A simple risk score accurately predicts in-hospital mortality, length of stay, and cost in acute upper GI bleeding CME

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Background: Although the early use of a risk stratification score in upper GI bleeding is recommended, existing risk scores are not widely used in clinical practice.

Objective: We sought to develop and validate an easily calculated bedside risk score, AIMS65, by using data routinely available at initial evaluation.

Design: Data from patients admitted from the emergency department with acute upper GI bleeding were extracted from a database containing information from 187 U.S. hospitals. Recursive partitioning was applied to derive a risk score for in-hospital mortality by using data from 2004 to 2005 in 29,222 patients. The score was validated by using data from 2006 to 2007 in 32,504 patients. Accuracy to predict mortality was assessed by the area under the receiver operating characteristic (AUROC) curve.

Main Outcome Measurements: Mortality, length of stay (LOS), and cost of admission.

Results: The 5 factors present at admission with the best discrimination were albumin less than 3.0 g/dL, international normalized ratio greater than 1.5, altered mental status, systolic blood pressure 90 mm Hg or lower, and age older than 65 years. For those with no risk factors, the mortality rate was 0.3% compared with 31.8% in patients with all 5 ($P < .001$). The model had a high predictive accuracy (AUROC = 0.80; 95% CI, 0.78-0.81), which was confirmed in the validation cohort (AUROC = 0.77, 95% CI, 0.75-0.79). Longer LOS and increased costs were seen with higher scores ($P < .001$).

Limitations: Database data used does not include outcomes such as rebleeding.

Conclusions: AIMS65 is a simple, accurate risk score that predicts in-hospital mortality, LOS, and cost in patients with acute upper GI bleeding. (Gastrointest Endosc 2011;74:1215-24.)

Upper GI hemorrhage is common, resulting in more than 300,000 hospital admissions per year in the United States, with estimated mortality rates between 2% and 15%.[1,2] The recently published International Consensus Recommendations on the management of patients with nonvariceal upper GI bleeding recommend "early risk stratification, by using validated prognostic scales."[3] It is expected that the incorporation of risk scores will lead to improved patient triage and ultimately better outcomes.

Factors previously found to be predictors of mortality include advanced age, low hemoglobin level, low systolic blood pressure, blood in a gastric aspirate, presence of severe comorbidity (neoplasia, cirrhosis), worsening health status (American Society of Anesthesiology classification 3 or 4), rebleeding, hypoalbuminemia, elevated creatinine, elevated serum aminotransferase level, onset of bleeding while an inpatient, and active bleeding or other stigmata of recent hemorrhage at the time of endo-

Abbreviations: AUROC, area under the receiver operating characteristic; INR, international normalized ratio; LOS, length of stay.

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scopy.[4-12] Unfortunately, the existing risk stratification scores for upper GI bleeding are not commonly used in clinical care for a variety of reasons including that there are many scores available, the differences between the existing scores are not well understood, they can be difficult to calculate, and some require endoscopic information not readily available at the time of presentation.[5-6,13]

This study was conducted to determine predictors of mortality in patients with upper GI hemorrhage by using a large database and to incorporate those predictors into an easily calculated and clinically useful predictive score. Our goal was to create a simple prognostication tool that does not require endoscopic data that can be used to facilitate earlier triage and goal-directed treatment. We hypothesized that, in addition to predicting mortality, such a score would also correlate with length of stay (LOS) and cost.

Take-home Message

- A new risk stratification score for patients with GI bleeding was derived and validated that contains 5 elements: albumin less than 3.0 g/dL, international normalized ratio greater than 1.5, altered mental status, systolic blood pressure 90 mm Hg or lower, and age older than 65 years.
- The AIMS65 score accurately predicts in-hospital mortality, length of stay, and costs.

METHODS

Setting and participants

We used a clinical research database from CareFusion Inc (formerly Cardinal Health Clinical Outcomes Research Database [Clinical Research Services, Cardinal Health, Marlborough, Mass]) for current study. This data set has been described in detail elsewhere.[14-20] For acute care admissions to participating hospitals, the data set includes demographic information, diagnoses, hospital mortality, results from laboratory testing, vital signs, and other key clinical findings on the day of admission. The study population contained data from a total of 187 hospitals (45% teaching and 55% nonteaching). A total of 141 (75%) were urban hospitals and 46 (25%) were rural. There were 45 hospitals (24%) with a bed size of more than 300, 95 hospitals (51%) with 100 to 300 beds, and 47 hospitals (25%) with fewer than 100 beds.

