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Incidence and delirium risk factors in burn patients: A prospective cohort study

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ABSTRACT

Background: Delirium is a neurocognitive syndrome caused by systemic disturbances, leading to impaired attention, awareness, and/or cognition. It poses a significant risk of comorbidities, mortality, prolonged hospitalization, and increased healthcare costs. The challenges in delirium management, follow-up, and rehabilitation, arising from complex chronic conditions and long-term complications after severe burns, highlight the urgent need for more research in this area. Thus, this study aims to investigate the incidence of delirium and the risk factors specific to this population.

Methods: This analytical observational prospective cohort study was conducted between August 2022 and January 2024. Adults (18 years and older) admitted to a single burn unit with a confirmed burn injury were included, regardless of burn severity. Sociodemographic and clinical variables included age, sex, extent of burn, and prior health status. Delirium assessment was made using the CAM-ICU scale at least twice a day. The primary outcome was the incidence of delirium and its risk factors, with secondary outcomes including the onset and duration of delirium episodes.

Results/Discussion: The sample consisted of 50 patients, with a delirium incidence of 52 %. Burn patients admitted to the burn unit developed delirium an average of 11.81 days (95 % CI=7.09–16.52) after hospitalization, with an average duration of 11.5 days (95 % CI = 7.28–15.72). Age was the only predisposing risk factor that emerged ($p = 0.0141$). Five variables emerged as precipitating risk factors in bivariate analyses: total surface burn area (TSBA) ($p = 0.026$), surgery ($p = 0.0438$), mechanical ventilation ($p < 0.001$), opioid infusion use ($p < 0.001$), and infection ($p < 0.001$). However, in multivariate Cox regression analyses, only mechanical ventilation remained statistically significant as a risk factor for delirium (HR=8.017; 95 % CI = 1.926 – 33.368; $p = 0.004$).

Conclusion: This study highlights mechanical ventilation as a critical risk factor contributing to the high incidence of delirium among burn patients. Early identification and management of risk factors—mainly mechanical ventilation, but also TSBA, surgery, opioid infusion use, and infection—can guide targeted interventions to improve patient outcomes and mitigate the impact of delirium on recovery.

1. Introduction

Delirium is a neurocognitive syndrome caused by systemic disturbances that temporarily disrupt regular neuronal activity. The primary mechanisms contributing to delirium include neuroinflammation, cerebral vascular dysfunction, alterations in cerebral metabolism, neurotransmitter imbalances, and impaired neuronal network connectivity. Additionally, the occurrence of delirium depends on an individual's resilience and capacity to withstand acute stress events [1,2].

The definition of delirium in the perioperative context remains heterogeneous across the literature. While several efforts have been made to standardize its identification, no universally accepted criteria exist [3]. Our study recognizes this limitation and has adopted a clinical assessment based on DSM-5 criteria.

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According to the DSM-5 criteria [4], delirium involves a sudden disturbance in attention, awareness, and/or cognition, characterized by fluctuations in severity throughout the day and a noticeable deviation from baseline functioning. It is also associated with cognitive impairments, such as memory loss, disorientation, language difficulties, visuospatial issues, or perceptual disturbances. Diagnosis requires evidence that other existing neurocognitive disorders cannot explain. It is commonly categorized into three subtypes: hyperactive, hypoactive, and mixed delirium, with hypoactive delirium being the most prevalent, particularly among burn patients [4,5].

A 2024 meta-analysis reported a delirium incidence of 20.5 % among burn patients, based on a total of 2710 patients [6]. Delirium represents a significant risk to comorbid patients, and to those who receive intensive care unit (ICU) care or undergoing surgery [7]. In the ICU, the incidence of delirium can reach up to 77 % among mechanically ventilated patients [8]. In patients with burns, delirium is an independent predictor of mortality, extended hospitalization, and increased healthcare costs [7–9].

