ICU Discharge APACHE II Scores Help to Predict Post-ICU Death

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Background: The mortality rate after discharge from the intensive care unit (ICU) (so called post-ICU mortality) has remained high (8.6-23.6%) during the past 15 years. The object of this study was to examine the effects of the severity of illness at ICU discharge assessed using the Acute Physiology and Chronic Health Evaluation (APACHE) on the post-ICU mortality rate.

Methods: A 6-month prospective observational study was conducted in the medical ICU of a university affiliated tertiary care hospital.

Results: A total of 203 patients were discharged from the ICU to general wards from December 1998 through June 1999, and 39 (19.2%) of the 203 discharged ICU patients subsequently died at hospital. Logistic regression analysis identified two independent risk factors for post-ICU mortality rate: discharge APACHE II score (Odds Ratio 1.17, 95% IC 1.10-1.25, $p < 0.0001$) and male gender (OR 3.24, 95% CI 1.26-8.33, $p = 0.015$). Patients discharged from the ICU with discharge APACHE II scores of 17 or greater had the mortality rate of 37.3% compared with 9.4% for those with discharge APACHE II scores of less than 17. The former group were significantly older ($p < 0.0001$) and had higher proportion of requiring tracheostomy or hemodialysis during ICU admission ($p < 0.0001$) than the latter group.

Conclusion: In our study, a higher APACHE II score calculated at ICU discharge and male gender were independent risk factors for post-ICU death. Identifying patients with discharge APACHE II scores of 17 or greater helps to predict post-ICU death.

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Key words: post-ICU mortality rate, admission APACHE II score, discharge APACHE II score

Intensive care units (ICUs) provide a service for patients with potentially recoverable diseases who benefit from more detailed observation and treatment than is usually available on the general wards. Patients may be discharged from the ICU when their physiologic status has stabilized and the need for ICU monitoring and care is no longer necessary.(1) However, a number of patients who are successfully discharged from intensive care subsequently die during their hospital admissions. This may indicate premature discharge from the ICU or suboptimal management in the ICU or ward.(2) As trends move

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towards earlier ICU discharge, it becomes increasingly important to be able to identify those patients at high risk of subsequent clinical deterioration, who might benefit from longer ICU stays or from transfers to intermediate care units.(3) Daly et al. reported that a strategy to reduce premature discharges in patients at high risk of in-hospital death could result in a 39% reduction in post-ICU death in these patients.(4)

We speculated that a lack of objective measures at ICU discharge could lead to premature discharge of these patients. We also postulated that post-ICU death could be related to severity of illness assessed both at ICU admission and ICU discharge, as well as many clinical variables during ICU admission. As published in 1985 at the George Washington University Medical Center, the Acute Physiology and Chronic Health Evaluation II (APACHE II) scoring system provided accurate and reliable measures of the severity of illness in critically ill patients.(5) This model incorporated 12 physiological variables (weighted from 0 to 4 points), age, surgical status, and previous health status. Since predischarge organ dysfunction/failure has been demonstrated to be the most important prognostic factor for post-ICU death,(6) APACHE II scores calculated just before ICU discharge may be more helpful in identifying the patients at high risk of post-ICU death.

The aims of this study were to (a) examine a possible link between the greater severity of illness at ICU discharge as defined by APACHE II scores at ICU discharge and poor outcomes, and (b) explore possible significantly clinical influences affecting post-ICU death.

METHODS

This study was conducted prospectively from December 1998 through June 1999 within the medical ICU of the Linkuo Chang Gung Memorial Hospital. This institution is a 3900-bed acute-care teaching hospital and a tertiary medical center in Taiwan. The 20-bed MICU cares mostly for acute nonsurgical, noncardiac and nonneurological adult patients. The MICU is staffed by a senior resident, and a junior resident under the supervision of a member of the full-time attending staff. All patients consecutively admitted in the MICU were entered into the database. Where patients were readmitted to the MICU, the data from their first admission was used for evaluation of the severity of the illness on admission and the data from their last entry into the ICU was used for the evaluation of the severity of the illness at ICU discharge. Charts were reviewed on a regular basis during each patient's ICU stay and again following death or hospital discharge. Post-ICU death was defined as death occurring between ICU discharge and hospital discharge.

