

Introduction

Sedation is defined as the administration of pharmacological agents to attenuate irritability or agitation, thereby facilitating therapeutic or diagnostic procedures as mechanical ventilation. Sedation exerts significant effects on various physiological systems. Sedative pharmacological agents primarily target neurotransmitter pathways within the CNS to inhibit neuronal activity and diminish arousal levels. Over-sedation is associated with extended durations of mechanical ventilation, a higher risk of ventilator-associated pneumonia (VAP), also in delays in weaning from respiratory support. Conversely, inadequate sedation may result in patient agitation and distress, potentially precipitating hazardous behaviors such as self-extubation or inadvertent removal of intravenous lines and catheters. Additionally, agitated patients are more likely to experience psychological trauma. Sedation is also an integral part of the ICU liberation bundle which takes an approach to managing pain, delirium and agitation in critically ill patients to facilitate ventilator weaning and early mobilization and also promotes patient and family engagement in the process making it most effective.

Aim of the Work

The aim of this work was to perform a survey of the sedation adequacy of intensive care patients in Alexandria main university hospital according to Richmond Agitation Sedation scale and to assess its effect on the duration of mechanical ventilation days and duration of ICU stay.

Patients and Methods

This study had been an observational comparative prospective cohort study that was done on 47 patients in Critical Care Medicine Department of Alexandria University Hospital. All patients included in the study were subjected to the followings: the following demographic, clinical, laboratory and radiological data were obtained from all patients on admission:

1. Demographic data including age (years) and sex.
2. Complete past medical history, drug history and cause of admission to ICU.
3. Vital signs including heart rate (HR), mean arterial pressure (MAP), respiratory rate and temperature.

4. GCS on admission to the ICU.
5. Sequential Organ Failure Assessment (SOFA) Score
6. Routine laboratory investigations (Complete blood count (CBC), sodium (Na), potassium (K), urea, creatinine, random blood sugar) daily during the period of the study.
7. Richmond sedation scale had been calculated twice daily for every candidate and also daily interruption of sedation (sedation vacation) had been documented till weaning from sedation. The Richmond Agitation-Sedation Scale (RASS) is an instrument designed to assess the level of alertness and agitated behavior in critically-ill patients.
8. Sedation protocols including drugs used (e.g., propofol, midazolam, dexmedetomidine), their dosages, and use of analgesia had been documented.
9. Patient outcome including duration of ICU stay, days of mechanical ventilation and mortality had been documented.

Results

Table 1: Relation between RASS Subgroup with Outcome

Outcome	RASS Subgroup						Test of Sig.	P	
	Under Sedation (n = 12)		Proper Sedation (n = 14)		Over Sedation (n = 21)				
	No.	%	No.	%	No.	%			
Delirium									
Not applicable	0	0.0	2	14.3	2	9.5	$\chi^2=2.069$	MCp=0.832	
No	10	83.3	9	64.3	14	66.7			
Yes	2	16.7	3	21.4	5	23.8			
ICU stay days									
Min. – Max.	3.0 – 14.0		4.0 – 14.0		4.0 – 16.0		H=5.371	0.068	
Mean ± SD.	7.17 ± 3.56		9.07 ± 3.43		10.52 ± 3.96				
Median (IQR)	7.0 (4.0 – 10.0)		9.0 (7.0 – 12.0)		10.0 (7.0 – 14.0)				
Length of mechanical ventilation									
Min. – Max.	0.0 – 8.0		0.0 – 13.0		2.0 – 16.0		H=8.441*	0.015*	
Mean ± SD.	2.83 ± 2.89		4.36 ± 5.0		7.62 ± 4.89				
Median (IQR)	3.0 (0.0 – 4.50)		2.50 (0.0 – 8.0)		6.0 (2.0 – 12.0)				
Mortality									
Alive	8	66.7	11	78.6	11	52.4	$\chi^2=2.552$	0.279	
Died	4	33.3	3	21.4	10	47.6			

IQR: Inter quartile range SD: Standard deviation H: H for Kruskal Wallis test χ^2 : Chi square test
MC: Monte Carlo p: p value for Relation between RASS Subgroup with Outcome *: Statistically significant at $p \leq 0.05$

Table 1 showed no significant differences were found in delirium incidence or mortality between sedation groups. There was a non-significant trend indicating longer ICU stays and higher mortality in the over sedation group.

Table 1 also showed that duration of ventilation varied significantly ($H = 8.441$, $p = 0.015$), with the over sedation group having the longest ventilation period (mean 7.62 ± 4.89 days, median 6.0 days), followed by the proper sedation (mean 4.36 ± 5.0 days, median 2.5 days), and under sedation group (mean 2.83 ± 2.89 days, median 3.0 days).

Table 2: Relation between mortality Odds ratio and RASS Subgroup (n=47)

	Odds ratio (OR)	95% CI (Lower-Upper)	P-value
Under vs proper sedation	1.83	0.32 – 10.75	0.665
Over vs proper sedation	3.33	0.72 – 15.51	0.162
Over vs under sedation	1.82	0.42 – 7.49	0.486

p: p value for Relation between mortality odds ratio and RASS Subgroup

Table 2 showed that none of the pairwise comparisons show statistically significant differences in odds between sedation levels. The wide confidence intervals indicate a high degree of uncertainty, likely due to small sample sizes. Under sedation patients had 1.83 times the odds compared to properly sedated patients, but this is not statistically significant. Over sedation patients had higher odds (3.33 times) relative to proper sedation, but the result is not statistically significant.

Conclusion

Over-sedation represented the most prevalent sedation category in the study, accounting for 44.7% of the evaluated cases. There was no statistically significant difference between the under-sedation, proper sedation and over-sedation regarding mortality, ICU stay or delirium incidence, however there was only a non-significant trend indicating longer ICU stays and higher mortality in the over sedation group. There was a significant difference regarding duration of ventilation between the under-sedation, proper sedation and over-sedation groups, with the oversedation group having the longest ventilation period, followed by the proper sedation then the under-sedation group. Dexmedetomidine use was predominantly observed in patients who achieved proper sedation. This supports the growing evidence that dexmedetomidine provides a balanced sedation profile with minimal respiratory depression and allows for greater patient arousability.