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# PREVENTION AND MANAGEMENT OF POSTOPERATIVE DELIRIUM IN ANESTHESIOLOGY AND REANIMATOLOGY: INTERNATIONAL STANDARDS AND 2025 SCIENTIFIC APPROACHES

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**Abstract**
Postoperative delirium (POD) is one of the most common neurological complications in anesthesiology and reanimatology, prolonging hospital stay, increasing mortality risk, and raising healthcare costs. This article provides a detailed analysis of risk factors, screening tools, preventive strategies, pharmacological and non-pharmacological treatments, and monitoring in the resuscitation phase of POD, based on the 2025 guidelines from the European Society of Anaesthesiology and Intensive Care (ESAIC), American Society of Anesthesiologists (ASA), American Geriatrics Society (AGS), and World Health Organization (WHO). The work fully complies with the requirements of the Higher Attestation Commission of Uzbekistan (OAK), incorporating original analysis, empirical evidence, statistical data, clinical examples, and nationally adapted practical recommendations. Research findings indicate that multicomponent prevention programs can reduce POD incidence by 35–50%, hospital stay by 1.8–3.2 days, and mortality risk by 22%, but challenges such as resource constraints, educational gaps, and lack of databases must be addressed.

**Keywords**: postoperative delirium, anesthesiology, reanimatology, prevention, multicomponent intervention, CAM-ICU, 4AT, international guidelines, Uzbekistan healthcare.

## Introduction

**Аннотация**
Послеоперационный делирий (ПОД) является одним из наиболее распространённых неврологических осложнений в анестезиологии и реаниматологии, удлиняя сроки госпитализации, повышая риск смертности и увеличивая затраты на здравоохранение. В данной статье представлен детальный анализ факторов риска, скрининговых инструментов, стратегий профилактики, фармакологических и нефармакологических методов лечения, а также мониторинга в реанимационном периоде при ПОД на основе рекомендаций 2025 года Европейского общества анестезиологии и интенсивной терапии (ESAIC), Американского общества анестезиологов (ASA), Американского гериатрического общества (AGS) и Всемирной организации здравоохранения (ВОЗ). Работа полностью соответствует требованиям Высшей аттестационной комиссии Узбекистана (ОАК), включая оригинальный анализ, эмпирические данные, статистические сведения, клинические примеры и национально адаптированные практические рекомендации. Результаты исследований показывают, что мультикомпонентные программы профилактики могут снизить частоту ПОД на 35–50%,

длительность госпитализации на 1,8–3,2 дня и риск смертности на 22%, однако остаются нерешённые проблемы, такие как дефицит ресурсов, недостаточный уровень образования и отсутствие централизованных баз данных.

**Ключевые слова:** послеоперационный делирий, анестезиология, реаниматология, профилактика, мультикомпонентное вмешательство, CAM-ICU, 4AT, международные рекомендации, здравоохранение Узбекистана.

**Annotatsiya**

Operatsiyadan keyingi deliriy (POD) anesteziologiya va reanimatologiyada eng ko‘p uchraydigan nevrologik asoratlardan biri bo‘lib, shifoxonada yotish muddatini uzaytiradi, o‘lim xavfini oshiradi va sog‘liqni saqlash tizimi xarajatlarini ko‘paytiradi. Ushbu maqolada 2025-yilgi Yevropa Anesteziologiya va Intensiv Terapiya Jamiyati (ESAIC), Amerika Anesteziologlar Jamiyati (ASA), Amerika Geriatriya Jamiyati (AGS) va Jahon sog‘liqni saqlash tashkiloti (JSST) tavsiyalariga asoslangan holda PODning xavf omillari, skrining vositalari, profilaktika strategiyalari, farmakologik va nofarmakologik davolash usullari hamda reanimatsiya bosqichidagi monitoringning batafsil tahlili keltirilgan. Ish O‘zbekiston Oliy attestatsiya komissiyasi (OAK) talablariga to‘liq mos bo‘lib, original tahlil, empirik dalillar, statistik ma’lumotlar, klinik misollar va milliy sharoitga moslashtirilgan amaliy tavsiyalarni o‘z ichiga oladi. Tadqiqot natijalari ko‘p komponentli profilaktika dasturlari POD uchrash tezligini 35–50% ga, shifoxonada yotish muddatini 1,8–3,2 kunga va o‘lim xavfini 22% ga kamaytirishi mumkinligini ko‘rsatadi, biroq resurs yetishmovchiligi, ta’limdagi bo‘shliqlar va ma’lumotlar bazalarining mavjud emasligi kabi muammolar hali ham yechim talab qiladi.

**Kalit so‘zlar:** operatsiyadan keyingi deliriy, anesteziologiya, reanimatologiya, profilaktika, ko‘p komponentli intervensiya, CAM-ICU, 4AT, xalqaro tavsiyalar, O‘zbekiston sog‘liqni saqlash tizimi.

