

Management of Delirium in Intensive Care Department

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Abstract

Introduction: Delirium is a fluctuating disturbance of consciousness, which is accompanied by a change in cognition. It is commonly associated with brain dysfunction and seen in three-fourths of the intensive care unit patients with poor prognosis. It is frequently seen in mechanically ventilated patients with recognized subtypes such as hyperactive, hypoactive and mixed. Delirium usually requires the use of specific diagnostic instruments for its diagnosis. It can considerably reduce the patient's mortality rate as well.

The Aim of Work: This article reviews the incidence, prognostic implications, risk factors, clinical presentation, prevention and management of patients undergoing delirium in intensive care unit.

Methodology: The review is comprehensive research of PUBMED from the year 1999 to 2017.

Conclusion: The latest advances in the field of critical care medicine have drastically increased the survival rates of the patients in intensive care units. Brain dysfunction can lead to poor short-term outcomes and may have many complications as its sequelae during the following years. To avoid long term cognitive dysfunction, it is important to diagnose the condition early with the needful management and disposition to improve outcomes in such patients.

Keywords: Delirium; Intensive Care Unit; Management; Risk Factors; Mortality

Introduction

Patients in intensive care units (ICUs) show improved life expectancy rates due to the recent advances that have been made in critical care medicine. However, the seriousness of brain dysfunction affecting patients in ICU is often undervalued as opposed to pulmonary, cardiac or renal dysfunctions that can cause mortality or morbidity in these patients [1].

Intensive Care Unit (ICU) delirium is generally a nonspecific, potentially preventable, and mostly reversible disorder of impaired cognition. Off late delirium has been recognized as a serious problem in critically ill patients, which is directly associated with the increased days of mechanical ventilation, length of hospital stay, cost of care, long-term cognitive impairment, the need for post-discharge institutionalization and mortality. In appropriate management is a common problem with delirium since mostly there is a failure in accurate recognition of the condition by the treating physician. Patients on mechanical ventilators have an increased risk of developing delirium as opposed to those who are non-mechanically ventilated (20 - 25%) [2,3].

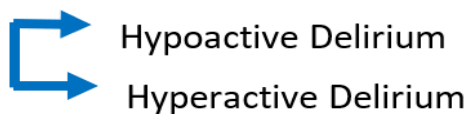
The American Psychiatric Association's (APA) Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV defines Delirium as 'disturbance of consciousness and cognition that develops over a short period of time (hours to days) and fluctuates over time.

Alteration in the mental status, along with cognitive changes, memory deficit, disorientation, or perceptual disturbances, is commonly seen in this condition [4].

Prevalence and subtypes

Depending on the severity of the clinical condition and the diagnostic method used, delirium can range from 20 - 80% [3]. Most often, the symptoms of delirium go unrecognized, or they are falsely attributed to dementia, depression or IC syndrome (expected, inconsequential complication of critical illness) [1].

According to psychomotor behavior, delirium is categorized into:



Hypoactive delirium	Hyperactive delirium
<ul style="list-style-type: none"> • Decreased responsiveness • Withdrawal • Apathy 	<ul style="list-style-type: none"> • Agitation • Restlessness • Emotional lability

Table 1: The characteristics of hypoactive and hyperactive delirium [5].

Peterson in 2000 observed the hyperactive delirium alone was rarely seen in ventilated or non-ventilated patients. About 54% of the patient have only hypoactive delirium as opposed to purely hyperactive delirium, which is very rare. A little less than half (43%) of the patients have mixed type of delirium [6].

The prognosis of hyperactive delirium is better than hypoactive delirium among non-ICU patients [7]. It is advisable to carry out routine monitoring using effective and dependable diagnostic instruments to assess the prognostic significance of delirium in critically ill patients [1]. Reliable instruments like the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) [8] and the Intensive Care Delirium Screening Checklist (ICDSC) are the more popularly used ones. The usage of the Richmond Agitation-Sedation Scale (RASS) is recommended along with the delirium assessment tool [1].

In 2007 Ouimet, *et al.* categorized delirium based on the number of symptoms present. The term subsyndromal delirium was attributed to those patients having up to three syndromes (since the DSM-IV criteria were absent). Patients with four or more syndromes had clinical delirium, and those without any symptoms had no delirium [8].