All patients age 18 years or older in the database with principal International Classification of Diseases, Ninth Revision, Clinical Modification discharge codes associated with acute variceal and upper GI bleeding from specific and nonspecific sites were included. The principal diagnosis identifies the primary reason for acute care admission. Admissions in 2004 and 2005 were used for the derivation cohort, and admissions in 2006 and 2007 were used for the validation cohort. The study protocol was reviewed and approved by the institutional review board of Partner's Healthcare.

Outcomes and endpoints

Mortality, defined as any death occurring during index hospitalization, was the primary endpoint. Secondary endpoints were hospital LOS and cost. Hospital cost was based on universal billing data, which was standard across hospitals. Cost per patient was calculated as total cost/charge ratio, multiplied by total charge. Cost/charge ratios were based on data from the Centers for Medicare and Medicaid Services for each hospital between 2004 and 2005 for the derivation cohort and between 2006 and 2007 for the validation cohort.

Potential candidate variables were selected a priori based on biological plausibility for increasing the risk of death. Variables included demographic factors (age, sex), vital signs (pulse, systolic blood pressure, diastolic blood pressure, temperature, and respiratory rate), mental status, results of laboratory tests, and underlying comorbid conditions. Altered mental status was defined as a Glasgow Coma Scale score of less than 14 or a physician-charted designation of "disoriented," "lethargy," "stupor," or "coma." For patients admitted from the emergency department, vital signs and mental status collected at time of presentation were used. Laboratory test results collected on the day of admission, including routine chemistry, hematology, and blood gases, were considered potential predictive variables. Comorbid conditions of interest included underlying cardiopulmonary disease, chronic renal failure, history of malignancy, and other chronic conditions abstracted through chart review or secondary ICD-9 diagnostic codes. For items collected via chart abstraction, trained abstractors collected the data by using a strict glossary for definitions.

Risk score development

A recursive partition approach was used to identify mortality risk factors with the highest discriminative power.[21] This classification and regression tree analysis[22] have been used to derive prediction rules for chronic obstructive pulmonary disease,[19] acute chest pain,[23] congestive heart failure,[24] and other disease states.[25-27] The recursive partition first identifies the variable with the highest discrimination to partition the patient population into low- or high-risk groups for the outcome of interest (nodes). It then continues the process to partition the subsequent nodes. The goal is to identify the variables and partition points that optimally separate low-risk from high-risk patients. We used the 1 standard error rule to limit the tree-generation depth.

The recursive partition results in a treelike algorithm consisting of multiple nodes. Whereas recursive partitioning naturally incorporates interactions between predictive factors, the treelike algorithm may be cumbersome to

remember. To increase the ease of use, we explored a simplified algorithm by giving each risk factor a weight of 1 point. This approach has been previously used for risk score development.[19,28] We compared the AUROCs of the tree algorithm, the unequal weight score based on the coefficients in the model, and the simplified equal weight score. The recursive partitioning software used to derive the initial rules was downloaded from a publicly accessible Web site.[29] All other analyses were conducted by using SAS software version 9.1 (SAS Institute Inc, Cary, NC).

Risk score validation

The risk algorithm derived from the derivation cohort was applied to the validation cohort. The area under receiver operating characteristic (AUROC) curves was used to assess model discrimination and the Cochrane-Armitage trending statistic was used to assess whether the risk score could differentiate low-risk from high-risk patients in a fashion of graded response based on the level of risk present.

Using mortality risk score to stratify LOS and cost

The mortality risk score was then evaluated for its ability to predict LOS and cost for both the derivation and validation cohorts. Because severely ill patients are more likely to die during early hospitalization, their LOS may be shorter and their costs lower than those of patients who are not as ill. Therefore, LOS and cost data were analyzed only for patients who survived hospitalization. Linear regression was used to assess the association of the risk score with LOS and cost.

RESULTS

Patient characteristics

The study included 29,222 admissions for the derivation cohort and 32,504 admissions for the validation cohort (Table 1). For both cohorts, the median age was 75 years (interquartile range 60-83 years), and 52% of the patients were female. The overall mortality rate was 3.2% for the derivation cohort and 2.7% for the validation cohort. Approximately 1.7% of admissions had a principal diagnosis of variceal bleeding in both cohorts.

