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The Combined Use of Interleukin-6 with Serum Albumin for Mortality Prediction in Critically Ill Elderly Patients: The Interleukin-6-to-albumin Ratio

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Abstract

Background: The association between interleukin-6 (IL-6) and serum albumin (ALB) with mortality in critically ill elderly patients, either as stand-alone biomarkers or in combination, has been scarcely reported. We, therefore, aimed to investigate the prognostic value of the IL-6-to-albumin ratio in this special population. Patients and methods: This was a cross-sectional study conducted in the mixed intensive care unit (ICU) of two university-affiliated hospitals in Malaysia. Consecutive elderly patients (aged above or equal to 60 years) admitted to the ICU, who underwent simultaneous measurement of plasma IL-6 and serum ALB, were recruited. The prognostic value of the IL-6-to-albumin ratio was assessed by analysis of the receiver-operating characteristic (ROC) curve. Results: A total of 112 critically ill elderly patients were recruited. The outcome of all-cause ICU mortality was 22.3%. The calculated IL-6-to-albumin ratio was significantly higher in the non-survivors compared to the survivors {14.1 [interquartile range (IQR), 6.5–26.7] vs 2.5 [(IQR, 0.6–9.2) pg/mL, $p < 0.001$]}. The area under the curve (AUC) of IL-6-to-albumin ratio for discrimination of ICU mortality was 0.766 [95% confidence interval (CI), 0.667–0.865, $p < 0.001$] which was slightly higher than that of IL-6 and albumin alone. The ideal cut-off value of the IL-6-to-albumin ratio was above 5.7 with a sensitivity of 80.0% and specificity of 64.4%. After adjusting for severity of illness, the IL-6-to-albumin ratio remained as an independent predictor of ICU mortality with an adjusted odd ratio of 0.975 (95% CI, 0.952–0.999, $p = 0.039$). Conclusion: The IL-6-to-albumin ratio offers a slight improvement in mortality prediction than either of its constituent individual biomarkers and as such, it may be a potential tool to aid in the prognostication of critically ill elderly patients although this requires further validation in a larger prospective study. © The Author(s).

Author Keywords

Albumin; Elderly; Intensive care unit; Intensive care unit mortality; Interleukin-6

Index Keywords

albumin, hypertensive factor, inotropic agent, interleukin 6; aged, albumin blood level, APACHE, Article, artificial ventilation, clinical feature, Clinical Frailty Scale, controlled study, critically ill patient, cross-sectional study, demographics, diagnostic test accuracy study, female, hospital mortality, human, human tissue, interleukin 6 to albumin ratio, major clinical study, male, metabolic ratio, mortality, renal replacement therapy, sensitivity and specificity, Sequential Organ Failure Assessment Score, survival prediction, survivor

References

- Mitchell, E, Walker, R.
Global ageing: Successes, challenges and opportunities
(2020) *Br J Hosp Med*, 81 (2), pp. 1-9.
- Oud, L.
Evolving Demand for critical care services for elderly adults with dementia in Texas: A population-based study
(2016) *J Am Geriatr Soc*, 64, pp. 432-434.
- Andersen, FH, Kvåle, R.
Do elderly intensive care unit patients receive less intensive care treatment and have higher mortality?
(2012) *Acta Anaesthesiol Scand*, 56 (10), pp. 1298-1305.

