Delirium in Critically Ill Patients Incidence and Relation with Sepsis

Essay

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا
عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ
صدق الله العظيم
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Amr Mohamed Fathi El Yasaky

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List of Abbreviations

AR	:	Auto regulation
BBB	:	Blood-brain barrier
CAM	:	Confessional assessment method
CAM-ICU	:	Confusion Assessment Method for the Intensive Care Unit
CMR	:	Cerebral metabolic rate
DDS	:	Delirium Detection Scale
EEG	:	Electro encephalogram
GABA	:	Gamma-amino butyric acid
GH	:	Growth hormone
ICDSC	:	Intensive care delirium Screening check list
ICUs	:	Intensive care units
LSD	:	Lysergic acid diethylamide
MMSE	:	Mini-Mental State Examination
MRI	:	Magnetic resonance imaging
RASS	:	Richmond agitation scale score
SAD	:	Sepsis-associated delirium
SAE	:	Sepsis-associated encephalopathy
SE	:	Septic encephalopathy
SEDCOM	:	Safety and Efficacy of Dexmedetomidine Compared with Midazolam
SIRS	:	Systemic inflammatory response syndrome
SSRI	:	Selective serotonin reuptake inhibitors
TNF-α	:	Tumor necrosis factor alpha

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Introduction

The word delirium is derived from the Latin term meaning "off the track." This syndrome was reported during Hippocrates' time, in 1813 Sutton described delirium tremens.

Delirium <*acute confusional state*> is a transient global fluctuated disorder of cognition, This condition is a medical emergency associated with increased morbidity and mortality rates in hospitalized patients <*acute brain angina*>. Early diagnosis and resolution of symptoms are correlated with the most favorable outcomes. Delirium is not a disease but it is a syndrome with multiple causes that result in a similar constellation of symptoms, It is defined as a transient, usually reversible cerebral dysfunction and manifests clinically with a wide range of neuropsychiatric abnormalities. The clinical hallmarks are decreased attention span and a waxing and waning type of confusion ***(Adamis et al., 2005).***

Delirium, or acute confusional state, is severe confusion that develops quickly, and often fluctuates in intensity. It is a common neuropsychiatric syndrome with a core feature of acute onset, meaning it has been present from hours to days, but not months or years. Delirium typically appears suddenly with a readily-identifiable time of onset, such as a time space

of a few hours, or overnight. It typically involves other cognitive deficits, changes in arousal *(hyperactive, hypoactive, or mixed)*, perceptual deficits, altered sleep-wake cycle, and psychotic features such as hallucinations and delusions ***(Albert et al., 2010)***.

It is a corollary of the criteria that a diagnosis of delirium cannot be made without a previous assessment, or knowledge, of the affected person's baseline level of cognitive function. In other words, a mentally disabled or demented person who is operating at their own baseline level of mental ability would be expected to appear delirious without a baseline mental functional status against which to compare ***(Fong et al., 2006).***

Accumulating evidence indicates three core domains of delirium phenomenology: *"Cognition"*, composed of inattention and other cognitive deficits; *"Higher Level Thinking Processes"* including impaired executive function, semantic expression and comprehension; and "Circadian Rhythm" including altered motor activity and fragmented sleep-wake cycle. Phenomenology studies suggest that "core" symptoms occur with greater frequency while other less consistent "associated" symptoms may reflect the biochemical

influence of particular etiologies or genetic, neuronal or physiological vulnerabilities ***(Inouye et al., 1999).***

Language disturbances in delirium include dysnomia, paraphasias, impaired comprehension, dysgraphia, and word-finding difficulties. Incoherent or illogical / rambling conversation is reported commonly. Disorganized thinking includes tangentiality, circumstantiality and a proneness to lose associations between elements of thought which results in speech that often makes limited sense with multiple apparent irrelevancies ***(Bogousslavsky et al., 2001)***.

