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Review

# Delirium: A key challenge for perioperative care

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ABSTRACT

Delirium is highly prevalent, occurring in 20% of acute hospital inpatients and up to 62% of surgical patients. It is a significant predictor of poor outcomes including mortality and institutionalisation, however it is often viewed as simply a marker of underlying illness and is frequently overlooked in older adults. Although delirium is commonly comorbid with dementia, it represents a more urgent diagnosis, requiring prompt intervention. Delirium presents most commonly with hypoactive features (e.g. withdrawal and reduced spontaneous movement and speech). The common stereotype of hyperactive delirium tremens (e.g. agitation, hallucinations), although more visible, is less common. All presentations share acute disimprovement of cognitive function. Delirium is a highly predictable and preventable occurrence, however a major barrier to improving delirium care and impacting upon outcomes is that it remains poorly detected, particularly in surgical populations and especially in patients with hypoactive presentations. Routine ward-based screening for delirium, particularly in high-risk populations, and improved staff awareness of the significance of the problem can improve detection rates. Preventative strategies, particularly multicomponent approaches, have been most efficacious in improving patient outcomes. Optimising perioperative risk factors can lead to reduced incidence. Appropriate treatment of delirium requires thorough investigation, management of the underlying illness, avoidance of complications and simplification of the care environment. Studies suggest a role for pharmacological prophylaxis, particularly in relation to anaesthetic and sedative agents used intra- and post-operatively. Furthermore, gathering evidence suggests that judicious use of antipsychotic medications may be helpful in delirium prevention and treatment.



## 1. Delirium: a common and complex neuropsychiatric syndrome

Delirium is a complex neuropsychiatric syndrome characterised by acutely declined cognitive function secondary to physical precipitants. It is extremely common across all healthcare settings, occurring in up to 62%[1] of surgical patients, particularly those older or with pre-existing cognitive impairment. Delirium is often viewed as simply a marker of underlying pathology and is commonly overlooked, especially in the older ill. However, this acute syndrome is independently associated with serious adverse outcomes such as increased mortality, functional and cognitive decline.[2] Although multiple studies show that these poor outcomes can be significantly attenuated with prompt intervention, delirium remains underdetected, particularly in surgical cohorts.[3–5]

## 2. Incidence

Delirium is ubiquitous with a point prevalence of approximately 20% across the acute hospital.[6] It occurs in 11–42% of medical inpatients[7] and in up to 80–90% of palliative care and intensive care patients.[8,9] Delirium is a major preventable post-operative complication in older surgical patients,[10] with a reported incidence of 2%–60%,[11] reflective of differences between study populations and diagnostic criteria. Hip fracture and cardiac surgery patients have reported rates of up to 62%[1] and 52%[12] respectively. Lower rates have been observed in those undergoing less invasive procedures.[13]

Delirium typically develops early post-operatively,[14] often during the immediate recovery period. It is considered distinct from emergence agitation, excessive motor activity occurring

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during emergence from anaesthesia. However, this phenomenon can herald delirium onset, particularly in high risk groups.[15] Hence symptoms lasting over an hour, or which fluctuate, should be regarded as probable delirium.

## 3. Significance

Over the past decade, it has been well established that delirium predicts adverse outcomes independent of underlying pathology (see Fig. 1).[16–20] Poor outcomes are closely linked to the challenges posed by delirium symptoms,[21] particularly falls and self harm in hyperactive presentations and hypostasis, infections and pressure ulcers in hypoactive patients. Many patients with successful immediate surgical outcomes subsequently succumb to delirium-related complications and pose considerable management challenges in busy clinical settings.[22,23]

## 4. Pathophysiology

Delirium is the clinical presentation of acute generalised disturbance of brain function. The favoured neurochemical hypothesis suggests disruptions in several neurotransmitter pathways in the brain, culminating in a final common pathway of reduced cholinergic and GABAergic activity and increased dopamine, glutamate and noradrenaline release.[17]

Recent studies of biomarkers and genetic polymorphisms have indicated links with increased delirium incidence, severity and course[24–31] however studies of (anti)cholinergic parameters in delirium have been inconsistent. Other work indicates that melatonergic metabolism is affected, particularly in hypoactive presentations, suggesting key alterations in circadian function.[32] Delirium is also associated with white matter changes on neuroimaging[33] and generalised slowing on EEG,[34] however both tests are poorly specific and often impractical for use in delirious patients.