Risk factors can be categorized as predisposing or precipitating, modifiable or non-modifiable. These include advanced age, sex, comorbidities, alcoholism, total body surface area (TBSA), duration of hospitalization, ICU length of stay (LOS), infections, prolonged mechanical ventilation, and the use of opioids, benzodiazepines, methadone, anticholinergics, or corticosteroids. Also, the hospital environment, physical restraint, and repeated surgical procedures [6,8,10–12].

Delirium assessment is conducted using validated scales like the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC) [13], with CAM-ICU being the most reliable scale, as it is translated into Portuguese [13,14]. However, there is no consensus on identifying patients at 'high risk' for delirium [15]. Therefore, paying close attention to various risk factors is essential for effective clinical reasoning. Understanding and managing these risk factors are crucial for improving patient outcomes, particularly in vulnerable populations like burn patients. Early identification and prevention of these risk factors, combined with targeted interventions for high-risk patients, can significantly reduce the incidence of delirium [15].

The literature has identified a gap in research on delirium in burn patients [7], noting the challenges in delirium management, follow-up, and rehabilitation due to the development of complex chronic conditions and long-term complications following severe burns [16]. Thus, this study aims to investigate the incidence of delirium and the risk factors specific to this population. We establish specific objectives: (1) to determine the median time from the onset of hospitalization to the development of delirium; (2) to determine the average duration of delirium in burn patients admitted to the burn unit; and (3) to determine risk factors for the development of delirium in burn intensive care unit patients.

2. Material and methods

2.1. Study design and setting

This study was an analytical observational prospective cohort study. We followed STROBE guidelines for reporting observational studies [17] and a protocol design registered in the Hospital Ethics Committee (ref. no. 32/23).

2.2. Participants

The study was conducted between August 2022 and January 2024 and included all patients admitted to a burn unit in Portugal. This burn unit exclusively treats adults aged 18 years or older.

We initially determined that 250 patients would be needed when calculating the sample size, based on the 20.5 % incidence reported in the meta-analysis. However, since this burn unit treats approximately 50 patients per year, completing the study would have required five years—an approach that was not feasible given our available resources. Consequently, we selected the specified time frame to ensure the study's feasibility.

Participants were eligible for inclusion if they met the following criteria: (1) Aged 18 years or older; (2) Admission to the Burn Unit with a confirmed diagnosis of burn injury, regardless of the burn severity.

The exclusion criteria included: (1) Patients who did not understand Portuguese or were deaf, making it impossible to apply the CAM-ICU scale; (2) Patients who were admitted with diagnoses other than burns, such as Stevens-Johnson Syndrome, Toxic Epidermal Necrolysis and necrotizing fasciitis; (3) Patients that during their stay in the burn unit, did not undergo any CAM-ICU evaluation.

Participants were consecutively selected as they were admitted to the burn unit during the study period. Patient data were extracted from hospital medical records, and a digital registry system was created to organize the data into a standardized database, ensuring comprehensive admission coverage and facilitating analysis.

2.3. Variables

We developed a standardized data sheet with a unique patient identification code for each participant to collect data (supplementary material 1). This coding system ensured that all personal and identifying information, such as names or medical record numbers, remained confidential. Using this anonymized coding key, we maintained patient privacy while accurately tracking and analyzing data for each individual.

The sociodemographic and clinical variables gathered included sex, age, presence or absence of hypertension, cardiac disease, pre-existing cognitive impairment, alcohol use, smoking habits, auditory or visual impairments, and LOS in ICU, as these are reported risk factors for delirium in ICU patients [12,18].

Regarding burn-specific variables, we collected information about the type of burn (thermal, electrical, and chemical) and the % TBSA, categorized into three groups ($\leq$10 %; >10 %; and >25 %). The severity of the disease is considered a risk factor for delirium in ICU patients [11]; in this population, major burns were defined as those with a TSBA exceeding 25 % [19]. However, burns involving a TSBA > 10 % have also been associated with a higher risk of delirium [7,9].