Data collected included basic demographic information, severity of illness, interventions in the MICU, length of stay in the ICU and hospital, and outcome information. The severity of the illness was measured using the APACHE II classification system. We calculated the admission APACHE II scores for all of the patients based on clinical and biological data obtained during the first 24 hours of MICU stay as well as their chronic health status. If a variable was measured more than once during that time, the worse value was used. We also calculated the discharge APACHE II scores for all of the patients based on values obtained during the 24 hours prior to MICU discharge.

The APACHE II gradient was defined as the admission APACHE II minus the discharge APACHE II. 'Mechanical ventilation' was defined as the use of an invasive mechanical ventilator during ICU admission. 'Sedation' was defined as the use of Propofol or Midazolam with or without neuromuscular blocking agents during ICU admission. 'Central venous catheter, arterial line, or Foley catheter' was defined as performing the procedure during ICU admission. 'Tracheostomy or hemodialysis' was defined as requiring the treatment during ICU admission. Outcome information included ICU death, unexpected readmission to the MICU, or unexpected death in the general ward. In addition, we assessed and compared the discrimination (the ability of the model to separate survivors and non-survivors) and calibration (the degree of correspondence between observed and predicted mortality) of both the admission APACHE II and discharge APACHE II scores using the receiver operating characteristics (ROC), area under the curve (AUC) and calibration curve, respectively.

The decision for discharge from the MICU was made by the attending physician subjectively when the patient's physiologic status became stabilized (e.g. successful weaning from ventilator for more than 3 days) and ICU monitoring and care were no longer necessary. All patients were discharged on schedule and were sent to general wards for further care.

Statistics

Continuous variables were presented as the mean ± standard deviation (SD). Two-tailed Student's *t* test was used for the between group comparisons for continuous variables. Categorical variables were examined using the Chi-square test first. If 25% of the cells had expected counts of less than 5, they were reexamined using the Fisher's exact test. $p < 0.05$ was considered as statistically significant. Odds ratio was calculated for some categorical variables with 95% conference interval (CI). All statistical computations were performed using the SAS software. (SAS9.1, SAS Institute, Cary, N.C.)

RESULTS

During the 6-month study period, there were 326 patients (112 women, 214 men) admitted to the MICU. A total of 203 patients (62.3%) were discharged to the general wards and 123 (37.7%) died during their ICU admissions. Of the 203 live discharges from the MICU, 15 (7.4%) were readmitted to the MICU, and 39 (19.2%) subsequently died in the hospital. The in-hospital mortality rate became 49.7% cumulatively. Regarding the 203 live discharges, the mean admission APACHE II score was 20.75, the mean discharge APACHE II score was 17.05, and the average age was 67.7 years old.

The differences between the post-ICU non-survivors and post-ICU survivors are listed in Table 1, which shows demographic data, severity of illness,