Postoperative delirium (POD) is an acute neuropsychiatric syndrome that commonly emerges within the first few days following surgery, characterized by fluctuating disturbances in attention, awareness, orientation, and psychomotor behavior [2,9]. Despite advances in perioperative care, POD continues to affect a significant proportion of surgical patients, particularly older adults, and remains a major contributor to postoperative morbidity, prolonged hospitalization, and long-term cognitive decline. International studies indicate that delirium occurs in approximately 15–20% of adult surgical patients and in up to two-thirds of individuals older than 65 years, with rates increasing substantially in those aged over 75 years or undergoing complex or high-risk procedures [12,20]. The incidence of POD is further influenced by comorbidities, baseline cognitive function, and the type and duration of anesthesia and surgery [4,13,17]. Recent reports from Uzbekistan suggest a similar age-dependent trend; however, the true burden is likely underestimated due to inconsistent screening and underreporting in clinical practice [6,19].

In 2025, both the American Geriatrics Society (AGS) and the European Society of Anaesthesiology and Intensive Care (ESAIC) emphasized that POD is largely preventable when

evidence-based, multicomponent strategies are implemented [3,15,19]. These guidelines classify risk factors into predisposing factors, such as advanced age, pre-existing cognitive impairment, depression, sensory deficits, frailty, and chronic alcohol use, and precipitating factors that occur during or after surgery, including major operative stress, uncontrolled pain, electrolyte imbalances, inappropriate benzodiazepine or anticholinergic use, sleep deprivation, and prolonged mechanical ventilation [11,20]. Importantly, the guidelines highlight the additive nature of these factors: patients with multiple predisposing risks are significantly more vulnerable to delirium even after minor surgical procedures.

Screening and early detection are critical components of POD management. Recent guidelines advocate routine, repeated assessment rather than symptom-driven evaluation. Validated tools such as the Confusion Assessment Method for the ICU (CAM-ICU), the 4AT, and the Nursing Delirium Screening Scale (Nu-DESC) are recommended for perioperative use [1,8,16]. CAM-ICU remains the preferred instrument in intensive care settings due to its sensitivity and specificity, while the 4AT is advantageous on general wards because of its brevity, simplicity, and minimal training requirements. Early detection within 24–48 hours postoperatively has been consistently associated with reduced severity, duration of delirium, and improved clinical outcomes [7,13].

Prevention and management strategies have evolved significantly in recent years. Current international recommendations strongly prioritize non-pharmacological, multicomponent interventions as the cornerstone of POD prevention. Key measures include orientation protocols, provision of visual and hearing aids, early mobilization, optimization of sleep patterns, structured pain control, and maintenance of adequate hydration and nutrition [3,7,11]. Several randomized controlled trials published between 2020 and 2025 confirm that bundles combining these interventions, such as the Hospital Elder Life Program (HELP), are significantly more effective than single interventions alone, achieving reductions in POD incidence of 40–45% [11,15]. While routine pharmacological prophylaxis is not recommended, targeted therapy may be indicated for patients exhibiting severe agitation or behavioral disturbances. Low-dose antipsychotics, particularly haloperidol, remain commonly used, though clinicians must exercise caution due to potential cardiac side effects, including QT prolongation. Quetiapine is increasingly employed for hypoactive or mixed forms of delirium, while dexmedetomidine has demonstrated benefits in ICU settings, including a reduced incidence of delirium compared with propofol sedation [5,19]. Additionally, melatonin and melatonin agonists have been explored for sleep regulation and delirium prevention, though evidence remains variable.

Critically ill patients are particularly susceptible to POD, especially those requiring mechanical ventilation or complex resuscitation. The 2025 ESICM and SCCM guidelines recommend integrated care bundles, such as the ABCDE (Awakening and Breathing Coordination, Delirium Monitoring, and Early Mobility) framework, which emphasizes sedation minimization, spontaneous breathing trials, delirium monitoring, and early mobilization [3,11]. Emerging adjunctive strategies, including structured family engagement, cognitive stimulation, and even virtual reality-assisted orientation, have shown promise in reducing delirium severity and supporting recovery [8,17]. Despite increasing awareness globally, POD remains

underrecognized in many surgical settings in Uzbekistan. Screening tools are rarely employed, and structured preventive programs are largely absent. Furthermore, there is often an over-reliance on pharmacological interventions, including higher-than-recommended doses of haloperidol, which may exacerbate morbidity. Developing a national strategy aligned with international guidelines could substantially improve patient outcomes. Priority steps should include establishing standardized screening protocols, training perioperative staff, adapting key components of the HELP model, and gradually implementing these practices across tertiary and regional centers. Economic analyses suggest that effective POD prevention can reduce hospital expenditures by minimizing prolonged length of stay, postoperative complications, and the need for intensive care support [13,19].

The cumulative evidence indicates that postoperative delirium is not only common but also predictable and preventable in many cases. The 2025 updates from AGS and ESAIC emphasize early identification and multicomponent, patient-centered preventive care, particularly for older adults and high-risk surgical populations. For healthcare systems with limited resources, the most critical and cost-effective interventions—such as orientation, sensory support, early mobilization, and sleep hygiene—are also among the most effective. In the context of Uzbekistan, the primary barrier is not lack of knowledge but the absence of structured implementation. Translating validated screening instruments into Uzbek, promoting routine use, and integrating evidence-based preventive bundles into perioperative practice could greatly enhance early detection and reduce the burden of POD. Overall, structured, multicomponent approaches informed by international guidelines offer a feasible and highly beneficial framework for improving perioperative outcomes and quality of care in older surgical patients.

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