Hospitalization-related variables and potential precipitating risk factors were also collected, including the need for surgical intervention (and the number of surgeries), mechanical ventilation (and the number of days), opioid use (considering only opioid infusion), benzodiazepine use, systemic infection (bloodstream infection, respiratory infection and/or urinary tract infection) [6,12,18]. Opioid use in this study refers exclusively to continuous intravenous infusions administered during ICU stay. Opioids administered intermittently or during burn wound care procedures were not included in the analysis. Many patients admitted to the burn ICU had less extensive injuries and less complex clinical needs, which allowed for the use of multimodal analgesia strategies. These included non-opioid analgesics and, when appropriate, regional anesthesia techniques, often reducing or eliminating the need for continuous opioid infusions.

These variables were collected until the outcome variable, delirium, except for the number of surgeries and the duration of mechanical ventilation, which continued to be recorded throughout the study.

We hypothesized that these variables would be potential risk factors for developing delirium in burn patients in the ICU. The primary outcome measured was the incidence of delirium, including the time to onset and the duration of delirium episodes for each patient.

2.4. Data sources/measurement

According to the literature, the systematic use of a delirium scale for

assessment [13] is recommended. Thus, we applied the scale at least twice daily. Delirium diagnosis was made using the CAM-ICU scale [13], considering a day as positive if at least one positive record within 24 hours indicates the presence of delirium. To ensure the proper use of the CAM-ICU, the team underwent training on both delirium and the CAM-ICU tool. Additionally, audits were conducted, with ongoing support and clarification provided throughout the process.

The CAM-ICU tool has high reliability, with a sensitivity of 80 % and a specificity of 96 %. It demonstrates better sensitivity but lower specificity in mechanically ventilated patients [14]. This scale was adapted from the Confusion Assessment Method (CAM) specifically for ICU use. It can only be applied when the level of consciousness on the Richmond Agitation Sedation Scale (RASS) is $\geq$ -3. The tool assesses four items: (1) altered or fluctuating mental status, (2) inattention, (3) altered level of consciousness, and (4) disorganized thinking. A diagnosis of delirium was confirmed when alterations were observed in the first two items, along with either an altered level of consciousness or disorganized thinking [20].

2.5. Ethics

This research was performed following the Declaration of Helsinki. The Lisbon Academic Medical Center reviewed and approved the study on May 22, 2023 (ref. no. 32/23). In this study, patient anonymization ensured patients could not be identified [20]. Informed consent was also obtained from all patients included in the study.

2.6. Statistical analysis

All statistical and analytical processes were performed using the software SPSS 26.0.

The incidence of delirium was calculated, with results expressed in percentages. The population was characterized based on variables related to the presence or absence of delirium. Numerical variables were described using the mean and standard deviation, while categorical variables were presented as absolute and relative frequencies.

The student's *t*-test and Levene's test were applied for group comparisons of numerical variables, while categorical variables were analyzed using Pearson's chi-square test and the likelihood ratio test. The results of hypothesis tests and their respective p-values were reported [21].

A Kaplan-Meier survival analysis was performed to calculate the median time to delirium onset. TBSA was used to stratify median times until the development of delirium. The Kaplan-Meier survival table and cumulative survival curve were included. Additionally, a multivariate Cox regression analysis was conducted to calculate hazard ratios, considering the development of delirium as the outcome (hazard event). The study period was defined as the time from the start of hospitalization until the development of delirium or discharge from the burn unit. For all analyses, an alpha level of 0.05 and 95 % confidence intervals were applied whenever applicable [21].

3. Results

3.1. Participants' characteristics

In this study, 66 patients were initially enrolled. However, ten patients were excluded due to the absence of a burn diagnosis, one was excluded for not speaking Portuguese, one declined to provide consent, and four did not have CAM-ICU evaluation (Fig. 1). Consequently, the final sample consisted of 50 patients.

