

Research Article

Effect of Daily Sedation Interruption on Length of ICU Stay

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ABSTRACT

Background: Sedation is routinely used in intensive care units (ICUs) to facilitate mechanical ventilation, reduce anxiety, and improve patient comfort.

Objective: To evaluate the effect of daily sedation interruption on the length of ICU stay among patients receiving mechanical ventilation.

Methods: This prospective comparative study was conducted at CMH Muzaffarabad from October 2024 to May 2025, included 105 critically ill patients admitted to the ICU and requiring mechanical ventilation with continuous sedation. Patients were divided into two groups according to the sedation protocol used: daily sedation interruption (n = 52) and continuous sedation without interruption (n = 53). Demographic characteristics, duration of mechanical ventilation, and length of ICU stay were recorded.

Results: The mean age of the participants was 52.7 ± 14.3 years, with 64 (61.0%) males and 41 (39.0%) females. Patients receiving daily sedation interruption had a shorter duration of mechanical ventilation (5.8 ± 2.4 days) compared with those receiving continuous sedation (7.1 ± 3.1 days). Similarly, the mean ICU length of stay was significantly lower in the daily sedation interruption group (7.9 ± 3.2 days) than in the continuous sedation group (10.1 ± 4.0 days) ($p < 0.05$).

Conclusion: Daily sedation interruption was associated with reductions in mechanical ventilation duration and ICU length of stay among critically ill patients.

Keywords: Daily Sedation Interruption, ICU Stay, Mechanical Ventilation, Sedation Management.

INTRODUCTION

Sedation is a very common technique employed in intensive care units (ICUs) to promote mechanical ventilation, reduce anxiety and agitation, and make patients feel comfortable [1]. Severely, critically ill patients need constant IV sedatives to withstand invasive treatment and life-sustaining treatments. Nevertheless, the long-term or excessive sedation has been linked to several negative effects, such as delayed awakening, longer mechanical ventilation, high chances of delirium, and long ICU stay. Such complications not only add to the cost of health care but also add to the morbidity of the patients who are critically ill [2]. Therefore, the optimization of sedation practices has gained significant relevance in

contemporary critical care medicine. Recent years have seen a relatively high number of strategies aimed at reducing unnecessary sedation [3]. A daily sedation interruption (DSI), also called a sedation vacation, is one of such strategies. It is a method that involves temporarily discontinuing daily sedative infusions so that patients can wake up and undergo a neurological examination [4]. Each day of interruption in the process of administered sedation, clinicians can assess the patient's neurological condition, the level of readiness to withdraw the patient, and avoid the accumulation of sedative medications. Research has indicated that the practice could shorten the mechanical ventilation process and improve overall clinical outcomes for ICU

patients [5]. One of the biggest problems in the critical care environment is prolonged ICU stay. Long ICU stay predisposes the risk of nosocomial infection, muscle weakness, psychological complication and healthcare spending [6]. Thus, clinical importance lies in interventions capable of reducing ICU length of stay in a safe manner. It has been shown that over-sedation can lead to a long stay in the ICU through postponed recovery and ventilator weaning [7]. A practical intervention to overcome this problem, which was suggested to minimize the non-beneficial exposure to sedatives and enhance patient awakening, is daily sedation interruption [8]. A number of clinical trials and observational studies have been focused on the effects of daily sedation interruption on the outcome of the ICU. Certain studies have shown that patients who discontinue daily sedation have shorter mechanical ventilation and ICU stays than those who discontinue continuous sedation [9-11]. Other studies, however, have yielded conflicting results, necessitating research to obtain the most reliable information on the effectiveness of such an intervention across diverse clinical settings and patient populations. Given the potential advantages of optimal sedation management, it is of interest to assess the impact of daily sedation interruptions on ICU length of stay to improve patient outcomes and resource utilization [12]. Knowledge of whether this strategy can reduce ICU stays can help clinicians use evidence-based sedation guidelines and improve the quality of care provided to patients in critical conditions. Thus, the aim of this study is to determine the impact of daily sedation interruptions on ICU length of stay in patients under mechanical ventilation and in critical condition. The control of sedation amongst the critically ill patients should strike a delicate balance between patient comfort and safety [13]. Poor sedation can result in agitation, accidental disconnection of life-support, and aggravated stress responses, and excessive sedation can result in slower recovery and neurological evaluation. The use of continuous deep sedation has been the norm in the ICUs in the past, and when the patient is under mechanical ventilation. Nevertheless, there is an increasing body of evidence suggesting that lighter sedation approaches with structured sedation protocols can result in better clinical outcomes, such as earlier mobilization and quicker recovery [14]. The role of a daily sedation break is an important part of the current sedation regimens prescribed by the