Derivation of prediction rule

The recursive partition approach selected an albumin level of less than 3.0 g/dL as the first partition node for separating patients based on probability of in-hospital mortality (Fig. 1). Subsequently, patients were segregated into groups based on alterations in mental status, followed by separation as a function of systolic blood pressure of 90 mm Hg or lower, an international normalized ratio (INR) greater than 1.5, and age older than 65 years. This resulted in 7 distinct risk cohorts given the potential combinations of the 5 risk factors.

Simplified risk score and validation

We compressed the tree algorithm from 7 distinct categories into an aggregate score that is calculated by summing the number of risk factors present: albumin level less than 3.0 g/dL, INR greater than >1.5, altered mental status, systolic blood pressure 90 mm Hg or lower, and age older than 65 years (AIMS65). In the derivation cohort (Fig. 2), the mortality rates of patients with 0 to 5 risk factors present on admission were 0.3%, 1.2%, 3.6%, 9.8%, 21.8%, and 31.8%, respectively ($P < .001$). In the validation cohort, the corresponding mortality rates were 0.3%, 1.2%, 2.8%, 8.5%, 15.1%, and 24.5%, respectively ($P < .001$). The simplified risk score had a good fit as demonstrated by the AUROC curves for the derivation and validation cohorts (0.80 [95% CI, 0.78-0.81] and 0.77 [95% CI, 0.75-0.79], respectively; Fig. 3). The AUROC (0.77) for the simplified AIMS score with equal weight for each risk factor in the validation cohort was comparable with the unequal weight risk score (0.78).

For the validation cohort, the score cutoff point of 2 or more, 3 or more, 4 or more, or 5 or more corresponded to a positive predictive value ranging from 0.05 to 0.25 and a negative predictive value ranging from 0.97 to 0.99, respectively (Table 2). The corresponding positive post- to pretest likelihood ratio was 2.0, 4.2, 7.2, and 11.8 respectively, ie, approximately 2-, 4-, 7-, or 12-fold enhancement, respectively, in detecting the mortality risk. The Cochrane-Armitage test for trend and the 95% confidence intervals were highly significant ($P < .001$) for both cohorts, confirming the graded mortality risk with an increase in the level of risk strata.

AIMS65 risk score and LOS and cost

The simplified AIMS65 risk score discriminated patients based on the need for extended hospital care and cost (Fig. 4). For the derivation cohort, average LOS for patients with 0 to 5 risk factors present on admission were 3.39, 4.42, 5.38, 6.51, 7.42, and 8.06 days, respectively ($P < .001$). The corresponding average costs were $5341, $6389, $7837, $10,141, $12,730, and $15,800, respectively ($P < .001$). For the validation cohort, the average LOSs for patients with 0 to 5 risk factors were 3.44, 4.37, 5.35, 6.23, and 7.21 days, respectively ($P < .001$). The corresponding average costs were $5647, $6466, $7980, $10,042, $12,986, and $15,776, respectively ($P < .001$).

DISCUSSION

By using a large clinical database, we have developed and validated a simple risk score to predict mortality in patients with upper GI bleeding. Five factors were included in the score: albumin level less than 3.0 g/dL, INR greater than 1.5, altered mental status, systolic blood pressure 90 mm Hg or lower, and age older than 65 years (AIMS65). As the number of risk factors present increased, so did the mortality rate. Patients in the validation cohort