Among the included patients, 38 (76 %) were male, and 12 (24 %) were female. Analysis of age distribution revealed no significant differences: 12 patients (24 %) were aged 18–24 years, 14 patients (28 %) were aged 41–55 years, 12 patients (24 %) were aged 56–65 years, and 12 patients (24 %) were older than 65 years (Table 1). The mean age was 54.76 years (SD $\pm$ 18.54).

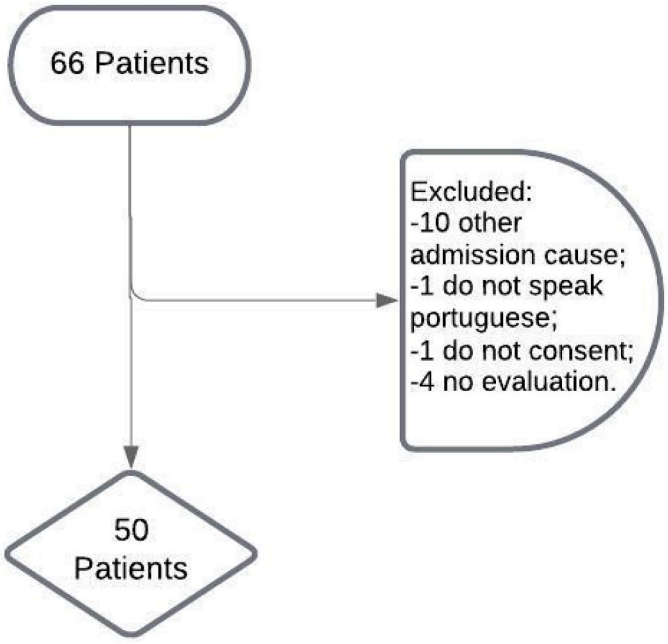


Fig. 1. Participants' flowchart.

Table 1
Participants' characteristics.

	Variables	n	%
Sex	Male	38	76 %
	Female	12	24 %
Age	18–40	12	24 %
	41–55	14	28 %
	56–65	12	24 %
	> 65	12	24 %
Comorbidities	Hypertension	16	32 %
	Cardiac diseases	7	14 %
	Cognitive impairment	2	4 %
	Visual impairment	5	20 %
	Hearing impairment	10	10 %
	Alcohol abuse	8	16 %
	Smokers	16	32 %
Type of burns	Electrical	2	4 %
	Thermal	47	94 %
	Chemical	1	2 %
%TBSA	$\leq$ 10 %	18	36 %
	> 10 %	20	40 %
	> 25 %	12	24 %

* N = 50; n = number of participants.

The most prevalent comorbidities were hypertension and smoking, each reported in 16 patients (32 %), followed by hearing impairment in 10 patients (20 %), alcohol abuse in 8 patients (16 %), cardiac diseases in 7 patients (14 %), visual impairment in 5 patients (10 %), and cognitive impairment in 2 patients (4 %).

Thermal burns were the most common type of burn injury, affecting 47 patients (94 %), followed by electrical burns in 2 patients (4 %) and chemical burns in 1 patient (2 %). Regarding TBSA, 18 patients (36 %) had burns involving $\leq$ 10 % TBSA, 20 patients (40 %) had burns involving > 10 % TBSA, and 12 patients (24 %) had burns involving > 25 % TBSA.

3.2. Statistical results

The incidence of delirium in this study was 52 % (n = 26). On average, patients experienced delirium for 11.5 days (95 % CI =

7.28–15.72), with the longest case lasting 36 days and the shortest just one day. After admission to the burn unit, it took an average of 11.81 days (95 % CI = 7.09–16.52) for patients to develop delirium, with a maximum delay of 40 days.

In our bivariable analysis of risk factors for developing delirium, none of the comorbidities (hearing impairment, visual impairment, smoking, alcohol abuse, hypertension, cardiac diseases, cognitive impairment) increased the likelihood of delirium (Table 2). The delirium group had a mean age of 60.85 years, with the oldest patient being 92 and the youngest 21, identifying age as the only predisposing risk factor ($p = 0.0141$) (Table 2).