international critical care standards. Allowing the patients to wake up temporarily will enable clinicians to examine neurological functioning more efficiently and identify possible complications like delirium and the likelihood of readiness to undergo a spontaneous breathing test [15].

Objective

To evaluate the effect of daily sedation interruption on the length of ICU stay among patients receiving mechanical ventilation.

METHODOLOGY

This was a prospective comparative study conducted at CMH Muzzafarabad from October 2024 to May 2025. A total of 105 critically ill patients admitted to the ICU and requiring mechanical ventilation with continuous intravenous sedation were included in the study. Patients were recruited using a non-probability consecutive sampling technique. The patients who were aged 18 years or above, admitted to the ICU, received mechanical ventilation and continuous intravenous sedation for at least 24 hours were included in the study. Patients that were in hemodynamic stability and under routine ICU care were the only ones eligible to be included. Patients were also not included in the study in case they had severe neurological injuries or conditions that needed to be under deep sedation, e.g., traumatic brain injury or status epilepticus. The patients with unstable hemodynamic status who need high-dose vasopressor support, who are under neuromuscular blocking agent treatment, who have known psychiatric problems that influence the management of sedation, or who have contraindications to daily interruption of sedation as dictated by the treating physician were also not included in the study.

Data Collection

The data were collected using a structured data collection form. Demographic data and clinical variables, including age, gender, initial diagnosis, mechanical ventilation duration, sedation management protocols, and ICU length of stay, were collected. The study group was split into two groups based on the sedation management protocol the ICU had to follow. Daily sedation interruption group patients had their sedative infusions regularly terminated after every 24 hours to enable the patient to wake up so that neurological evaluation and ventilator weaning readiness could be assessed. The adjusted dose of sedation was

resumed when a patient got agitated, uncomfortable, or intolerant of the ventilator. Patients in the continuous sedation group were given an uninterrupted infusion of sedatives as per the standard ICU sedation protocol without interruption every day. The patients were followed up daily, and the ICU length of stay was calculated from admission to discharge. The length of stay in the ICU in days was the main outcome measure of the study. The aim of the study was to establish the relationship between daily sedation interruption and reduced length of stay in the ICU when compared to continuous sedation.

Data Analysis

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Continuous variables were presented as mean $\pm$ standard deviation, while categorical variables were expressed as frequencies and percentages. The independent

sample t-test was used to compare the mean ICU length of stay between the two groups. A p-value of ≤ 0.05 was considered statistically significant.

RESULTS

Data were collected from 105 patients; the mean age was 52.7 ± 14.3 years. Most patients were aged 41–60 years (49; 46.7%), followed by those older than 60 years (33; 31.4%), while 23 patients (21.9%) were aged 18–40 years. Regarding gender distribution, 64 patients (61.0%) were male and 41 (39.0%) were female. The most common primary ICU diagnosis was respiratory failure (36; 34.3%), followed by sepsis (29; 27.6%), postoperative complications (21; 20.0%), and cardiovascular conditions (19; 18.1%). With respect to sedation protocols, 52 patients (49.5%) received daily sedation interruption, whereas 53 patients (50.5%) received continuous sedation without interruption.