TABLE 1. Patient baseline characteristics by derivation and validation cohorts

	Derivation cohort (2004-2005)		Validation cohort (2006-2007)	
	Prevalence, no. (%)	Mortality, no. (%)	Prevalence, no. (%)	Mortality, no. (%)
Total, no. (%)	29,222 (100.0)	948 (3.2)	32,504 (100.0)	872 (2.7)
Age, y, median (1st, 3rd quartiles)	75 (60, 83)		75 (60, 83)	
Age >65 y	19,857 (68.0)	769 (3.9)	21,796 (67.1)	701 (3.2)
Male	14,073 (48.2)	491 (3.5)	15,762 (48.5)	448 (2.8)
Lab test results				
WBC >10.9	9608 (32.9)	532 (5.5)	10,657 (32.8)	470 (4.4)
Calcium ≤8.4 mg/dL	8789 (30.1)	489 (5.6)	9,612 (29.6)	433 (4.5)
Calcium >10.1 mg/dL	676 (2.3)	29 (4.3)	1041 (3.2)	31 (3.0)
Creatinine >1.4 mg/dL	8083 (27.7)	519 (6.4)	8983 (27.6)	444 (4.9)
Glucose >165 mg/dL	7056 (24.1)	387 (5.5)	8023 (24.7)	321 (4.0)
Albumin <3.0 g/dL	5487 (18.8)	476 (8.7)	6436 (19.8)	425 (6.6)
INR >1.5	5281 (18.1)	352 (6.7)	6317 (19.4)	300 (4.8)
Total bilirubin >1 mg/dL	2718 (9.3)	219 (8.1)	3238 (10.0)	183 (5.7)
Platelets ≤115 $10^{-}9$/L	2150 (7.4)	165 (7.7)	2391 (7.4)	145 (6.1)
Bands >7%	1928 (6.6)	208 (10.8)	1924 (5.9)	178 (9.3)
PTT >45 s	1913 (6.5)	169 (8.8)	2174 (6.7)	137 (6.3)
AST >60 U/L	1760 (6.0)	173 (9.8)	2071 (6.4)	156 (7.5)
K >5.3 mEq/L	1706 (5.8)	167 (9.8)	1707 (5.3)	130 (7.6)
K ≤3.2 mEq/L	1336 (4.6)	69 (5.2)	1551 (4.8)	55 (3.6)
WBC ≤4.3	1433 (4.9)	56 (3.9)	1745 (5.4)	59 (3.4)
Na ≤130	1401 (4.8)	87 (6.2)	1525 (4.7)	80 (5.3)
Na >145	875 (3.0)	105 (12.0)	950 (2.9)	76 (8.0)
Glucose ≤70 mg/dL	462 (1.6)	37 (8.0)	688 (2.1)	50 (7.3)
Pco_2 arterial				
≤30	435 (1.5)	90 (20.7)	432 (1.3)	85 (19.7)
>60	160 (0.5)	45 (28.1)	170 (0.5)	38 (22.4)
Po_2 arterial				
>140	310 (1.1)	80 (25.8)	330 (1.0)	69 (20.9)
≤50	120 (0.4)	26 (21.7)	120 (0.4)	26 (21.7)
Vital signs and mental status				
Diastolic BP ≤69 mm Hg	11,064 (37.9)	509 (4.6)	12,065 (37.1)	433 (3.6)
Systolic BP ≤90 mm Hg	5115 (17.5)	448 (8.8)	5,102 (15.7)	368 (7.2)
Pulse >119	3264 (11.2)	194 (5.9)	3,531 (10.9)	209 (5.9)
Respiration >29	1568 (5.4)	177 (11.3)	1634 (5.0)	151 (9.2)
Oral temperature ≤95°F	1452 (5.0)	155 (10.7)	534 (1.6)	61 (11.4)

TABLE 1. Continued

	Derivation cohort (2004-2005)		Validation cohort (2006-2007)	
	Prevalence, no. (%)	Mortality, no. (%)	Prevalence, no. (%)	Mortality, no. (%)
Oral temperature >101°F	212 (0.7)	15 (7.1)	352 (1.1)	19 (5.4)
Altered mental status*	4659 (15.9)	447 (9.6)	5039 (15.5)	395 (7.8)
Comorbidities				
COPD	5924 (20.3)	257 (4.3)	6958 (21.4)	252 (3.6)
History of heart failure	5504 (18.8)	286 (5.2)	6109 (18.8)	248 (4.1)
Atrial fibrillation	2631 (9.0)	167 (6.4)	3239 (10.0)	170 (5.3)
Current immunosuppressive medication	2011 (6.9)	136 (6.8)	2414 (7.4)	120 (5.0)
Pleural effusion	1656 (5.7)	173 (10.5)	1968 (6.1)	155 (7.9)
History of malignancy	1516 (5.2)	210 (13.9)	1783 (5.5)	144 (8.1)
Renal failure	1511 (5.2)	94 (6.2)	1761 (5.4)	72 (4.1)
Severe malnutrition	855 (2.9)	106 (12.4)	943 (2.9)	93 (9.9)
Ascites	732 (2.5)	97 (13.3)	874 (2.7)	81 (9.3)

Altered mental status was defined as Glasgow Coma Scale score of <14 or a designation of disoriented, lethargy, stupor, or coma by a physician.
Principal diagnosis codes identify the primary reason for hospital admission.
WBC, White blood cell count; *INR*, international normalized ratio; *PTT*, partial thromboplastin time; *AST*, aspartate aminotransferase; *BP*, blood pressure; *COPD*, chronic obstructive pulmonary disease.

