Comparing the prognostic role of red blood cell volume distribution width, neutrophil–lymphocyte ratio and platelet–lymphocyte ratio in predicting the mortality after hip fracture in geriatric population

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INTRODUCTION: Hip fractures are a major public health concern in the older adults, leading to high mortality rate within 1-year after hip fracture surgery. Red blood cell volume distribution width(RDW), neutrophil–lymphocyte ratio(NLR) and platelet–lymphocyte ratio(PLR) are all reported as crucial prognosis predictors following hip fracture surgery, although the results varied among studies. This study aimed to comparing the accuracy of RDW, NLR and PLR as prognostic makers in prediction of the mortality after hip fracture surgery in geriatric population.

METHODS: 469 hip fracture surgical patients with complete one-year follow-up from one single medical center Dec 2018 to March 2021 were prospectively included. Clinical characteristics, pre-operative RDW, NLR and PLR levels were collected. Receiver operating characteristics curve and the area under the curve (AUC) were used to assess the ability of RDW, NLR and PLR to predict 1-month, 3-month and 1-year mortality in patients following hip fracture surgery.

RESULTS: Among the 469 enrolled patients, the mean age were 81.2±9.4, and 12(2.6%), 19(4.1%) and 65(13.9%) patients died within 1 month, 3 month and 1 year following hip fracture surgery. For 1-month mortality prediction, RDW and PLR were all significantly prognostic factors for mortality at a cut-off value of 15.6 and 160.7, respectively (AUC=0.67 and 0.67, respectively). However, in prediction of 3-month and 1-year mortality, RDW was the only significant factor associated with mortality at a cut-off value of 15.1 and 13.7 in predicting 3-month and 1-year mortality, respectively (AUC=0.69 for 3-month and 0.58 for 1-year mortality). In addition, in the subgroup analysis for the population aged below 80 years, the prognostic power of RDW could be increased to AUC= 0.83, 0.85 and 0.64 in predicting 1-month, 3-month and 1-year mortality, respectively.

DISCUSSION AND CONCLUSION: RDW level was the most powerful prognostic factor in prediction of mortality older patients following hip fracture surgery than NLR and PLR levels. The predicting accuracy of RDW could also be increased especially for prediction of the short-term mortality in younger patients following hip fracture surgery.