

Acute Brain Failure

Pathophysiology, Diagnosis, Management, and Sequelae of Delirium



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KEYWORDS

- Delirium • Acute brain failure • Encephalopathy • Post-operative delirium
- ICU-psychosis • Neurotransmitter dysfunction • Network dysregulation
- Systems integration failure hypothesis

KEY POINTS

- Delirium is a neurobehavioral syndrome caused by the transient disruption of normal neuronal activity secondary to systemic disturbances.
- It is the most common neuropsychiatric syndrome found in the general hospital setting.
- In addition to causing distress to patients, families, and medical caregivers, the development of delirium has been associated with increased morbidity and mortality, increased cost of care, increased hospital-acquired complications, poor functional and cognitive recovery, decreased quality of life, prolonged hospital stays, and increased placement in specialized intermediate and long-term care facilities.

EPIDEMIOLOGY OF DELIRIUM

Delirium is the most common neuropsychiatric syndrome found in the acute care setting, with a prevalence ranging from 10% in general medicine to 85% in advanced cancer and critical care (**Table 1**).^{1–14} One study found that 89% of survivors of stupor or coma progressed to delirium.¹⁵

Risk Factors for Delirium

A systematic review among intensive care unit (ICU) patients revealed the following: age, dementia, hypertension, pre-ICU emergency surgery or trauma, Acute Physiology and Chronic Health Evaluation (APACHE) II score, mechanical ventilation, metabolic acidosis, delirium on the prior day, and coma as strong risk factors for delirium; whereas multiple organ failure was a moderate risk factor.^{16,17} For every year after age 50, the chance of delirium increases by 10%.

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Table 1 A comparison of the incidence of psychiatric disorder in the general population and delirium among medically ill patients	
Selected Medical Populations	Incidence of Delirium (%)
Medical Services	
At admission to inpatient medicine ward	10–31
New delirium: general medicine wards	3–29
HIV-AIDS	20–40
Poststroke	13–48
Medical: ICU	60–87
Sepsis	9–71
CCU	26
Surgical Services	
General surgical wards	11–46
Postoperative delirium	4.7–74
Post-CABG	13–32
Vascular surgery	22
Abdominal aneurysm repair	33
Orthopedic surgery	12–41
Postorthotopic liver transplant	45.2
Postcardiotomy	32–67
Critical Care Setting	
Coronary care units	26
Medical ICU	60–87
ARDS	70–73
Survivors of stupor or coma	Up to 89
Elderly	
In nursing homes	15–70
Delirium present at hospital admission	10.5–39
In-hospital delirium	15–31
Frail-elderly patients	Up to 60
Postsurgery	20–65
In Cancer Patients	
General prevalence	25–40
Hospitalized cancer patients	25–50
BMT	73
Terminally ill cancer patients	45–88

Abbreviations: AIDS, acquired immunodeficiency syndrome; ARDS, acute respiratory distress syndrome; BMT, bone marrow transplantation; CABG, coronary artery bypass grafting surgery; CCU, cardiac care unit; HIV, human immunodeficiency virus; ICU, intensive care unit.

The mnemonic END ACUTE BRAIN FAILURE encapsulates the many risk factors known to contribute to the development of delirium ([Table 2](#)).

Neuropathogenesis of Delirium

The various precipitants of delirium have been extensively reviewed elsewhere and are not fully discussed here ([Fig. 1](#)).¹⁸ Whatever the proximate underlying cause, delirium is a neurobehavioral syndrome caused by an alteration in neurotransmitter synthesis, function,

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