Table 1. Comparisons between Post-ICU Survivors and Post-ICU Non-survivors

	Post-ICU non-survivors 39 (19.2%)	Post-ICU survivors 164 (80.8%)	Odds ratio (95% CI)	*p* value
Age (years)	69.5 ± 14.6	66.1 ± 15.4	1.026 (0.99 - 1.04)	0.209
ICU days	11.6 ± 8.8	9.3 ± 7.2	1.04 (0.99 - 1.08)	0.097
Ward days	23.7 ± 24.1	19.5 ± 17.0	1.01 (0.99 - 1.03)	0.208
Hospital days	34.2 ± 24.3	28.8 ± 18.7	1.01 (0.99 - 1.03)	0.138
Admission APACHE II	22.9 ± 5.5	18.6 ± 6.1	1.13 (1.06 - 1.20)	0.002
Discharge APACHE II	20.4 ± 6.4	13.7 ± 5.8	1.17 (1.10 - 1.24)	< 0.001
APACHE II gradient	2.5 ± 6.0	4.9 ± 5.2	1.10 (1.02 - 1.17)	0.015
Male gender	31 (79.5%)	98 (59.8%)	2.63 (1.12 - 5.88)	0.021
MV	33 (84.6%)	137 (83.5%)	1.09 (0.41 - 2.42)	0.870
CVC	13 (33.3%)	43 (26.2%)	1.41 (0.66 - 1.51)	0.372
Arterial line	2 (5.1%)	13 (7.9%)	0.63 (0.14 - 1.51)	0.741
SG catheter	0 (0%)	2 (1.2%)	0.82 (0.04 - 16.7)	1.0
Sedation	5 (12.8%)	27 (16.5%)	0.75 (0.27 - 2.08)	0.575
GI bleeding	5 (12.8%)	9 (5.5%)	2.56 (0.80 - 8.33)	0.151
Foley catheter	33(84.6%)	141 (86.0%)	0.90 (0.34 - 2.38)	0.827
Hemodialysis	7 (18.0%)	17 (10.4%)	1.89 (0.72 - 5.00)	0.266
Tracheostomy	7 (18.0%)	16 (9.8%)	2.00 (0.76 - 5.26)	0.164
Diagnostic category				0.545
Respiratory	23 (59.0%)	90 (54.9%)	1.28 (0.14 - 11.5)*	
Sepsis	5 (12.8%)	27 (16.5%)	0.93 (0.09 - 9.70)*	
Cardiac	3 (7.7%)	10 (6.1%)	1.50 (0.12 - 18.4)*	
CNS	4 (10.3%)	7 (4.3%)	2.86 (0.24 - 33.9)*	
renal/metabolic	3 (7.7%)	25 (15.2%)	0.60 (0.05 - 7.01)*	
Others	1 (2.6%)	5 (3.1%)		

Abbreviations: *: relative to others; ICU: intensive care unit; APACHE II: acute physiology and chronic health evaluation II; Admission APACHE II: APACHE II score on the day of ICU admission; Discharge APACHE II: APACHE II score on the day of leaving ICU; APACHE II gradient: discharge APACHE II minus admission APACHE II; MV: mechanical ventilation; CVC: central venous catheter; SG: Swan-Ganz; GI: gastrointestinal; CNS: central nervous system; CI: confidence interval.

clinical features, and candidate variables for multivariate analysis. The post-ICU non-survivors had greater proportion of male patients than that of the post-ICU survivors (79.5% vs. 59.8%; $p = 0.021$). The post-ICU non-survivors had greater severity of illness at admission with a mean admission APACHE II score of 22.9 $\pm$ 5.5, compared with 18.6 $\pm$ 6.1 for post-ICU survivors ($p < 0.001$). Moreover, the post-ICU non-survivors had a higher mean discharge APACHE II score (20.4 $\pm$ 6.4) than that of post-ICU survivors (13.7 $\pm$ 5.8) ($p < 0.001$). The APACHE II gradient was also associated with prognosis ($p = 0.026$), which depended on the magnitude of the alteration. Patients with different diagnostic categories did not differ in post-ICU mortality rate ($p = 0.545$).

Variables used in univariate logistic regression analysis were used for stepwise multiple logistic regression analysis. The results showed that discharge APACHE II score (Odds Ratio 1.17, 95% CI 1.10-1.25, $p < 0.0001$) and male gender (Odds Ratio 3.24, 95% CI 1.26-8.33, $p = 0.015$) were independently associated with post-ICU death.