Prognostic implications and risk factors

The adverse effects of delirium can be [1]:

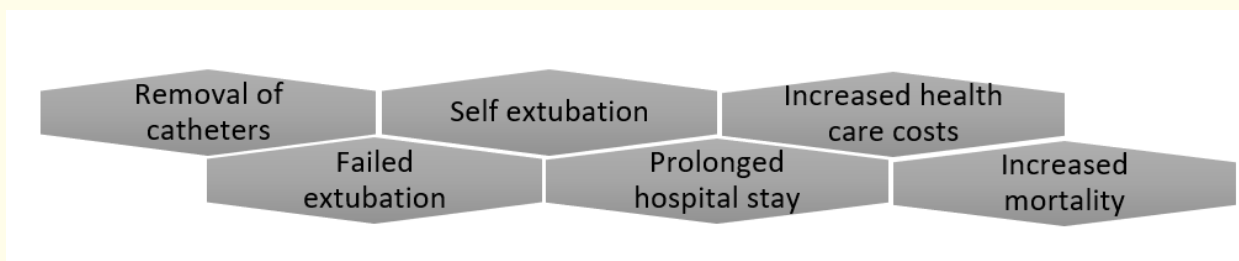


Figure 1

Though the effect of ICU Delirium on cognitive impairment is a continuing debate, evidence does suggest a significant cognitive decline for up to three years after discharge of patients [1].

The risk factors of Delirium can be categorized as precipitating and predisposing factors [9].

