

QATAR CRITICAL CARE CONFERENCE ABSTRACT

Incidence, risk factors and outcome of delirium in a surgical intensive care unit of a tertiary care hospital

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ABSTRACT

Background and Objective: Delirium in critically ill patients is common and distressing.¹ The incidence of delirium in intensive care units (ICU) has been reported to range from 45–87%.^{2,3} Arguably, delirium is a well-recognized cause of morbidity and mortality among ICU patients. It can lead to longer hospital stays, lower six-month survival, and cognitive impairment persisting even years after discharge.³ It has therefore been recommended that all ICU patients are assessed for delirium using a validated tool.³ To date, limited data is available on the prevalence of delirium in surgical patients. In a study published in 2008, the observed risk was 73% in surgical and trauma patients.⁴

This study aimed to evaluate the incidence and modifiable risk factors of delirium in the surgical intensive care unit (SICU) of a tertiary care hospital in a developing country.

Methods: We conducted a prospective observational study in patients over 18 years of age who were admitted to the SICU for more than 24 hours in Aga Khan University Hospital, Pakistan, from January 2016 to December 2016.

The SICU has 9 beds and is run by trained intensivists with 24/7 coverage. Nurse to bed ratio is 1:1. Admissions are received from the emergency department, operating room, and surgical wards. After approval from the University's ethical review committee, written informed consent was taken from the patient's next of kin. Patients who had a preexisting cognitive dysfunction, signed a Do-Not-Resuscitate order, or stayed in the SICU for less than 24 hours were excluded from the study. Delirium was assessed by the Intensive Care Delirium Screening Checklist (ICDSC).⁵ The incidence of delirium was computed and univariate and multivariable analyses were performed to observe the relationship between outcome and associated factors.

Results: The average patient age was 43.29 ± 17.38 years and BMI was 26.25 ± 3.57 kg/m² (Table 1). Delirium was observed in 19 of 87 patients with an incidence rate of 21.8%. In univariate analysis, chronic obstructive pulmonary disease (COPD), fever, pain score $> 4/10$, agitation, sedation, hypernatremia, length of ICU stay ≥ 7 days, and mortality were significantly higher in patients who developed delirium (Table 2). Patients on midazolam and propofol were four times more likely to develop delirium. Patients on pethedine were also more likely to develop delirium. Multivariable analysis showed that COPD, pain score > 4 , and hypernatremia were strong predictors of delirium (Table 3). Midazolam

Table 1. Characteristics of the patients according to incidence of delirium.

Variables	Delirium (n = 19)	Non-delirium (n = 68)
Age (years)	41.47 \pm 18.84	43.79 \pm 17.07
Weight (kg)	72.63 \pm 12.28	72.68 \pm 11.77
Height (cm)	167.16 \pm 8.17	165.88 \pm 6.54
BMI (kg/m ²)	25.91 \pm 3.36	26.36 \pm 3.63
Gender		
Male	14 (73.7%)	54 (79.4%)
Female	5 (26.3%)	14 (20.6%)
Comorbidities		
Hypertension	4 (21.1%)	26 (38.2%)
Diabetic mellitus	3 (15.8%)	14 (20.6%)
IHD	3 (15.8%)	4 (5.9%)
COPD	10 (52.6%)	3 (4.4%)
Others	3 (15.8%)	16 (23.5%)
Surgical procedure		
Neurosurgical	5 (17.2%)	24 (82.8%)
Gynecological	0 (0%)	4 (100%)
General	13 (28.3%)	33 (71.7%)
Others	1 (12.5%)	7 (87.5%)
APACHE II [‡]	18 [15-22]	18 [16-20]
Length of ICU stay (days) [‡]	8 [5-12]	5 [3-8]
Length of hospital stay (days) [‡]	21 [11-26]	13 [8-21]

Data are presented as n (%), mean \pm standard deviation and [‡]median [25 – 75 percentile]

Table 2. Univariate analysis - factors associated with delirium.

Variables	n 87	Delirium (n = 19)	OR[95%CI]	P-value
Age (years)				
≤ 40	42	12 (28.6%)	2.17 [0.76-6.19]	0.142
> 40	45	7 (15.6%)	Ref	
Gender				
Male	68	14 (20.6%)	0.726 [0.22-2.36]	0.593
Female	19	5 (26.3%)	Ref	
BMI (kg/m ²)				
≥ 25	47	9 (19.1%)	0.71 [0.26 -1.97]	0.510
< 25	40	10 (25%)	Ref	
COPD	13	10 (76.9%)	24.07 [5.55-104.33]	0.0005*
Intubation	79	18 (23.1%)	2.4 [0.28-20.49]	0.677
Fever	25	10 (40%)	3.92 [1.35-11.42]	0.009*
Infection	25	5 (20%)	0.85 [0.27-2.69]	0.792
Pain score ≥ 4*	19	11 (57.9%)	10.31 [3.19-33.29]	0.0005*
Agitation	40	17 (42.5%)	16.63 [3.53-78.26]	0.0005*
Sedation	54	16 (29.6%)	4.21 [1.12-15.80]	0.024*
Hypernatremia (Serum sodium ≥ 145)	42	16 (38.1%)	8.61 [2.28-32.46]	0.0005*
Serum creatinine ≥ 1.2	45	7 (15.6%)	0.46 [0.16-1.31]	0.142
Length of ICU stay (days)				
< 7 days	56	8 (14.3%)		
≥ 7 days	31	11 (35.5%)	3.3 [1.16-9.43]	0.022*
Length of hospital stay				
≤ 10	32	4 (12.5%)	2.63 [0.76-9.07]	0.291
11-30	44	12 (27.3%)	2.63 [0.48-14.23]	
> 30	11	3 (27.3%)		
Mortality	21	11 (52.4%)	7.97 [2.57-24.72]	0.0005*

* Behavioral Pain Scale (PBS):

Scores ≤ 3 indicate no pain, 4-5 indicate mild pain, 6-11 indicate an unacceptable amount of pain, ≥ 12 indicates maximum pain*

[aOR = 7.37; 95% CI: 2.04-26.61] and propofol exposure [aOR = 7.02; 95% CI: 1.92-25.76] were the strongest independent delirium predictors while analgesic exposures was not statistically significant to predict delirium on multivariable analysis. Conclusion: Delirium assessment is taken seriously and has been done for a long period of time in our unit. Our lower incidence rate of delirium concerns only the surgical patient population and reflects

different assessment modalities used as well as pharmacological and non-pharmacological therapeutic options in comparison to the traditional approaches. In addition, we use different strategies such as bundles, sedation and pain protocol, and appropriate family interactions with the patients to minimize delirium. Delirium is a significant risk factor of poor outcome in SICU. This study showed an independent association between inadequate pain control, sedative

Table 3. Multivariable logistic regression - factors associated with delirium.

Variables	P-value	aOR	95%CI
COPD	0.003	55.02	4.60-745.67
Pain score \geq 4	0.003	56.55	3.93-816.19
Hyponatremia (Serum sodium \geq 145)	0.007	40.73	2.80-592.27
Sedation	0.072	8.71	0.82-91.89

Model Accuracy = 90.8%; Nagelkerke R-Squared = 69.4%
 aOR = adjusted odds ratio; CI: Confidence Interval

medication, COPD, hypernatremia, and fever in developing delirium.

Keywords: delirium, surgical intensive care unit, hypernatremia, outcome

Ethical Review Committee Approval

This study (3210-Ana-ERC-PI-Dr Ali Asghar) has been approved by the Ethical Review Committee of Aga Khan University.

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