In the population of the live discharges from the MICU, the area under the ROC curve of the discharge APACHE II was slightly improved compared with the AUC of the admission APACHE II (0.746 vs. 0.706, $p = 0.347$) but the difference did not reach a statistically significant level (Fig. 1). Based on analysis derived from the ROC curve, a discharge APACHE II score of 17 gave the best sensitivity and specificity and was selected as the cutoff point for making a decision of discharge of the patients from the ICU. The probability level that provided an optimal cutoff point was 0.2. Based on the classification table, derived from the ROC curve analysis, the sensitivity was 71.8%, specificity was 71.3%, positive predictive value was 37.3%, and negative predictive value was 91.4%. Of the live discharges from the MICU with a discharge APACHE II of 17 or greater, 37.3% died in the hospital compared with only 9.4% of those with a discharge APACHE II of less than 17. Moreover, discharge APACHE II of 17 or greater was also a risk factor of post-ICU death (Odds Ratio 6.34, 95% CI 2.92-13.76, $p < 0.0001$). Comparisons between patients with discharge APACHE II scores of 17 or greater and those of < 17 are listed in Table 2. The former group members were significantly older ($p < 0.0001$) and had higher proportion of

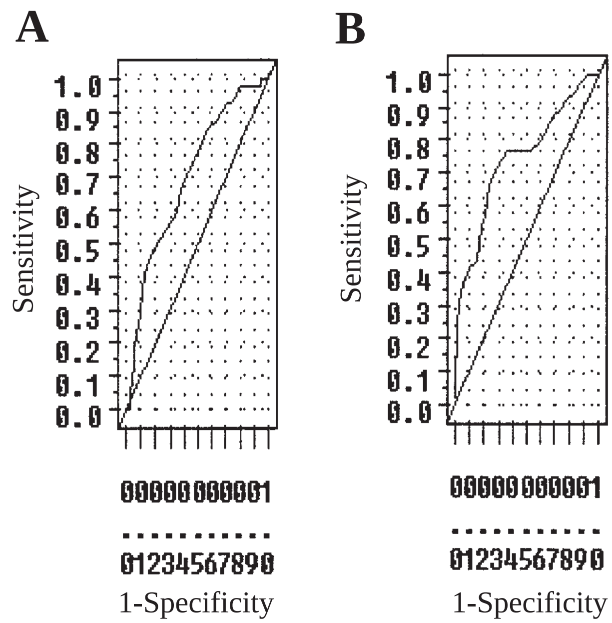

Fig. 1 Receiver operating characteristic (ROC) curves for APACHE II scores at initial ICU admission (A) and at ICU discharge (B). The relationship between true positives (sensitivity) and false positives (1 minus specificity) is shown for both models.
APACHE II at ICU admission (A)
Area under ROC curve: 0.706
APACHE II at ICU discharge (B)
Area under ROC curve: 0.746
$p = 0.347$

patients requiring tracheostomy or hemodialysis during ICU admission ($p < 0.0001$) than the latter group.

The immediate causes of death of the 39 post-ICU non-survivors are shown in Table 3. Acute respiratory failure was the most common cause of death, followed by septic shock and unspecified shock. The time from the last ICU discharge to death ranged from 1 day to 62 days, with a median of 8 days. Ten patients (25.6%) died within 1 week of their ICU discharges, and the cause was mostly septic shock (4 patients) and acute respiratory failure (3 patients). Twenty-eight patients (71.8%) had discharge APACHE II scores of 17 or greater compared with only 37% of the total 203 live ICU discharges. However, in the general wards, the order to ‘Do not resuscitate’ was placed on five of the post-ICU non-survivors.

Table 2. Comparisons between Patients with Discharge APACHE II ≧ 17 and Patients with APACHE II < 17.

	APACHE II ≧17 75 (37%)	APACHE II < 17 128 (63%)	*p* value
Age (years)	71.9 ± 9.9	63.7 ± 16.9	< 0.0001
ICU days	12.1 ± 8.8	8.4 ± 6.4	0.002
Ward days	23.7 ± 23.0	18.4 ± 15.3	0.078
Hospital days	35.2 ± 22.7	26.7 ± 17.4	0.004
Discharge APACHE II	22.1 ± 4.5	10.8 ± 3.7	< 0.0001
Male gender	48 (64.0%)	81 (63.3%)	0.918
MV	65 (86.7%)	105 (82.0%)	0.388
CVC	24 (32.0%)	32 (25.0%)	0.282
Arterial line	5 (6.7%)	10 (7.8%)	0.763
SG Catheter	0 (0%)	2 (1.6%)	0.532
Sedation	6 (8.0%)	26 (20.3%)	0.020
GI Bleeding	8 (10.7%)	6 (6.7%)	0.105
Foley catheter	60 (80.0%)	114 (89.1%)	0.075
Hemodialysis	19 (25.3%)	4 (3.2%)	< 0.0001
Tracheostomy	17 (23.0%)	6 (4.7%)	< 0.0001
Diagnostic category			0.014
Respiratory	32 (42.7%)	81 (63.3%)	
Sepsis	18 (24.0%)	14 (10.9%)	
Cardiac	8 (10.7%)	5 (3.9%)	
CNS	6 (8.0%)	5 (3.9%)	
renal/metabolic	9 (12.0%)	19 (14.8%)	
Others	2 (2.7%)	4 (3.1%)	

