rates in the geriatric group. Furthermore, it served as a follow-up biomarker in the recovery period and showed optimistic results for severe cases, which opened the door to more therapeutic avenues in practice.

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FOOTNOTES

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