- Tripathy, S.
Geriatric critical care in India
(2015) *Indian J Crit Care Med*, 19 (3), pp. 191-192.
- Haas, LEM, van Beusekom, I, van Dijk, D, Hamaker, ME, Bakhshi–Raiez, F, de Lange, DW
Healthcare-related costs in very elderly intensive care patients
(2018) *Intensive Care Med*, 44 (11), pp. 1896-1903.
- Gupta, V, Karnik, ND, Agrawal, D.
SOFA score and critically ill elderly patients
(2017) *J Assoc Physicians India*, 65 (7), pp. 47-50.
PMID: 28792169
- Qiao, Q, Lu, G, Li, M, Shen, Y, Xu, D.
Prediction of outcome in critically ill elderly patients using APACHE II and SOFA scores
(2012) *J Int Med Res*, 40 (3), pp. 1114-1121.
- Sánchez–Hurtado, LA, Ángeles–Veléz, A, Tejeda–Huezo, BC, García– Cruz, JC, Juárez–Cedillo, T.
Validation of a prognostic score for mortality in elderly patients admitted to intensive care unit
(2016) *Indian J Crit Care Med*, 20 (12), pp. 695-700.
- Yamamoto, R, Sasaki, J, Shibusawa, T, Nakada, TA, Mayumi, T, Takasu, O
Accuracy for mortality prediction with additive biomarkers including interleukin-6 in critically ill patients: A multicenter prospective observational study
(2021) *Crit Care Explor*, 3 (4), p. e0387.
- Franco, DM, Arevalo–Rodriguez, I, Roqué I Figuls, M, Oleas, NGM, Nuvials, X, Zamora, J.
Plasma interleukin-6 concentration for the diagnosis of sepsis in critically ill adults
(2019) *Cochrane Database Syst Rev*, 4.
- Lindmark, E, Diderholm, E, Wallentin, L, Siegbahn, A.
Relationship between interleukin 6 and mortality in patients with unstable coronary artery disease: Effects of an early invasive or noninvasive strategy
(2001) *JAMA*, 286 (17), pp. 2107-2113.
- Atrash, AK, de Vasconcellos, K.
Low albumin levels are associated with mortality in the critically ill: A retrospective observational study in a multidisciplinary intensive care unit
(2020) *South Afr J Crit Care*, 36 (2).
10.7196/SAJCC.2020. v36i2.422
- Rea, IM, Gibson, DS, McGilligan, V, McNerlan, SE, Alexander, HD, Ross, OA.
Age and age-related diseases: Role of inflammation riggers and cytokines
(2018) *Front Immunol*, 9, p. 586.
- Cabrerizo, S, Cuadras, D, Gomez–Busto, F, Artaza–Artabe, I, Marín– Ciancas, F, Malafarina, V.
Serum albumin and health in older people: Review and meta-analysis
(2015) *Maturitas*, 81 (1), pp. 17-27.
- Rizo–Tellez, SA, Mendez–Garcia, LA, Rivera–Rugeles, AC, Miranda– García, M, Manjarrez–Reyna, AN, Viurcos–Sanabria, R
The combined use of cytokine serum values with laboratory parameters improves mortality prediction of COVID-19 patients: The interleukin-15-to-albumin ratio
(2021) *Microorganisms*, 9, p. 2159.

- (2020) *World Population Ageing 2020 Highlights: Living arrangements of older persons (ST/ESA/SER.A/451)*, United Nations Department of Economic and Social Affairs, Population Division Accessed date: 13 August 2022
- Nielsson, MS, Christiansen, CF, Johansen, MB, Rasmussen, BS, Tønnesen, E, Nørgaard, M.
Mortality in elderly ICU patients: A cohort study
(2014) *Acta Anaesthesiol Scand*, 58 (1), pp. 19-26.
- Gom, I, Fukushima, H, Shiraki, M, Miwa, Y, Ando, T, Takai, K
Relationship between serum albumin level and aging in community-dwelling self-supported elderly population
(2007) *J Nutr Sci Vitaminol*, 53, pp. 37-42.
- Maggio, M, Guralnik, JM, Longo, DL, Ferrucci, L.
Interleukin-6 in aging and chronic disease: A magnificent pathway
(2006) *J Gerontol A Biol Sci Med Sci*, 61, pp. 575-584.
- Todi, S, Choudhuri, R.
Critical care research in elderly population: an uncharted territory
(2020) *Indian J Crit Care Med*, 24 (7), pp. 500-501.

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