Categorical data were analyzed by Chi-square test or Fisher's exact test, when appropriate, and continuous data by *t*-test.

Table 3. Causes of Deaths in Post-ICU Non-survivors Based on Assessment of Data Recorded in ICU and before Hospital Discharge

	No (%) of patients
Acute respiratory failure	12 (30.8)
Septic shock	8 (20.5)
Shock, unspecified	5 (12.8)
Neurology event	2 (5.1)
Cardiac arrest	1 (2.6)
Hypovolemic shock	1 (2.6)
Miscellaneous causes	10 (25.6)
Total	39 (100)

DISCUSSION

A significant number of critically ill patients die in the hospital after being discharged from the ICU. Data on this so-called post-ICU mortality rate varied from 8.6% to 23.6% among series (Table 4).[2-4,6-14,19] In our study, we found that 47 (23.2%) of the patients who were discharged from the MICU experienced acute deterioration during their remaining hospitalization that was serious enough to result in either unexpected deaths in the general wards or readmission to the MICU. Eight patients recovered after one to two readmissions to the MICU, and the other 39 (19.2%) patients subsequently died in the

Table 4. Data on ICU Mortality, Hospital Mortality, Post-ICU Mortality, Average Age and Mean APACHE II Score in the Various Cohort Studies Published in English Literature during the Past 15 Years

Author (years)	ICU mortality (%)	Hospital mortality (%)	Post-ICU mortality (%)	Average age (years)	Mean APACHE II
Rubins et al.[3] (1988)	20	30.5	12.7	59.9	NA
Ridley et al.[7] (1992)	NA	NA	23.6	NA	13
Rowan et al.[8] (1993)	17.9	27.7	11.9	NA	NA
Moreno et al.[14] (1997)	24.5	32	NA	55.4	19.6
Wallis et al.[9] (1997)	20	29	11.2	61	13
Moreno et al.[19] (1998)	13.9	20	NA	59.3	NA
Goldhill et al.[10] (1998)	23.7	32.5	11.7	58.5	NA
Smith et al.[11] (1999)	NA	NA	11	57	17
Trivedi et al.[12] (2001)	28.4	37.6	12.1	52	NA
Moreno et al.[6] (2001)	13.4	20	8.6	NA	NA
Daly et al.[4] (2001)	NA	NA	12.4	NA	NA
Timsit et al.[13] (2001)	22.7	30	9.4	72	NA
Elie et al.[2] (2003)	NA	NA	10.8	NA	NA
The present study	37.7	49.7	19.2	67.7	20.8

hospital. The high post-ICU mortality rate (19.2%) in our study could be attributed partly to older average age and greater severity of illness in our cohort than of those in previous reports. This is a reasonable speculation, because age, severity of illness, and male gender were all demonstrated to be independently associated with unexpected outcomes after ICU discharge.[3,11,12,14]

Since pre-discharge organ dysfunction/failure was demonstrated to be the only prognostic factor at ICU discharge in one cohort study,[6] we hypothesized that patients prematurely discharged from the MICU with greater severity of illness (i.e. higher discharge APACHE II and/or higher APACHE II gradient) would be more likely to have poor hospital outcomes compared with those with less severity of illness at ICU discharge. Our data support this hypothesis. Patients who subsequently died following ICU discharge had significantly higher discharge APACHE II scores. APACHE II scores provide general measures of the severity of disease. In Taiwan, it is the most commonly used among various scoring systems, and many physicians and nurses are: familiar with the calculation. However, in studies dealing with long-term ICU patients, severity scores calculated at admission were no longer related with death.[15,18,19] This might be due to changes in resuscitation status as many nosocomial infections and iatrogenic events took place after ICU admissions.[20] The changes could be reflected by lower values of the APACHE II gradient and higher discharge APACHE II scores in the post-ICU non-survivors.