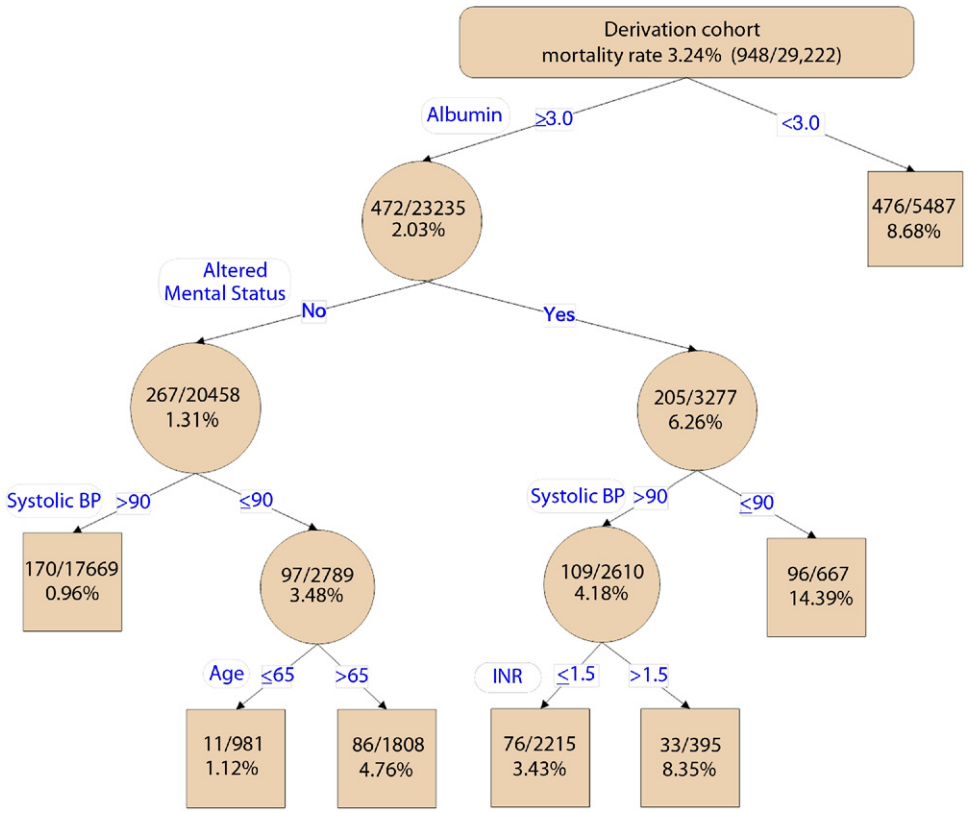

Figure 1. Classification tree for the derivation cohort.

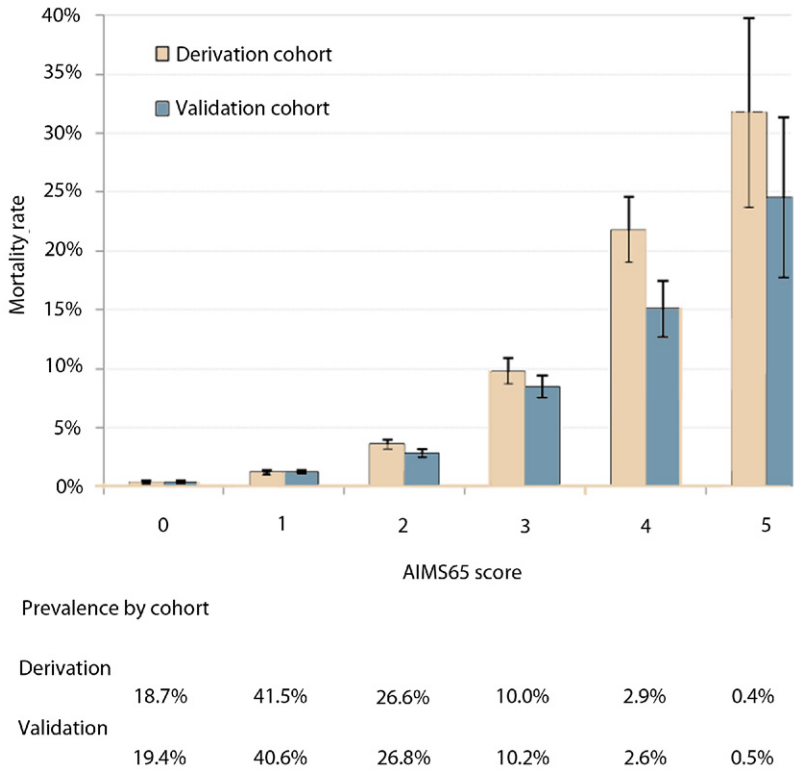

Figure 2. Mortality rate by AIMS65 score for derivation and validation cohorts.