Table 1. Demographic and Clinical Characteristics of ICU Patients and Sedation Protocol Distribution (n = 105)

Variable	Category	N (%) / Mean $\pm$ SD
Age (years)	—	52.7 $\pm$ 14.3
Age Group	18–40 years	23 (21.9)
	41–60 years	49 (46.7)
	>60 years	33 (31.4)
Gender	Male	64 (61.0)
	Female	41 (39.0)
Primary ICU Diagnosis	Respiratory failure	36 (34.3)
	Sepsis	29 (27.6)
	Postoperative complications	21 (20.0)
	Cardiovascular conditions	19 (18.1)
Sedation Protocol	Daily sedation interruption	52 (49.5)
	Continuous sedation	53 (50.5)

Patients who received daily sedation interruption had a shorter duration of mechanical ventilation (5.8 ± 2.4 days) compared with those receiving continuous sedation (7.1 ± 3.1 days), and this difference was statistically significant ($t = 2.41$, $p =$

0.018). Similarly, the mean ICU length of stay was significantly lower in the daily sedation interruption group (7.9 ± 3.2 days) compared with the continuous sedation group (10.1 ± 4.0 days) ($t = 3.11$, $p = 0.002$).

Table 2: Comparison of Mechanical Ventilation Duration and ICU Length of Stay between Sedation Groups

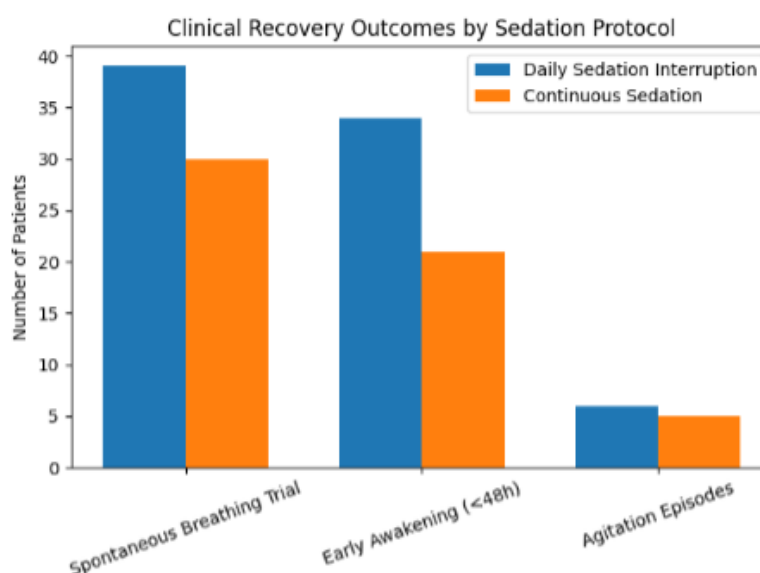
Variable	Daily Sedation Interruption (n = 52)	Continuous Sedation (n = 53)	Test Statistic	P-Value
Duration of Mechanical Ventilation (days)	5.8 ± 2.4	7.1 ± 3.1	$t = 2.41$	0.018
ICU Length of Stay (days)	7.9 ± 3.2	10.1 ± 4.0	$t = 3.11$	0.002

Successful spontaneous breathing trials were observed in 39 patients (75.0%) in the daily sedation interruption group compared with 30 patients (56.6%) in the continuous sedation group, showing a statistically significant difference ($p = 0.047$). Early awakening within 48 hours occurred in 34 patients (65.4%) in the daily sedation interruption group, compared

with 21 patients (39.6%) in the continuous sedation group, a statistically significant difference ($p = 0.009$). Sedation-related agitation episodes occurred in 6 patients (11.5%) in the daily sedation interruption group and 5 patients (9.4%) in the continuous sedation group, and this difference was not statistically significant ($p = 0.72$).

