The Akcaalan Mortality Score: A Novel Mortality Score to Predict 3-Year Mortality of Elderly Hip Fractures

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This study aimed to determine whether the postoperative mortality ratio of a patient with a hip fracture can be predicted using evaluations conducted upon first admission. Therefore, we intended to develop a scoring system that is easy to apply at first admission and better informs interested parties about postoperative three-year mortality. METHODS:

This study was designed retrospectively. The data collection process started following our hospital's research ethics committee approval with .../... number. Patients evaluated for hip fractures between January 2016 and March 2021 were included in the study. Patients under the age of 65 at the time of admission due to hip fracture, those who had pathological fractures, subtrochanteric fractures, prior surgical history on the related hip area, multiple fractures, polytrauma patients, those previously diagnosed with or treated for malignancy, patients with isolated and greater trochanter fractures with no surgical intervention, those who had received dialysis treatment due to chronic kidney failure, and patients diagnosed with hematological diseases were excluded.

The blood parameters and demographic data of the patients taken upon first emergency admission were collected to develop the scoring system. However, the mortality status of the patients was obtained from the national electronic health system network. The system is 100% reliable in terms of mortality. Seven different parameters were used for the scoring. The first of these is the patient's age when they first suffered a hip fracture. The literature clearly shows increased hip fracture mortality as age increases . In a study in which the intrahospital mortality of hip fractures was evaluated, Monedero et al. grouped patients into three age groups: 65-74, 75-84, and >85, clearly revealing the relationship between this grouping and mortality. Other studies have shown that hip fractures in males resulted in higher mortality. Since various studies in the literature have indicated the effect of sex on mortality, the second parameter in our scoring system was the sex of the patient. The fracture type parameter, which is not included in these seven parameters, was excluded as previous studies have shown that it is not associated with mortality. Anemia is a commonly encountered problem among older people; it is associated with high mortality and morbidity rates and reduced functional status. Other studies have focused on the effects of different hemoglobin (Hgb) values on hip fracture mortality. The Hgb level of the patients at the time of admission was determined as the third parameter in our scoring system. Albumin is a significant parameter that informs us about the metabolic status of the patients, and low levels of albumin affect mortality rates in hip fractures. Therefore, our scoring system determined the albumin value as the fourth parameter. Based on the effects of creatinine values on hip fractures, which are an indicator of kidney functions, the creatinine levels of patients at the time of admission were determined as the fifth parameter in our scoring system. Extensive research has been conducted on the possible relationship between preoperative the neutrophile-lymphocyte rate (NLR) and mortality in hip fractures; this was revealed in a large-scale meta-analysis. Using these data from the literature, the sixth parameter in our scoring system is NLR. The seventh and last parameter in our scoring system is the monocyte-lymphocyte rate (MLR). The relationship between the different values of MLR and hip fracture mortality has also been assessed in various studies.

RESULTS:

Along with the inclusion and exclusion parameters, the data of 1343 patients were included in this study. Exactly 863 (64.3%) of the patients were female, and 480 (35.7%) were male. Regarding which side the fracture occurred, 704 (52.4%) occurred on the right side and 639 (47.6%) on the left side. Considering the fracture type, 417 (31.04%) were collum femoris fractures, and 926 (68.95%) were intertrochanteric femur fractures. Regarding the mortality of the 1343 patients at the end of the three years, it was observed that 40.7% of the patients lost their lives.

For a mortality score of >11.5, the probability of patients with hip fractures losing their lives at the end of the three-year-long process was 63.9% (95% CI; 0.61–0.67), the sensitivity was 63.8%, and the specificity was 58%. DISCUSSION AND CONCLUSION:

The mortality scoring system developed in the present study can be used to set surgical times for patients. If the mortality score of the patient is higher than 11.5 at first admission, surgery can be planned with a follow-up of daily blood parameters after the score is at lower levels. Accordingly, mortality will decrease in the patient population.

In conclusion, the Akcaalan Mortality Score can provide satisfactory data to predict the three-year mortality of hip fractures in elderly patients during the preoperative process. In addition to the mortality prediction, the mortality score can be used to assess surgical timing in these cases. Prospective studies are required to improve the mortality score. Identifying the preoperative mortality score can be useful as it positively affects prognosis through extensive evaluation and appropriate treatment methods.

Та	bl	e	s:

Parameters	Cut-off Value	Score
	65-74 years	1
Age	75-84 years	2
	>85 years	3
	Famala	
Sex	Male	2
Hemoglobin Level	>12 mg/dL	1
	9,8-12 mg/dL	2
	< 9,8 mg/dL	3
Albumin Level	>35 g/L	1
	19,5-35 g/L	2
	<19,5 g/ L	3
	<0,87 mg/dL	1
Creatinin Level	0,87-1,2 mg/dL	2
	>1,2 mg/dL	3
	<6,55	1
NLR	>6,55	2
	< 0.635	1
MI P	>0.625	2
PRAY	~0,033	2
Total Score		7-18