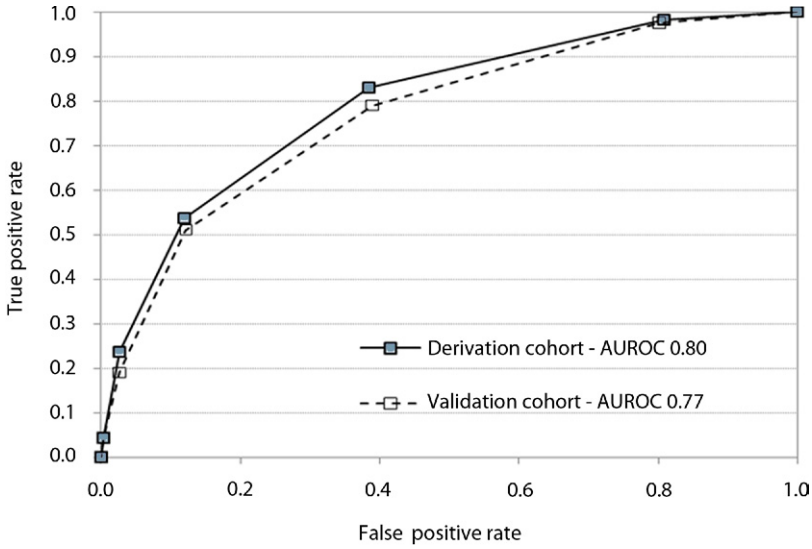

Figure 3. Area under the receiver operator characteristic (AUROC) curve for the AIMS65 score by derivation and validation cohorts.

with no risk factors had a low mortality rate (0.3%), whereas those with all 5 risk factors had a high mortality rate (24.5%). In addition, increasing numbers of risk factors were also associated with longer LOS and higher costs in both the derivation and validation cohorts. Mortality risk can be characterized as low (AIMS65 <2 risk factors) or high (AIMS65 ≥ 2 risk factors). The AIMS65 score only includes variables in the risk score that are easily obtained as part of the initial evaluation when patients are in the emergency department, making it applicable as an early risk stratification tool.

There are multiple advantages to the risk stratification score developed in this study. The first is that the score was derived by using a very large database of patients with upper GI bleeding and was then validated with a separate very large cohort of patients. To our knowledge, this is the largest study of risk factors in acute upper GI bleeding to date. Because the patients came not only from teaching

TABLE 2. Sensitivity, specificity, positive and negative predictive values, and likelihood ratio by score cutoff point for the validation cohort

AIMS65 score cutoff point	No. of patients	No. of deaths	% of mortality	Sensitivity	Specificity	PPV	NPV	LR+
≥1	26,212	851	3.2	0.976	0.198	0.032	0.997	1.2
≥2	13,012	689	5.3	0.790	0.610	0.053	0.991	2.0
≥3	4307	445	10.3	0.510	0.878	0.103	0.985	4.2
≥4	1004	166	16.5	0.190	0.974	0.165	0.978	7.2
5	155	38	24.5	0.044	0.996	0.245	0.974	11.8
Total	32,504	872	2.7					

PPV, Positive predictive value; *NPV*, negative predictive value; *LR+*, positive likelihood ratio.