Other studies have investigated postoperative cognitive dysfunction (POCD) and long-term cognitive impairment (LTCI),[35–37] less well-defined concepts characterised by cognitive decline occurring after physical illness or interventions (such as surgery). Although, POCD/LTCI is viewed as distinct to delirium, recent work suggests a link between the two, and that patients who develop delirium post-operatively are at higher risk of subsequent LTCI.[38]

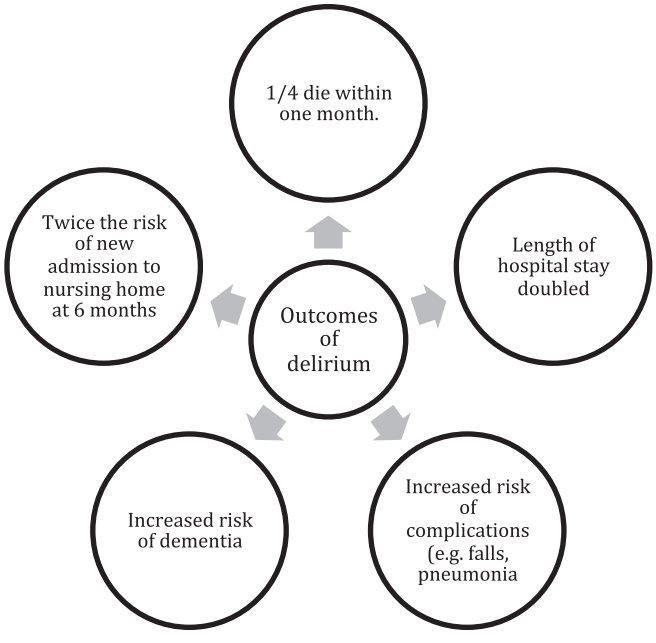


**Fig. 1.** Outcomes of delirium: Fast facts (independent of comorbidities and other confounders).

## 5. Who is at risk?

Delirium is a highly predictable occurrence with a range of patient, illness, and treatment factors that have considerable predictive accuracy. The most consistent predictors across patient groups are age extremes, prior cognitive impairment, severe co-morbid illness, and psychoactive medications (anticholinergic agents, opioids and benzodiazepines).[39] Delirium involves a dynamic interplay between pre-existing vulnerabilities and precipitating insults, with baseline predisposition especially important.[40] Although some risk factors (e.g. age) are unmodifiable, many can be minimised, such as uncontrolled pain, anaemia and infection (see Fig. 2).

Certain surgical subgroups, for example, hip fracture patients are at higher risk, due partly to the physiological stress and pain of the injury, as well the often emergency nature of surgery, and subsequent reduced mobility.[41] However, the high rates of delirium in this group may be an epiphenomenon reflecting the inherent frailty of this population.[42]

The high delirium prevalence in surgical populations has stimulated efforts to identify prediction rules for risk stratification[43–45] (see Table 1). Importantly, delirium risk increases exponentially with each additional risk factor. These tools facilitate surgical 'prehabilitation' programmes aimed at pre-operative optimisation of delirium risk status (see below).

## 6. Assessment

A major challenge in delirium care is to improve detection in everyday practice. Sixty-five percent of delirium cases are missed in the emergency department[46] and up to 72% of medical cases of delirium are missed.[47] Surgical patients have consistently been shown to be the cohort with lowest detection rates.[3–5,48]

The factors that complicate delirium recognition are manifold. Circadian disintegrity leads to nocturnal worsening of symptoms, often with relative lucidity come the morning ward round that is easily missed, particularly in the absence of routine neurocognitive assessment. Additionally, 'confusion' in ill older adults is often normalised, leading to under-appreciation of delirium as a clinically important syndrome independent of its aetiology. Some features, such as disorganised thinking, affective lability and fluctuating symptom pattern are more readily recognised by family members and nurses, who spend longer periods with the patient. Furthermore, the prevailing stereotype is of hyperactive delirium while less obvious hypoactive presentations are more common. Reduced activity is readily overlooked or misattributed to fatigue, senility and sedation with the 'good' and 'quiet' patient often presumed to have intact cognition. The prognosis for hypoactive cases is generally worse than for hyperactive patients.[49]

Formal delirium diagnosis is based upon careful assessment by an experienced clinician. Hence, a generalised approach to detection is best achieved in two stages; firstly, using a simple, brief and sensitive screening tool to assess for key indicators of possible delirium (inattention, disorganised thinking, behavioural changes); and secondly, more detailed assessment in those who screen positive, as per the recent NICE guidelines[50] (see Table 2). Ideally, given its prevalence and seriousness, all hospitalised patients should undergo daily routine delirium screening while all high-risk patients should be targeted for closer monitoring. The choice of screening instrument is guided by (a) time available for screening, (b) population being assessed, and (c) skillset of assessor, including