The type of burns (thermal, electrical, or chemical) ($p = 0.129$) and benzodiazepines ($p = 0.273$) were not identified as significant risk factors for the development of delirium in the burn population (Table 2). In this analysis, five variables emerged as risk factors: TSBA ($p = 0.026$), surgery ($p = 0.0438$), mechanical ventilation ($p < 0.001$), opioid infusion ($p < 0.001$), and infection ($p < 0.001$) (Table 2).

Regarding TSBA, 10 out of 12 patients with burn areas exceeding 25 % developed delirium, as did 10 out of 20 with burn areas between 10 % and 25 % (Table 2). Similarly, 82 % of the patients in the delirium group underwent surgery, and only 2 out of 26 did not require it. Around half of the population developed a systemic infection (52 %), including 20 patients in the delirium group. Additionally, 54 % needed mechanical ventilation, with 22 of these patients in the delirium group. Opioids were administered via continuous infusion to 64 % of burn unit patients, and 72 % of them developed delirium (Table 2).

We conducted a multivariate Cox regression analysis including six variables (age, surgery, TSBA, infection, opioid, and mechanical ventilation) identified as potential factors influencing the development of delirium, with all variables adjusted to each other (Table 3 and supplementary material 2). Our analysis revealed that, among these variables, only mechanical ventilation demonstrated statistical significance as a risk factor for delirium (HR=8.017; 95 % CI = 1.926 – 33.368; $p = 0.004$) (Table 3 and Fig. 2). This finding suggests that patients requiring mechanical ventilation are over eight times more likely to develop delirium compared to those who do not need it.

Table 3
Cox Regression.

Variable (n = 50)		**B**	**Hazzard Ratio**	**p value**	CI **95 %**
Age	18–40	ref.			
	41–55	0.202	1.224	0.755	(0.345; 4.336)
	56–65	−0.807	0.446	0.310	(0.093; 2.119)
	> 65	0.519	1.680	0.430	(0.463; 6.091)
Surgery		0.031	1.032	0.971	(0.186; 5.709)
TSBA	TSBA < =10 %	ref.			
	TSBA > 10 %	0.657	1.929	0.238	(0.648; 5.748)
	TSBA > 25 %	0.251	1.285	0.687	(0.379; 4.354)
Infection		−0.211	0.810	0.733	(0.241; 2.718)
Opioid		0.345	1.412	0.655	(0.311; 6.412)
Mechanical Ventilation		2.082	8.017	0.004	(1.926; 33.368)

According to the multivariate analysis, surgery (HR =1.032; 95 % CI = 0.186 – 5.709; $p = 0.971$) and infection (HR=0.810; 95 % CI = 0.241 – 2.718; $p = 0.733$) did not represent risk factors (Table 3 and supplementary material 2). The lack of statistical significance for these two factors indicates that, despite being common clinical considerations, they do not independently contribute to the likelihood of delirium in this patient population when analyzed alongside other variables.

