After-Hours Discharge of ICU Patients treated for Delirium

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STUDY HIGHLIGHTS

- **16.5% of patients were treated for delirium in ICU during the 1-year study period**
- **24.5% of patients were discharged from the ICU after-hours**
- **Patients treated for delirium in ICU had greater mortality compared to those not treated for delirium**
- **Time of ICU discharge was not significantly associated with mortality**
- **Other significant predictors of all-cause hospital mortality include APACHE* II illness severity score and patient comorbidities like acute renal failure and cirrhosis**

*APACHE = Acute Physiology and Chronic Health Evaluation

BACKGROUND

Delirium is a significant factor that determines patient outcomes in the ICU. It is associated with longer hospital length of stay, increased risk of hospital mortality and long-term risk of cognitive dysfunction.

After-hours discharge of ICU patients is also a matter of concern as it may be associated with increased risk of all-cause hospital mortality and morbidity. Nevertheless, an increasing pressure for ICU beds have led to the continuing practice of discharging patients after hours.

Moreover, there is no large-scale study on the association between after-hours discharge of ICU patients treated for delirium and their subsequent hospital mortality.

AIM

To study the associations between delirium in the ICU, after-hours discharge and post-ICU hospital mortality.

METHODS

This was a single-centre, retrospective cohort study of adult patients admitted to ICU and discharged alive to a ward. Stringent exclusion criteria used include patients on Limitation of Medical Treatment orders, admissions for drug overdoses and ICU readmission episodes.

Delirium was identified in patients newly prescribed and administered with ≥1 anti-psychotic drug usually used for delirium in ICU – dexmedetomidine, haloperidol, olanzapine, quetiapine or risperidone.

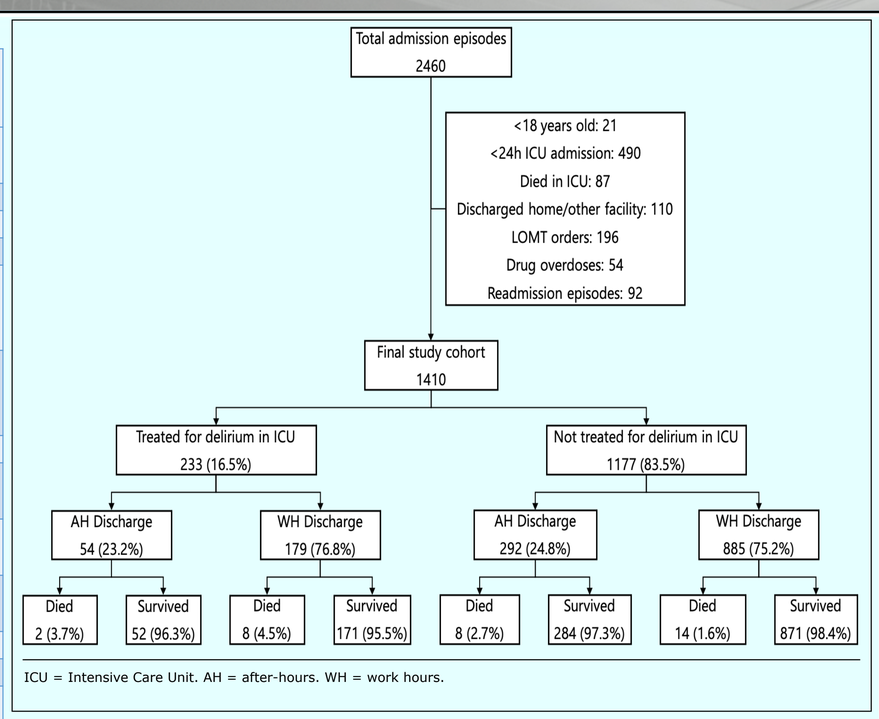
Both univariate and multivariate statistical analyses were done on the various patient characteristics collated.

RESULTS

Table 1. Baseline characteristics of study population (n = 1410)

Characteristic	Treated for delirium		Not treated for delirium		Total
	AH Discharge	WH Discharge	AH Discharge	WH Discharge	
Mean age in years (SD)	59.7 (19.0)	59.0 (17.4)	62.6 (16.9)	62.3 (16.5)	61.8 (16.8)
Sex, n (%)					
Male	29 (53.7)	127 (70.9)	166 (56.8)	520 (58.8)	842 (59.7)
Female	25 (46.3)	52 (29.1)	126 (43.2)	365 (41.2)	568 (40.3)
Chronic cardiovascular disease, n (%)	0 (0.0)	2 (1.1)	2 (0.7)	8 (0.9)	12 (0.9)
Chronic respiratory disease, n (%)	0 (0.0)	3 (1.7)	5 (1.7)	7 (0.8)	15 (1.1)
Cirrhosis, n (%)	1 (1.9)	4 (2.2)	0 (0.0)	11 (1.2)	16 (1.1)
Acute renal failure, n (%)	1 (1.9)	5 (2.8)	7 (2.4)	11 (1.2)	24 (1.7)
Median APACHE II score (IQR)	16 (12.5)	16 (9.0)	13 (6.3)	13 (7.0)	13 (7.0)
Admission category, n (%)					
Planned	10 (18.5)	52 (29.1)	108 (37.0)	360 (40.7)	530 (37.6)
Emergency	44 (81.5)	127 (70.9)	184 (63.0)	525 (59.3)	880 (62.4)