Predisposing factors

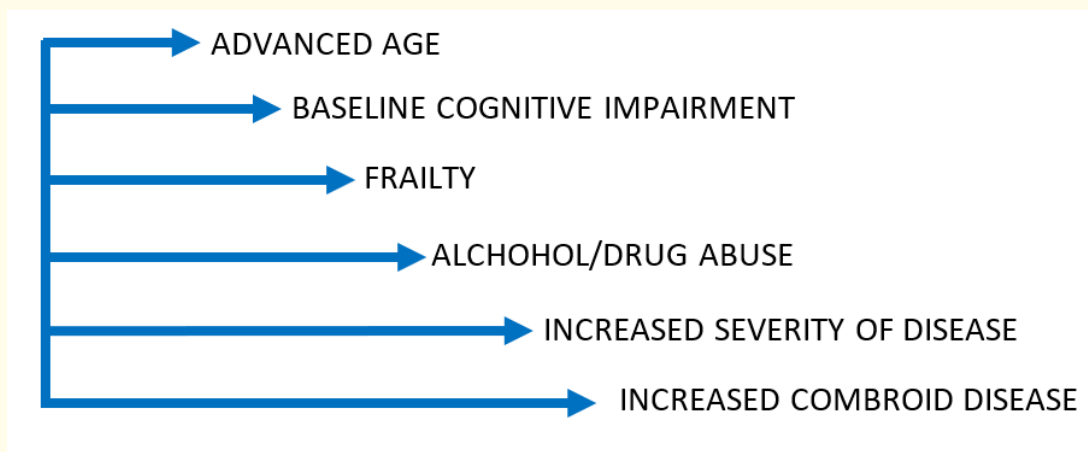


Figure 2

Precipitating factors

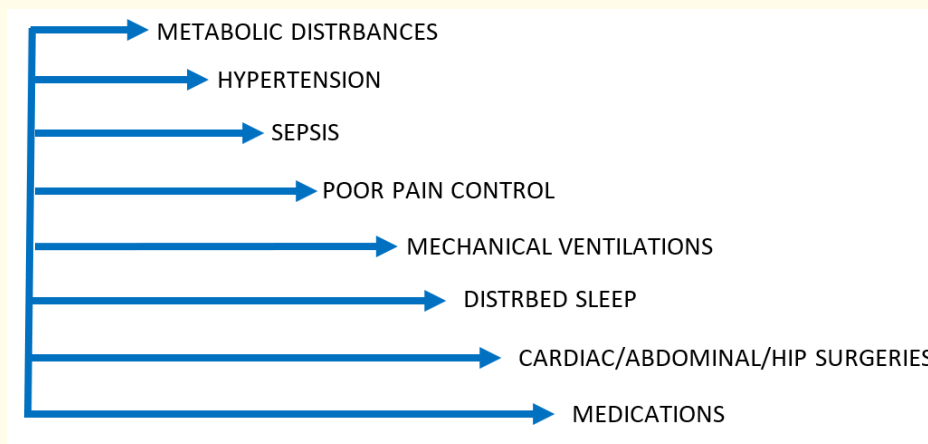


Figure 3

Medications are also associated with the precipitation of delirium. Analgesics like morphine, lorazepam is more strongly associated with delirium compared to propofol or fentanyl. Sedatives like Benzodiazepine and deeper sedations have higher associated risks compared to lighter sedation. Altered neurotransmission or reduced neuronal control of inflammation are seen in Drugs with anticholinergic properties, which have the potential to precipitate delirium. Steroid applications can transit to delirium [9].

Pathophysiology of delirium

Though the pathophysiology of delirium in critically ill patients is vaguely understood, the hypothesis is that cholinergic deficiency is what contributes to the occurrence of delirium. The cholinergic activity is increased in patients with delirium. The effect of the serotonergic activity (increase/decrease) can also contribute to the cause. Reduction in function and number of GABA receptors and enhancement

of N-methyl-D-aspartate receptors are seen in chronic alcoholics, which can be a risk factor for delirium. Release cytokines that mediate inflammatory and immune responses to stress can be triggered by various environmental or medical factors. These may enhance the risks of delirium due to neurotoxic effects of increased blood-brain barrier permeability [10].

Presentation and assessment tool of delirium in ICU

The most commonly seen signs of delirium in ICU are inattention, disturbances in consciousness in short intervals, an abrupt change in psychotic behavior. If the patients have a reduced level of consciousness cognitive features like memory loss, confusion, language or emotional disturbances may not be easily detected [10]. Due to the absence of structured tools, delirium goes unrecognized in about 75% of the patients. An assessment of the consciousness levels should be done thoroughly and recorded using a Sedation-Agitation Scale (SAS) like the Richmond Agitation-Sedation Scale (RASS). RASS helps to categorize patients based on the level of their consciousness. The preferred level is RASS 3, in which the patients should respond to voice. Screening is initiated after the consciousness level is assessed. Since ICU patients are often intubated, sedated, physically weak, they are more susceptible to have delirium [10].

According to the Diagnostic and Statistical Manual of Mental Disorders criteria of the American Psychiatric Association, the five validated screening tools for delirium include [4]:

1. Confusion Assessment Method-ICU (CAM-ICU)
2. Intensive Care Delirium Screening Checklist (ICDSC)
3. Delirium Detection Score (DDS)
4. Nursing Delirium Screening Scale (Nu-DESC)
5. Neelon and Champagne Confusion Scale.

The most popularly accepted and efficient scaled are the CAM-ICU (a modified version of CAM) and ICDSC. The CAM-ICU has better sensitivity, but lower specificity compared to ICDSC for presence of delirium in ICU patients. The diagnostic accuracy of CAM-ICU is also better than later. For diagnostic features can define delirium and is considered positive when either of the features is present [11]:

- i. Feature 1 (acute onset or fluctuating course)
- ii. Feature 2 (inattention)
- iii. Feature 3 (altered level of consciousness)
- iv. Feature 4 (disorganized thinking).

Prevention and treatment of delirium

A number of risk factors can lead to the occurrence of delirium in the ICU. Risk factors are usually difficult to modify; however certain preventive methods can be used to decrease the incidence of ICU delirium. Dexamethasone sedation has lesser delirium/coma days in patients as compared to lorazepam or midazolam [9].

Drugs as prophylaxis

Delirium is linked to agents that can

- a. Reduce dopamine activity.
- b. Improve neurotransmitter imbalances (e.g. antipsychotics)
- c. Reduce cholinergic inhibition (e.g. acetylcholinesterase inhibitors).