4. Discussion

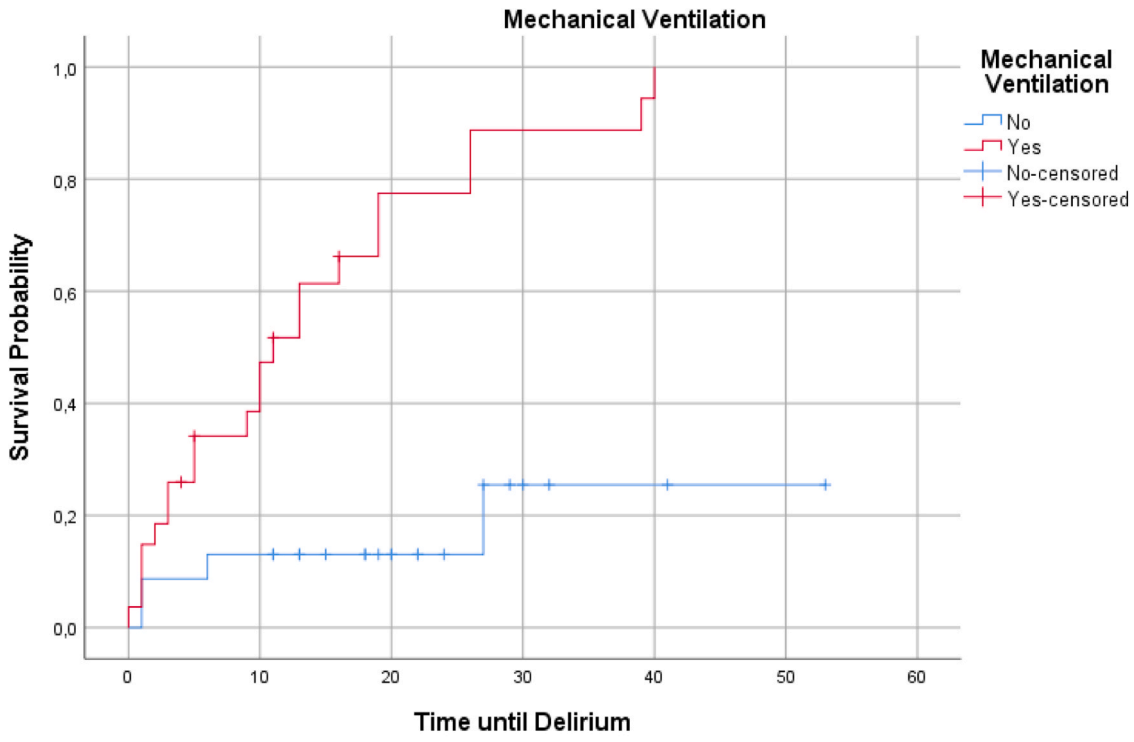
Delirium is a common complication in burn patients, with prevalence rates varying widely. Our study aimed to assess the onset and duration of delirium in burn patients and found that 52 % of patients developed this condition.

The study's findings of a median onset of delirium at 11.81 days ICU post-hospitalization contrast with earlier findings by Perry and Blank, who reported an average onset on the sixth day post-injury [22]. This discrepancy highlights potential variability in onset timing, possibly influenced by differences in patient populations or care protocols.

Table 2
Bivariable analysis for risk factors of delirium.

Variable	**Category**	**No Delirium group** (n = 24)		**Delirium group** (n = 26)		**Total** (n = 50)		**Result of statistical test**	***p value***
Sex	Male	19	79.2 %	19	73.1 %	38	76.0 %	0.254	0.614 (1)
	Female	5	20.8 %	7	26.9 %	12	24.0 %		
Age	Mean	48.17		60.85		54.76		−2.557	0.0141 (2)
	SD	16.79		18.27		18.54			
Hearing impairment	Yes	2	8.3 %	3	11.5 %	5	10.0 %	0.144	0.705 (3)
Visual impairment	Yes	3	12.5 %	7	26.9 %	10	20.0 %	1.666	0.197 (3)
Smokers	Yes	5	20.8 %	11	42.3 %	16	32.0 %	2.645	0.104 (1)
Alcohol abuse	Yes	3	12.5 %	5	19.2 %	8	16.0 %	0.425	0.514 (3)
Hypertension	Yes	5	20.8 %	11	42.3 %	16	32.0 %	2.645	0.104 (1)
Cardiac diseases	Yes	2	8.3 %	5	19.2 %	7	14.0 %	1.272	0.259 (1)
Cognitive impairment	Yes	0	0.0 %	2	7.7 %	2	4.0 %	2.693	0.101 (3)
Type of Burns	Thermal	23	96 %	24	92 %	47	94.0 %	4.100	0.129 (3)
	Electrical	0	0 %	2	8 %	2	4.0 %		
	Chemical	1	4 %	0	0 %	1	2.0 %		
TSBA	TSBA ≤ 10 %	12	50 %	6	23 %	18	36.0 %	7.265	0.026 (1)
	TSBA > 10 %	10	42 %	10	38 %	20	40.0 %		
	TSBA > 25 %	2	8 %	10	38 %	12	24.0 %		
Surgery	Yes	17	70.8 %	24	92.3 %	41	82.0 %	4.063	0.0438 (3)
Surgery number	Mean	1.00	3.69		2.40			−4.613	< 0.001 (4)
	SD	0.98	2.80		2.51				
Mechanical Ventilation	Yes	5	20.8 %	22	84.6 %	27	54.0 %	20.439	<0.001 (1)
Benzodiazepines	Yes	13	54.2 %	18	69.2 %	31	62.0 %	1.202	0.273 (1)
Opioid	Yes	9	37.5 %	23	88.5 %	32	64.0 %	14.068	<0.001 (1)
Infection	Yes	6	25.0 %	20	76.9 %	26	52.0 %	13.48	<0.001 (2)