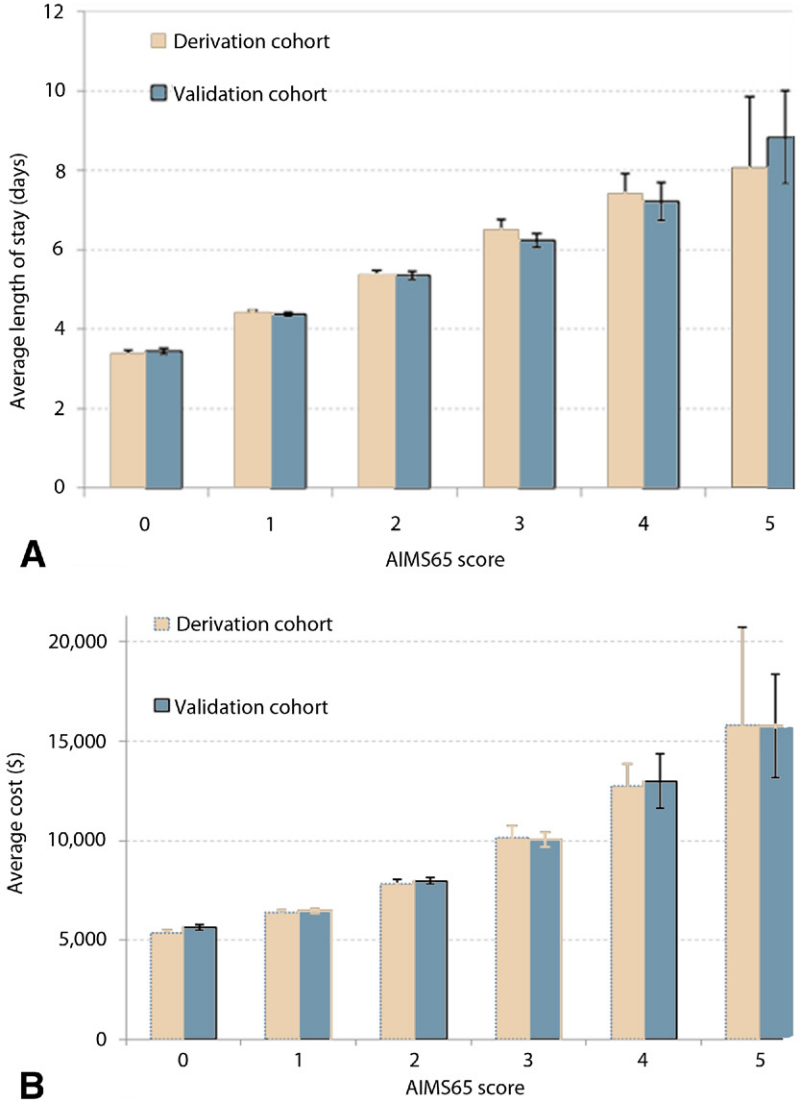

Figure 4. A, Length of stay and **B,** cost by AIMS65 score for derivation and validation cohorts (live discharges).

hospitals (45%), but also from nonteaching hospitals (55%), it is likely that the patients analyzed for this study represent a generalizable cross section of the U.S. population. Additional advantages are that the AIMS65 score predicts a clinically important endpoint, in hospital mortality, and is easily applied as part of the initial evaluation at the time of hospital admission, when most triage decisions are made. This simple risk score also displays high discrimination for hospital LOS and cost.

Existing risk stratification scores

Risk stratification in patients with upper GI bleeding is essential for optimal management. Patients who are identified as being at increased risk of mortality can be appropriately triaged to receive monitoring in an intensive care unit with aggressive management, whereas patients at low risk could potentially be managed conservatively with observation or even discharged.[4,30-32] There are many scores available; however, the differences between the existing scores are not well understood. Many risk stratification scores require endoscopic data, which is generally only available after triage decisions have been made. The AIMS65 risk score only uses information that is readily available at presentation and does not depend on information from an endoscopy.

The Rockall and Blatchford scores are the most well-known upper GI bleeding risk stratification tools. The Rockall score was retrospectively developed to predict mortality in a cohort of 3981 patients with acute upper GI bleeding and was then prospectively validated with a separate cohort of 1584 patients with an overall mortality rate of 14%.[6] In addition to clinical data (age, shock, and comorbidities), the Rockall score incorporates endoscopic diagnosis and the presence or absence of endoscopic stigmata of recent hemorrhage. The disadvantages of the Rockall score are that it can be difficult to remember the individual components of the score and their relative weights and that it requires endoscopic data. There is a recent modification of the Rockall score called the clinical Rockall score that does not incorporate endoscopic data.[33]

The Blatchford score was developed retrospectively to predict the need for clinical intervention in a cohort of 1748 patients who were hospitalized with acute upper GI bleeding. It was then validated prospectively with 197 patients[13] and 676 patients.[34] The score includes systolic blood pressure, heart rate, melena and/or syncope, hepatic disease, cardiac failure, blood urea nitrogen, and hemoglobin. A modified version with fewer factors in its calculation has also been validated in the literature.[35] The Blatchford score is similar to ours in that it does not include endoscopic data and thus can be applied at the time of admission to the hospital. However, like the Rockall score, it can be difficult to recall the various components of the score and their weights. In addition to being easier to recall and calculate, it should be noted that the AIMS65 score predicts a clinically significant outcome, mortality, whereas the Blatchford score predicts a surrogate outcome, the need for clinical intervention. We did not compare the AIMS65 score with the Rockall or Blatchford score because these scores were not possible to calculate by using the database that we analyzed.