A careful and complete physical examination including a mental status examination is necessary. Testing vital signs such as temperature, pulse, blood pressure, and respiration is mandatory. Patients have difficulty sustaining attention, problems in orientation and short-term memory, poor insight, and impaired judgment. Key elements here are fluctuating levels of consciousness ***(Ely, et al., 2011).***

*sepsis-associated delirium:

Sepsis-associated delirium (SAD) increases morbidity in septic patients and, therefore, factors contributing to SAD should be further characterized. One possible mechanism might be the impairment of cerebrovascular autoregulation

(AR) by sepsis, leading to cerebral hypo- or hyperperfusion in these haemodynamically unstable patients. Therefore, the present study investigates the relationship between the incidence of SAD and the status of AR during sepsis ***(Bogousslavsky et al., 2001)***.

Cerebral autoregulation (AR) is impaired in the great majority of patients with severe sepsis during the first two days. Impaired AR is associated with (sepsis associated delirium) SAD, suggesting that dysfunction of AR is one of the trigger mechanisms contributing to the development of SAD ***(Inouye et al., 1999).***

The pathogenesis of septic encephalopathy (SE) is unlikely to be directly induced by a pathogenic toxin, as similar encephalopathy can develop as a result of a number of systemic inflammatory response syndromes that lack an infectious etiology (e.g. acute pancreatitis, burns etc.). Clinical and experimental data suggest that a number of factors including the local generation of pro-inflammatory cytokines, impaired cerebral microcirculation, neurotransmitters imbalance and a negative impact of peripheral organ failure contribute to the development of SE ***(Albert et al., 2006)***.

Aim of the Work

To study the incidence of delirium in adult conscious patients in ICU and if there is any association between delirium and sepsis in critically ill patients

Pathophysiology of Acquired Impaired Cognitive Function and Relation with Sepsis

Delirium is a disturbance of consciousness characterized by acute onset and fluctuating course of inattention accompanied by either a change in cognition or a perceptual disturbance, so that a patient's ability to receive, process, store, and recall information is impaired. Delirium develops over a short period of time (hours to days), is usually reversible, and is a direct consequence of a medical condition, substance intoxication or withdrawal, use of a medication, toxin exposure, or a combination of these factors. Many delirious ICU patients have recently been comatose, indicating a fluctuation of mental status. Comatose patients often, but not always, progress through a period of delirium before recovering to their baseline mental state ***(Albert et al., 2005)***.

Based on the state of arousal, 3 types of delirium are described, Hyperactive delirium is observed in patients in a state of alcohol withdrawal or intoxication with phencyclidine (PCP), amphetamine, and lysergic acid diethylamide (LSD). Hypoactive delirium is observed in patients in states of hepatic encephalopathy and hypercapnia. In mixed delirium,

individuals display daytime sedation with nocturnal agitation and behavioral problems ***(Burns et al., 2005)***.

Table (1): Types of delirium: ***(Levkoff et al., 2006)***

Subtype	Characteristics
Hyperactive[32,36]	Agitation Restlessness Attempts to remove catheters or tubes Hitting Biting Emotional lability
Hypoactive[29,37,38]	Withdrawal Flat affect Apathy Lethargy Decreased responsiveness
Mixed	Concurrent or sequential appearance of some features of both hyperactive and hypoactive delirium

Delirium may caused by a disease process outside the brain that affects the brain, such as infection (urinary tract infection, pneumonia) or drug effects, particularly anticholinergics or other CNS depressants (benzodiazepines and opioids). Although hallucinations and delusions are sometimes present in delirium, these are not required for the diagnosis, and the symptoms of delirium are clinically distinct from those induced by psychosis or hallucinogens. Delirium

must by definition be caused by an organic process, i.e. a physically identifiable structural, functional, or chemical problem in the brain (organic brain syndrome), and thus, fluctuations of mentation due to changes in purely psychiatric processes or diseases, such as sudden psychosis from schizophrenia or bipolar disorder ***(Burns et al., 2004)***.

***Symptoms**

The signs and symptoms of delirium appear over a short period of time, from a few hours to a few days. They often fluctuate throughout the day, so a person may have periods of no symptoms. Primary signs and symptoms include those below.

Reduced awareness of the environment:

- An inability to stay focused on a topic or to change topics.
- Wandering attention.
- Getting stuck on an idea rather than responding to questions or conversation.
- Being easily distracted by unimportant things.
- Being withdrawn, with little or no activity or little response to the environment.