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Research Progress on Non-Pharmacological Sleep Interventions in the Prevention of Delirium in Postoperative ICU Patients

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Abstract: ***Sleep disorders are a significant risk factor for delirium in postoperative ICU patients. Sleep interventions can effectively reduce the incidence of delirium, but most studies have focused on pharmacological approaches. Non-pharmacological sleep interventions have shown significant efficacy in preventing delirium in postoperative ICU patients. This review examines non-pharmacological sleep interventions for delirium prevention in ICU patients, aiming to provide a reference for the prevention of delirium in postoperative ICU patients.***

Keywords: Postoperative ICU patients, Delirium prevention, Non-pharmacological sleep interventions, Review**.**

1. Introduction

Postoperative Delirium (POD) is one of the most common complications in elderly patients following surgery, with a particularly high incidence among patients in the Intensive Care Unit (ICU) [1]. Delirium is an acute brain dysfunction syndrome, typically manifesting within 24-72 hours postoperatively with symptoms such as attention disturbances, altered consciousness, disruptions in the sleep-wake cycle, and behavioral interruptions [2]. Studies have shown that the incidence of postoperative delirium in elderly patients is significantly higher than in other age groups, and is closely related to the type of surgery, anesthesia method, and the patient's baseline health status. Due to the critical condition and complex treatment of ICU patients, the incidence of delirium can be as high as 80%. Moreover, critically ill patients often experience alterations in sleep and circadian rhythms, which can exacerbate the risk of delirium [3]. Multiple studies have highlighted the association between sleep disturbances and the development of delirium. A meta-analysis revealed that sleep interventions can reduce the incidence of delirium in ICU patients, but the focus has primarily been on pharmacological interventions [4]. Although pharmacological interventions can prevent delirium, their safety profile still requires improvement due to the side effects of dependency and tolerance [5]. Guidances of the Society of Intensive Care Medicine emphasizes the use of non-pharmacological interventions to prevent delirium and promote sleep [6]. The European Society of Anesthesia Postoperative Delirium Guidelines also emphasize the need to use non-pharmaceutical intervention first and then drug intervention second [7]. The American Association for the Promotion of Rehabilitation recommends the use of multi-component non-pharmaceutical interventions to prevent postoperative delirium in high-risk elderly patients [8]. Therefore, this paper reviews relevant non-pharmacological sleep interventions for delirium prevention in postoperative ICU patients, aiming to provide reference in delirium prevention practices.

2. Factors Influencing Sleep Disorders in Postoperative ICU Patients

Circadian rhythm disorders, disruption of sleep structures, and emotional stress are factors influencing sleep disorders in postoperative ICU patients. Circadian rhythm disorders are mainly caused by sleep disorders caused by continuous light and noise interference in the ICU environment [9]. Sleep structure damage is mainly affected by emotional stress, which leads to the activity of norepinephrocytes, leading to increased micro-awakening during non-rapid eye movement sleep, reduced activity of sleep spindles, and disrupts sleep quality [10]. Research shows that most critically ill patients experience some form of sleep disorders, such as excessive noise, strong light and frequent nursing activities, which can lead to insufficient sleep [11]. Sleep disorders in ICU patients after surgery are affected by the superposition of multiple factors and require comprehensive intervention through multidisciplinary collaboration.

3. The Main Risk Factors for Delirium in Postoperative ICU Patients

Delirium is a serious complication in postoperative ICU patients, and age is the main factor in the development of delirium. Studies have shown that the incidence of postoperative delirium in the elderly, especially those over 65 years of age, ranges from 15% to 53% [12]. Men are more likely to develop delirium compared to women; in addition, a previous history of delirium significantly increases the risk of postoperative delirium [13]. Cognitive impairment and comorbidities are key factors that affect the development of postoperative delirium. In addition, comorbidities such as chronic renal failure and preoperative health problems can also increase the risk of delirium. Patients who underwent emergency surgery tend to have higher rates of delirium than those who underwent elective surgery. Stress associated with emergency surgery can lead to postoperative complications, including delirium. Extended ICU stays are associated with

increased risk of delirium. This may be due to the complexity of care and the various stressors that may be exposed to in the ICU environment. Postoperative complications: The occurrence of complications such as atrial fibrillation, respiratory failure or the need for hemodialysis is also related to the high incidence of delirium. The presence of complications may complicate the recovery process and increase cognitive confusion. The use of physical constraints has been identified as an independent risk factor for delirium. Constraints may cause a patient to develop agitation and confusion, thereby increasing the likelihood of delirium. Surgery types and techniques: Different types of surgery have different risks for delirium. For example, heart surgery usually has higher associated risks than normal surgery, which is attributed to stress during the surgery, anesthesia, and postoperative conditions. Intraoperative factors: Various intraoperative conditions, such as longer surgery time, significant blood loss, and complications during the surgery, may increase the chance of postoperative delirium. Therefore, identifying delirium risk factors is critical to alleviating the incidence of delirium in postoperative ICU patients.

4. Non-pharmaceutical Intervention Measures

There is currently relevant evidence that non-pharmacological methods may provide effective strategies for delirium prevention and will not produce adverse reactions related to drug treatment. The most prominent is the implementation of

multi-component non-pharmacological interventions, mainly through optimizing auditory and visual functions, enhancing cognitive stimulation, improving sleep quality, and promoting early activity. Research shows that structured programs of cognitive participation, sensory enhancement, and psychosocial support can significantly reduce the incidence and duration of delirium. In addition, the use of environmental interventions has been highlighted as beneficial in various studies. Environmental adjustments, such as creating a more sleep-friendly environment and reducing noise levels, have been shown to be associated with shortening the duration of delirium in ICU patients. Implementing cognitive assessment and targeted program in an ICU setting significantly improved patient outcomes [14]. Another important aspect of non-pharmacological intervention is the integration of family participation into the care process. Involving families in the care process, providing comfort and promoting communication can further reduce delirium risk by enhancing patients' comfort and helping them better understand their surroundings. Studies have shown that when families participate in the care of patients during their ICU hospitalization, it may help reduce confusion and fear, which may reduce the incidence of delirium [15]. In addition, massage, music therapy, therapeutic touch, aromatherapy, relaxation and psychological imagination can comfort and reduce stress and anxiety levels in critically ill patients, which in turn may lead to improved sleep and reduce the occurrence of delirium [16]. However, the effectiveness of these interventions may depend on a variety of factors, including specific patient populations and holistic nursing philosophy in the ICU. There are still challenges in standardizing methodology in different healthcare settings and ensuring compliance with protocols, as differences in implementation may affect outcomes [17]. Although the current evidence of non-pharmacological interventions shows good prospects, further high-quality, multi-center research is needed to establish clear best practices and develop comprehensive guidelines for a diverse ICU environment.

5. Summary

The status of non-pharmacological interventions for postoperative ICU patients highlights a multidimensional approach that has the potential to significantly improve patient outcomes, with interdisciplinary collaboration and structured projects essential for their successful implementation. In the future, the effectiveness and adaptability of these interventions in different clinical settings can be conducted, which will further enhance their application and effectiveness in preventing delirium in the population of ICU susceptible patients.

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