(1) Pearson's chi-square Test
(2) *t student* test
(3) Likelihood ratio test
(4) Levene test



	chi square	df	Sig.
Log Rank (Mantel-Cox)	19.694	1	0.000

Fig. 2. Kaplan-Meier survival curve of Mechanical Ventilation.

In our study, the average duration of delirium was 11.5 days, aligning with previous research that underscores the prolonged nature of this condition. Delirium has been strongly associated with several adverse outcomes, further emphasizing its clinical significance. Patients experiencing delirium tend to have extended hospital stays [6,10,11,23,24], which may reflect the complexity of their care needs and the additional interventions required. Moreover, delirium is linked to increased mortality rates [6,10,23].

Notably, the study found no significant association between most individual comorbidities and the development of delirium. However, factors such as TSBA, surgery, mechanical ventilation, opioid infusion use, age, and systemic infections showed significant correlations with delirium in univariate analyses.

In burn patients, mechanical ventilation is the most significant risk factor for delirium, as confirmed by multivariate analysis. This finding is consistent with previous studies that have identified mechanical ventilation as a primary contributor to delirium in this population [10,11,25]. Furthermore, deep sedation, often required for mechanically ventilated patients, has been associated with an increased risk of delirium [26]. These results suggest that the risk may stem not only from mechanical ventilation itself, but also from factors such as deep sedation. This underscores the importance of light sedation in reducing delirium and improving outcomes, including shorter ventilation duration, earlier extubation, and lower mortality. However, these factors may be considered potential sources of bias in the results presented. In this context, future studies could explore whether the risk of delirium associated with mechanical ventilation is influenced by the level of sedation, potentially opening new avenues for research on this topic [13,27,28].

The results of this study differ from other study that suggests that opioids, particularly intravenous opioids and methadone, may actually reduce the risk of delirium in this population [8]. According to the PADIS guidelines [13], managing pain is crucial to preventing and managing delirium. However, the challenges of managing pain in this population have been well-documented, with opioids being the first-line treatment for pain control but also being a risk factor for the development of delirium [6,29,30]. This raises questions about whether pain is being accurately assessed to ensure appropriate titration of opioids or if there is an overuse beyond what is necessary, which could explain the differences between our findings and those of Agarwall et al. [8]. Furthermore, due to the small sample size, we did not differentiate between opioid types or dosages, because it could affect the accuracy of the statistical analysis. This represents a potential area for future research.

The scale used to assess pain in the burn unit is the Behaviour Pain Scale, which is often inadequate due to facial burns, splints, and bandages on the limbs, allowing only the assessment of one of the three parameters [31]. Therefore, it would be beneficial in this population to assess pain using nociception assessment systems for continuous pain monitoring to enable adequate titration of opioids [31].