The administration of a single dose sublingual risperidone (1 mg) decreases the incidence of delirium in patients who have undergone elective cardiac surgery. Lesser incidence and duration of delirium was observed in patients who were administered with intravenous haloperidol (1 mg/8 hours) as a prophylactic measure in high-risk patients. However, the Haloperidol Effectiveness in Intensive Care Unit Delirium (HOPEICU) RCT study done in 2013 show no difference in the number of delirium free days or coma in patients with prophylactic delirium treatment [12].

Pleiotropic anti-inflammatory effects of statin medications show a reduced risk of delirium in patients [13]. Medications like dexamethasone, acetylcholinesterase inhibitor rivastigmine and donepezil have no significant effects in reducing the risks of delirium [9].

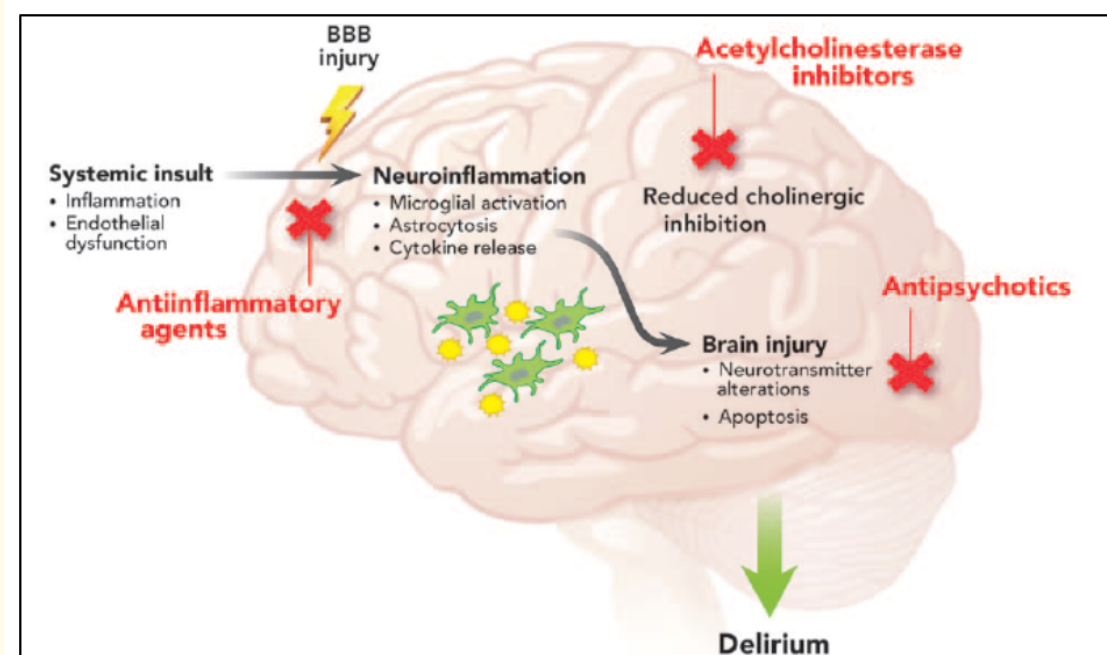


Figure 4: Potential mechanisms of delirium in ICU [9].

Sedatives for mechanical ventilation

The Pain, Agitation, and Delirium guidelines advise following analgesia-first sedation followed by nonbenzodiazepine medications in mechanically ventilated patients. Patients treated with intermittent morphine show increased agitated delirium compared to sedation with propofol or midazolam. Literature has proven the risk of delirium while administering sedatives, but the risk after its discontinuation is yet to be validated. Whether the delirium is rapidly reversible or persistent, delirium is a question. In 2014 it was found that in about 89% of the patients there seems to be persistent delirium even after the discontinuation of sedatives, but only about 12% had rapidly reversible sedation-related delirium [14].

Early mobility

Nursing staff, physical therapists, and respiratory therapists can help mechanically ventilated patients with physical and occupational therapy, which has shown reduced risks of delirium. Depending on the sedation level and physical abilities of the patient, activities like exercise in bed, sitting, standing, etc. can be encouraged [9].