AH = after-hours. WH = work hours.
APACHE = Acute Physiology and Chronic Health Evaluation.
SD = standard deviation. IQR = interquartile range.



ICU = Intensive Care Unit. AH = after-hours. WH = work hours.

Figure 1. Study consort diagram

Table 2. Factors associated with mortality in patients discharged from the ICU

Factor	Number of patients, n (%)	Odds ratio (95% C.I.)	P-value*
Age	1410 (100.0)	1.04 (1.02–1.07)†	**0.001**
Chronic cardiovascular disease	12 (0.9)	4.01 (0.50–32.02)	0.190
Chronic respiratory disease	15 (1.1)	7.00 (1.51–32.39)	**0.013**
Cirrhosis	16 (1.1)	6.50 (1.41–29.85)	**0.016**
Acute renal failure	24 (1.7)	17.19 (6.31–46.83)	**<0.0001**
APACHE II score	1410 (100.0)	1.14 (1.08–1.19)†	**<0.0001**
Planned admission	530 (37.6)	0.45 (0.20–1.07)	0.070
MET admission	220 (15.6)	2.93 (1.39–6.17)	**0.005**
ICU LOS	1410 (100.0)	1.02 (0.99–1.06)†	0.161
Hospital LOS	1410 (100.0)	1.00 (0.99–1.00)†	0.272
After-hours ICU discharge	346 (24.5)	1.41 (0.66–3.01)	0.374
Treated for delirium	233 (16.5)	2.35 (1.10–5.04)	**0.027**
Treated for delirium (adjusted)§	233 (16.5)	0.87 (0.07–11.18)	0.916
Dexmedetomidine	147 (10.4)	1.61 (0.61–4.25)	0.335
Haloperidol	95 (6.7)	1.45 (0.43–4.84)	0.549
Olanzapine	64 (4.5)	4.14 (1.54–11.13)	**0.005**
Quetiapine	80 (5.7)	4.07 (1.62–10.18)	**0.003**
Risperidone	13 (0.9)	– [1]	–
Therapy given		1.75 (1.12–2.73)†	**0.015**
None	1178 (83.5)		
Single	122 (8.7)		
Combination	110 (7.8)		

APACHE = Acute Physiology and Chronic Health Evaluation. MET = Medical Emergency Team. ICU = Intensive Care Unit. LOS = length of stay. CI = confidence interval.
[1] Risperidone odds ratio could not be calculated as the outcome rate was zero.
* P-values indicating statistical significance are in bold.
§ Adjusted for all other factors in multivariate analysis.
† Risk increment for each year increase in age, every 1-point increase in APACHE II score, each day increase in ICU or hospital LOS, or every escalation in therapy given, respectively.

In the study cohort, 233 (16.5%) patients were treated for delirium and 346 (24.5%) patients were discharged after-hours.

A higher proportion of patients treated for delirium (73.4%) were admitted as emergency admissions, compared to the proportion of patients not treated for delirium (60.2%).

Overall, after-hours discharge was not significantly associated with worse all-cause mortality (OR 1.41, 95%CI 0.66-3.01; P>0.05).

Patients treated for delirium in ICU had higher all-cause hospital mortality (unadj. OR 2.35, 95%CI 1.10-5.04; P<0.05). After-hours discharge of these patients was not associated with worse outcomes (OR 0.87, 95%CI 0.07-11.18; P>0.05). On multivariate analysis, delirium was not found to be associated with increased mortality.

The multivariate analysis identified the most significant predictors of increased risk of post-ICU hospital mortality were age, the APACHE II score, and the presence of comorbidities, specifically acute renal failure and cirrhosis.

CLINICAL IMPLICATION

This study was limited by its retrospective design and stringent exclusion criteria that resulted in a low event rate.

However, it is difficult to conduct a randomised controlled trial of this research question, given it may be unethical and harmful to randomise patients to be discharged after-hours.

There is a need for rigorous assessment of delirium in ICU and clinical guidelines regarding which patients may be discharged from ICU after-hours without an increased mortality risk.

CONCLUSION

This study found that the after-hours discharge of patients treated for delirium in the ICU was not significantly associated with worse hospital outcomes.

However, being a single-centre retrospective cohort study, its external validity may be poor. Further larger-scale research is warranted.

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