Stepwise logistic regression analysis showed that the discharge APACHE II score was a more powerful prognostic factor than the admission APACHE II score or APACHE II gradient. The calibration curve of admission APACHE II (not shown) showed significant deviation below the diagonal line. This phenomenon also occurred in a previous study which compared two outcome prediction models (Mortality Probability Model and new Simplified Acute Physiology Score II) for the evaluation of ICU outcomes,[19] although the discrepancy in our study is larger than theirs. Lack of patients with admission APACHE II scores of 40 or greater in our cohort may be a contributing factor. On the other hand, the discharge APACHE II model showed slightly better predictive ability even for the "more severely ill" patients. The lack of statistical significance in the comparisons of calibration and discrimination powers between the discharge APACHE II model and admission APACHE II model may be due to the small number of total patients and the enrollment of only one ICU in our study. However, there was a trend toward better predictive accuracy in the discharge APACHE II model, which takes into account the effects of ICU-acquired events.

Patients with discharge APACHE II scores of 17 or greater had poor post-ICU outcomes. This is compatible with the results of the previous study performed by Daly et al.,[4] which showed that patients that died in wards had mean APACHE II scores of 15.7 to 16.9. Moreover, they identified a group of patients as at risk for higher post-ICU death (25%) according to five independent variables: age, chronic healthy points, acute physiology points at discharge from units, length of stay in units, and cardiothoracic surgery. They speculated that the post-ICU mortality rate could be reduced by 39% if these patients stayed another 2 days before discharge. Likewise, Elie et al. demonstrated that the Simplified Acute Physiology Score II at ICU admission (Odds Ratio 1.57) and Sepsis-related Organ Failure Assessment Score at ICU discharge (Odds Ratio 1.11) were independent determinants of post-ICU death.[2] In this study, we provided a simplified measure (discharge APACHE II score $\geqq$ 17) to identify patients at risk for post-ICU death. The deaths of these patients could have been prevented by either minimizing inappropriately early discharge to the general ward (for example, stay at ICU for 2 more days), providing high-dependency and step-down units, or continuing advice and follow-up with the ICU team after ICU discharge.[9] Further studies are needed to determine whether the prevention of post-ICU death is likely to be linked to these measures.

Male gender is the other independent prognostic factor for post-ICU death in our study. In the stepwise multivariate analysis, male gender had a higher Odds Ratio but a larger range of 95% CI than discharge APACHE II score. In reality, the former had less statistical significance than the latter according to their p values. Male patients tended to be older (65.59 versus 59.03 years) and had slightly higher discharge APACHE II scores (14.95 versus 13.22) than the female patients. This is consistent with the report from Smith et al., who found that increasing age, Acute Physiology Score on admission, and male gender were significantly associated with post-discharge death.[11] In addition, Metnitz et al. reported that male gender was a risk factor for readmission to ICU (Odds Ratio 1.36).[13] On the contrary, in a recent large cohort of critically ill patients, no differences in the severity of illness-adjusted deaths were found between men and women.[21] However, little is known about the gender related differences in post-ICU death. Whether gender-related differences exist in the subgroup of live discharges remains to be determined.