Quality of sleep

Delirium can be directly associated with disturbed sleep. Providing favorable environments (earplugs in ICU etc.) in the ICU tends to improve sleep perception. Methods to minimize sleep disruptions, promote normal circadian rhythms and use of alternative sleep medications can also help prevent delirium. Thorough monitoring to differentiate between sleep perception and measurement of actual sleep must be done. Propofol administration can decrease the REM sleep, whereas dexmedetomidine can improve stage 2 sleep by decreasing nighttime sleep fragmentation and closely resemble natural non-REM sleep.

It is suggested that melatonin levels are lower in postoperative ICU patients with delirium than those without due to the abnormal circadian melatonin release [15].

Sedation bundles

In 2011 The Awakening and Breathing Coordination, Delirium Monitoring/Management, and Early Exercise/Mobility (ABCDE) bundle were published where evidence-based prevention techniques were combined to apply them together to reduce the delirium rates. an inde-

pendent effect of ABCDE to reduce delirium was found. A tool kit has been developed by The American Association of Critical Care Nurses for implementation of the ABCDE bundle along the bed. In 2016 the newly coined "ABCDEF" bundle included [16]:

- Assessment and management of Pain,
- Both SATs and SBTs,
- Choice of sedation if required,
- Delirium monitoring and management,
- Early mobility and exercise and
- Family engagement and empowerment.

Pharmacological AIDS

Since evidence-based pharmacological treatment options are nominal, it is of extreme importance to prevent the occurrence of delirium from limiting the complications. The medical condition that can probably contribute to the occurrence of delirium needs to be corrected. The pharmacological treatment option includes the use of haloperidol: 2.5 - 5 mg (typical antipsychotic) or olanzapine: 5 mg, quetiapine: 50 mg, or ziprasidone (atypical antipsychotics). However, the efficacy is limited and shows conflicting results. Comparing effects of dexmedetomidine or haloperidol, patients receiving the former have shorter time to extubation, lesser length of hospital stay and decreased requirement for tracheostomy [9].

In non-intubated ICU patients with hyperactive delirium, dexmedetomidine can be used as rescue therapy. They have decreased hemodynamic side effects and shorter ICU length of stay. Bradycardia is a common side effect seen with dexmedetomidine. Universally the use of dexmedetomidine is suggested as a treatment for refractory delirium (even in patients not on mechanical ventilation). However, the effectiveness of it as the first line of therapy still needs evidence. Another limitation includes the inability to administer dexmedetomidine by continuous infusion [17].

No single drug can effectively be used to treat delirium in the ICU. The treatment options that have been suggested in literature have significant side effects. Sedation, respiratory depression, and prolonged QT intervals and leading to life-threatening neuroleptic malignant syndrome can be seen with antipsychotics. The above-mentioned pharmacological therapy should only be used if there is a failure of the non-pharmacological methods and if the patient is a risk to themselves or those around [9].

Conclusion

Even though delirium is a momentary and revocable syndrome, its manifestation in ICU patients can result in long-term cognitive dysfunction. Since it can be identified and there is potential to prevent a serious acute neuropsychiatric condition, it is gaining attention. However, early identification and risk factor assessment are key to manage the condition appropriately. A multidisciplinary approach can improve the recognition chances of delirium. Validated delirium bedside screening tools can help minimize risk factors, detect delirium early, and begin with the needful interventions. The use of pharmacological methods can help to modify the risk factors associated with delirium. Though antipsychotics are commonly administered by clinicians in ICUs, more evidence is required to establish the safety and efficacy of these medications. However, they must be used according to the recommendations stated.

Improved functional status can be achieved by routine and regular physical activities and therapies, reduce the duration of delirium, and increased ventilation-free days. Sleep-hygiene practices based on evidence and reduction in noise can decrease the delirium incidence.

The use of restraint is required to prevent any harm among mechanically ventilated patients in certain ethical situations and should be used in situations where all other therapies have been unsuccessful after consultations by a multidisciplinary team, with complete ethical deliberations. Additional prospective studies are required to understand the epidemiology and risk factors for the condition and to discover preventive interventions to improve the prognosis and decrease the incidence of critically ill patients suffering from delirium.

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