Opioids remain a cornerstone of pain management in burn patients, but their use is associated with an increased risk of delirium. High doses of opioids can contribute to cognitive impairment, prolonged hospital stays, and increased ICU hours. To minimize opioid use while ensuring effective analgesia, multimodal pain management strategies are recommended. These include non-opioid analgesics, regional anesthesia (nerve blocks, epidurals), and adjuvant therapies such as ketamine, gabapentinoids, and dexmedetomidine. Early delirium screening and individualized pain management can help optimize outcomes while reducing opioid-related complications [32].

Benzodiazepines have also been identified as a risk factor in burn patients [8]. However, in our study, they were not a risk factor. Unlike the previous research, we did not distinguish between oral and intravenous benzodiazepines, which could explain the discrepancies in findings. Therefore, it would be important to investigate intravenous and oral benzodiazepines as separate variables in future studies.

Since surgery is a frequent procedure in our study and a risk factor,

this emphasizes the importance of minimizing the need for surgical intervention and operative stress, as the number of surgeries seems to increase the risk of delirium. Effective management and control of infection can also reduce graft loss [33], thereby decreasing the need for surgical intervention and, consequently, lowering the risk of developing delirium. Moreover, systemic infection is a risk factor ($p < 0.001$), so addressing infection management tackles two risk factors simultaneously in this population.

TSBA emerged as a risk factor in this population ($p < 0.026$). We found that 10 out of 12 patients with TSBA > 25 % developed delirium, compared to only 6 out of 18 with TSBA ≤ 10 %, indicating that higher TSBA increases the risk of delirium. This aligns with other studies in a similar population [7,9].

Limitations of this study include the research being conducted at a single institution, which raises concerns about the applicability of the results to other healthcare settings, where practices and patient care protocols may differ. Additionally, the final sample size of 50 patients limits the generalizability of the findings, as a small cohort can reduce statistical power and may not represent the broader population. Furthermore, the absence of long-term follow-up assessments prevents evaluation of the ongoing effects of delirium on recovery and rehabilitation in burn patients.

These limitations highlight the need for further research to validate the findings across diverse populations, using larger, multicenter cohorts and exploring additional risk factors, such as deep sedation and differentiated opioid types and dosages, to enhance our understanding of delirium in burn patients. It is essential to study comorbidities after discharge and evaluate the effectiveness of delirium prevention interventions, particularly through managing modifiable risk factors.

5. Conclusions

This study underscores the significant incidence of delirium among burn patients, identifying mechanical ventilation as a critical risk factor for its development. These findings emphasize the importance of targeted interventions in this vulnerable population. Understanding the specific onset and duration of delirium in burn patients is crucial for optimizing patient care and improving clinical outcomes. The results suggest that comprehensive assessment and delirium monitoring should be integral components of burn unit treatment protocols.

Early identification and management of risk factors, particularly in mechanically ventilated patients, but also addressing other common risk factors such as TSBA, surgical needs, opioid infusion use, and infection, can guide interventions to mitigate the adverse effects of delirium, including extended hospital stays and increased healthcare costs. Moreover, addressing the broader implications of delirium, such as its impact on long-term recovery, is essential for enhancing the rehabilitation process for burn patients.

This study contributes to a deeper understanding of delirium in burn patients, providing a foundation for future research and interventions to improve outcomes in this vulnerable group. Further studies are encouraged to explore the mechanisms linking medical interventions and delirium and to develop targeted strategies to reduce the duration and impact of delirium in the burn unit.

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CRediT authorship contribution statement

Márcia Pereira Silva: Project administration, Conceptualization, Methodology, Investigation, Data curation, Writing – original draft preparation. **Joana Vala:** Investigation, Data curation, Writing – review & editing. **João Sousa:** Investigation, Methodology, Data curation, Writing – review & editing. **Joana Ferreira Teixeira:** Investigation, Writing – review & editing. **Helga Rafael Henriques:** Supervision, Investigation, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Due to the sensitive nature of the clinical data collected and the risk of indirect identification, the dataset generated and analyzed during the current study is not publicly available. However, upon reasonable request, the identified data may be made available, subject to institutional approval and appropriate data use agreements.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.burns.2025.107556.

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