In our study, the use of central venous catheter, arterial line, or Swan-Ganz catheter was not associated with post-ICU deaths. This may indicate that invasive hemodynamic monitoring was safe and did not lead to fatal complications. On the other hand, it may suggest that invasive hemodynamic monitoring did not improve outcomes in terms of survival. The later speculation is supported by previous well-controlled studies, which failed to document any improved survival when patients were treated based on pulmonary arterial catheter-derived data.[22] The use of mechanical ventilation on the last ICU day was reported to be the strongest independent risk factor for ICU readmission in the study from Metnitz et al.,[13] while the use of mechanical ventilation during the whole ICU admission did not predict post-ICU outcomes in our study. This discrepancy further supports the hypothesis that the degree of organ dysfunction just before ICU discharge rather than that at admission could be used to predict post-ICU outcomes accurately. Wallis et al. reported that ward deaths had longer average stay in the ICU than survivors but similar lengths of ward stay to that of survivors.[9] We speculated that the length of the ICU stay might only reflect the general condition of the patients but did not affect outcome directly.

Diagnostic categories did not significantly affect post-ICU outcomes in our study, although patients in diagnostic categories of central nervous system, cardiac, or respiratory disorders tended to have higher risk of post-ICU death than those with diagnoses of sepsis or renal and metabolic disorders. In contrast, Wright et al. reported that admission diagnosis was a significant predictor of long-term (5-12 years) survival following intensive care.[15] The longer follow-up time in their study may partly explain this discrepancy. Another reason is the difficulty to categorize patients into a single diagnostic group. Whether initial diagnosis at ICU admission can affect the outcome remains to be determined.

Acute respiratory failure was a major cause of death in our study. This is consistent with the findings in several previous studies, which showed that respiratory and pneumonia were the most common causes of death after discharge from intensive care.[7,9,12] Surprisingly, only one of the 12 patients who died of respiratory failure had undergone tracheostomy. This may suggest the importance of performing tracheostomy early for patients with severe obstructive ventilation impairment, decreased respiratory drive, or poor cough function.

This study has several limitations. First, it was conducted during a short period on a small population of critically ill patients. Second, the work load of the health care workers and social factors may have affected post-ICU outcomes, but they were not incorporated into our predicting model. Finally, the comparison of calibration and discrimination powers between admission and discharge APACHE II scores did not reach statistical significance. Our study provides a novel model for assessing post-ICU prognosis, though a larger cohort may be required to confirm this result.

In conclusion, the analysis of patients who were discharged from the MICU indicated that discharge APACHE II score and male gender were independently associated with post-ICU death. Discharge APACHE II scores presented similar calibration and discrimination to admission APACHE II scores. Identifying patients with discharge APACHE II scores of 17 or greater helps to prevent premature discharge from the ICU and to reduce post-ICU death.

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轉出加護病房時的 APACHE II 評分有助於預測轉出後的死亡率

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背 景：這個研究的目的是要檢定轉出加護病房時，較大的疾病嚴重度 (以 APACHE II 來評估) 對轉出加護病房後的死亡率影響。

方 法：在臺灣某醫學中心的內科加護病房，進行爲期六個月的前瞻性及觀察性研究。

結 果：從 1998 年 12 月到 1999 年 6 月，共 203 人從加護病房轉出，其中 39 人 (19.2%) 後來死於醫院。Logistic 迴歸分析找出了兩個加護病房轉出後死亡的獨立危險因子：轉出時的 APACHE II 評分 (Odds Ratio 1.17, 95% CI 1.10-1.25, $p < 0.0001$) 及男性 (OR 3.24, 95% CI 1.26-8.33, $p = 0.015$)。從加護病房轉出的病人，如果轉出時的 APACHE II 評分大於 17，其死亡率爲 37.3%；如果轉出時的 APACHE II 評分小於 17，其死亡率則爲 9.4%。轉出時的 APACHE II 評分大於 17 的病人比小於17的病人有較大的年齡 ($p < 0.0001$) 及較多的比例接受氣管切開術或血液透析 ($p < 0.0001$)。

結 論：轉出時的 APACHE II 評分及男性，是預測轉出加護病房後死亡的獨立危險因子。找出轉出時的 APACHE Ⅱ 評分大於 17 的病人，將有助於預測轉出加護病房後的死亡率。

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關鍵詞：轉出加護病房後的死亡率，轉入時的APACHE II 評分，轉出時的APACHE II 評分

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