

Reply to Letter to the Editor

New Equations for Predicting Postoperative Risk in Patients with Hip Fracture

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I appreciate Dr. Moppett's comments regarding the article by Hirose et al. [2]. In response to his concerns, first, this study was performed to establish and evaluate equations for estimating morbidity and mortality rates in candidates for hip fracture surgery using the Estimation of Physiologic Ability and Surgical Stress (E-PASS) scoring system, and to compare the predictive quality of the E-PASS and POSSUM systems. To accomplish these purposes, all patients with and without complications were studied to develop and evaluate the equations and to compare the predictive quality of inhospital mortality between the E-PASS and P-POSSUM systems. I limited the subjects only in the calculations of predicted 30-day morbidity and mortality rates to compare the predictive quality of the E-PASS and O-POSSUM because O-POSSUM assesses 30-day morbidity and mortality [4]. The E-PASS scoring system can be used preoperatively to predict the occurrence of postoperative morbidity or mortality, and retrospective findings concerning complications are necessary to evaluate the quality of E-PASS.

Regarding the second question regarding the statistical assessment of goodness of fit, I used the Hosmer-Lemeshow test for the equations of E-PASS and POSSUM systems. The E-PASS scores showed good concordance with inhospital morbidity (chi square test, $p = 0.65$), inhospital mortality ($p = 0.40$), 30-day morbidity ($p = 0.35$), and 30-day mortality ($p = 0.48$). The POSSUM scores also were meaningful but showed less concordance with inhospital

mortality ($p = 0.30$), 30-day morbidity ($p = 0.11$), and 30-day mortality ($p = 0.24$).

Regarding the third point about the rationale for the comparisons with E-PASS and POSSUM, I recognize the POSSUM scoring for predicting 30-day mortality was not particularly useful in the population for hip fracture surgery [5]. However, the POSSUM systems are useful in hip fracture surgery for predicting inhospital morbidity [1] and 30-day morbidity and mortality [6]. Furthermore, the POSSUM and E-PASS systems need not only preoperative evaluation but also surgical factors for calculating their scores. Therefore, I compared these two scoring systems despite the narrow ranges of their surgical stress scores in a population with hip fractures. I agree that the preoperative scoring system, the Nottingham Hip Fracture Score (NHFS) described by Maxwell et al. [3], reasonably predicts 30-day mortality. In contrast, the equations using the E-PASS score developed by Hirose et al. [2] are focused mainly on predicting inhospital risk. Additional studies to evaluate and compare these established risk scoring systems may provide better predictive tools for this population, depending on purpose.

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