Serum albumin is a predictor

An important finding in this study is that serum albumin level at the time of presentation was the single most important predictor of mortality. This finding is supported by recent studies that demonstrate the role of hypoalbuminemia in predicting mortality in both upper GI bleeding and in critically ill patients.[33-38] Hypoalbuminemia, however, is not included in either the Rockall or Blatchford score. It should be noted that although hypoalbuminemia was more common in the variceal group, it was also present in 20% of the patients with specific and nonspecific etiologies. As shown in Table 1, a large proportion of GI bleeding patients had a variety of comorbidities other than cirrhosis that are also associated with hypoalbuminemia.

LOS and costs

Markers of resource use and clinical outcomes in upper GI bleeding include LOS and cost,[39,40] and this study found that both LOS and cost increased with increasing AIMS65 scores. By calculating LOS and cost only for patients who survived the index hospitalization, this study demonstrated that there are increased costs related to the treatment of patients with higher AIMS65 scores that were not tied to end of life care. In fact, several factors including procedures, medications, and increased use of imaging studies and other resources likely accounted for the increased costs.

Limitations

A limitation of this study was that it was developed retrospectively, so variables included in the score, as well as outcomes of interest, were limited to those that had been included in the database. As a result, information was not available on other outcomes of interest, such as endoscopic data, rebleeding, and transfusion requirement. The database does not contain information on treatment variables such as medication use or stigmata of recent hemorrhage. Another possible limitation of this study is that several of the risk factors are also risk factors for cirrhosis including hypoalbuminemia, prolonged INR, and mental status changes. However, there were only 273 (1.7%) versus 284 (1.7%) variceal cases in the derivation versus the validation cohort. This prevalence is very similar to that seen in a national representative sample (Agency for Healthcare Research and Quality, HCUPNET 2010).[41] We also do not have reliable information on the exact number of patients who may have any underlying chronic liver disease, although in Table 1, the percentages of patients with an elevated aspartate aminotransferase level were

noted to be 6.0% in the derivation cohort and 6.4% in the validation cohort. We measured in-hospital mortality and not 30-day mortality because it was not possible to accurately measure 30-day mortality by using this database. This may lead to an underestimate of the mortality. However, the observed inpatient mortality in our data set (3.2% vs 2.7% for derivation and validation cohorts, respectively) was comparable to that of 3.2% versus 2.85% for inpatients with a principal diagnosis of GI bleeding admitted in 2005 versus 2007 in a national representative sample[41] and similar to the mortality range in 2004 of 3.0% to 3.4% depending on hospital size reported in another study.[42] Finally, a simple risk score by using equal weights for each risk factor has the potential to be less precise than a weighted risk factor score. However, our simple equal weight score has comparable predictive accuracy compared with more complex unequal weight risk score.

Clinical implications

This study presents a risk stratification score to predict mortality in patients with acute upper GI bleeding that was derived and validated by using a large clinical database. The risk score can be applied as part of the initial evaluation at admission. The score is calculated by summing the number of risk factors present. The 5 risk factors included in the score are albumin level less than <3.0 g/dL, INR greater than 1.5, altered mental status, systolic blood pressure 90 mm Hg or lower, and age older than 65 years. In addition to predicting mortality, the score also predicts length of stay and cost of hospitalization. Mortality risk can be characterized as low (AIMS65 <2 risk factors) or high (AIMS65 ≥2 risk factors). We plan to evaluate the AIMS65 score compared with the modified Blatchford score in a different patient population to determine the relative strengths and weaknesses of these scoring systems.

There is a need for easily applied, validated risk stratification scores for patients with upper GI bleeding to improve patient outcomes. The importance of such scores is reflected by current guidelines that call for the incorporation of risk stratification scores in the early decision-making process.[3] The AIMS65 score is a simple, risk stratification score that meets this need.

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