Table 3. Clinical Recovery Indicators between Study Groups

Outcome Variable	Daily Sedation Interruption n (%)	Continuous Sedation n (%)	p-value
Successful spontaneous breathing trial	39 (75.0)	30 (56.6)	0.047
Early awakening (<48 hours)	34 (65.4)	21 (39.6)	0.009
Sedation-related agitation episodes	6 (11.5)	5 (9.4)	0.72



DISCUSSION

The aim of this study was to assess the impact of daily sedation interruption on ICU stay of patients in a critically ill condition who need mechanical ventilation. The results have shown that the patients that were subjected to daily sedation interruption had a lower mechanical ventilation time and a much shorter ICU stay than the patients who were given continuous sedation. These findings demonstrate the possible positive effects of using structured sedation guidelines in intensive care units to enhance patient outcomes and maximize the use of healthcare resources. The average length of stay in the ICU was also found to be shorter in the patients that were daily sedated (interrupted) (7.9 ± 3.2 days) than in the ones that were continuously sedated (10.1 ± 4.0 days). This observation implies that the periodic

awakening of the patients will enable the clinicians to determine the neurological condition and readiness of the patients to be taken off life support machines better, hence enabling prompt recovery and leaving the ICU. The lessening of ICU hospitalization is specifically vital in emergency care departments since any lengthy ICU hospitalization is linked to increasing chances of complications of infections, delirium, and muscle weakness [16]. It was also discovered that the duration of mechanical ventilation was shorter in patients receiving intermittent sedation (5.8 ± 2.4 days) than in those under constant sedation (7.1 ± 3.1 days). Early waking due to sedation disruption enables healthcare providers to assess respiratory activity and initiate spontaneous breathing trials earlier. This would hasten weaning from mechanical ventilation, which is

one of the significant determinants of ICU length of stay. The findings of the current research correspond with the findings of other studies which have shown the advantages of interrupting daily sedation in the critically ill patients [17]. The literature has already noted that daily discontinuation of sedative infusions will decrease the duration of mechanical ventilation and also improve the ICU outcomes by avoiding the over-accumulation of sedative medications. In the same line of research, past studies have revealed that patients who are treated by daily breaks of sedation awaken more quickly and recover faster as compared to patients under continuous sedation [18].

Alongside the shortening of mechanical ventilation time and ICU length of stay, daily sedation break may also help to optimize the neurological surveillance and promptly detect complications [19]. When sedation is interrupted, clinicians can conduct a neurological evaluation more effectively and identify possible neurological decline or delirium at an earlier. These complications can be countered by early detection which could assist in better management of the patients and prevent the further decline of their clinical condition. Other recovery indicators that were also discussed under the present study included, early awakening and early successful spontaneous breathing trails. There were more success rates of early awakening and successful attempts of spontaneous breathing in patients who are sedated daily by interruption than in patients who are fed with continuous sedation. These results also confirm the importance of sedation break in helping with the early patient recovery and better ventilator weaning outcomes [20-21].

Although the advantages of the identified practice are evident, introducing the daily sedation interruption should be done with caution to maintain patient safety. Some clinicians have raised concerns about potential agitation or discomfort from the interruption. But in this study, the proportion of patients who agitated was very low and well controlled by adjusting the level of sedation. Such results indicate that the intervention of daily sedation interruption is safe when it is performed under close clinical supervision. Given the healthcare system, the length of stay in the ICU should be minimized to enhance efficiency in critical care units. The resources available in the ICU are normally scarce, particularly in developing nations, and the ICU costs may be very heavy to the healthcare systems due to the length of

stay. The adoption of evidence-based sedation practices like daily sedation interruption can contribute to the better availability of beds at ICU, decreased treatment costs, and overall patient care. The results of this research can be understood in terms of some limitations. The research involved only one center and a relatively small sample of the patients (105), which can be a limitation of the study since the findings might not be generalized. Furthermore, differences in patients' diagnoses and illness severity might affect outcomes in the ICU.

CONCLUSION

It is concluded that daily sedation interruption is an effective strategy for sedation management in critically ill patients requiring mechanical ventilation. The findings of this study demonstrated that patients receiving daily sedation interruption had a shorter duration of mechanical ventilation and a reduced length of ICU stay compared with those receiving continuous sedation. Daily sedation interruption also facilitated earlier awakening and improved readiness for spontaneous breathing trials without causing significant complications.

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