Chapter 1

What is delirium in critical care?

Introduction

Imagine you are caring for a critically ill patient admitted with severe community-acquired pneumonia. Unfortunately, this evolves rapidly with severe sepsis that results in both cardiovascular and respiratory failure. You know the patient has haemodynamic failure because you are monitoring the blood pressure and heart rate. You know the patient has respiratory failure because you are monitoring the respiratory rate and the oxygen saturation. You treat the patient with antibiotics, ventilatory support, fluids and inotropes.

He gets better, a job well done.

But what about the brain?

Just like the other organs, the brain can acutely fail in critical illness. An acute episode of brain failure is recognized as delirium. Delirium is an acute organ failure, and can happen in critical care, the general ward or the community at large. It is common; it is dangerous, even life-threatening. It is all the more dangerous because we know little about it. Its importance has been underestimated in the critically ill

patient. The delirious patient is in an acute confusional state with a fluctuating altered mental status, inattention, an altered level of consciousness, disorganized thinking and often will have hallucinations. The delirium is triggered by an acute medical event, related to drugs or illness.

We therefore need to monitor the brain!

We monitor the patient's organs so we will know how they are functioning and when they are failing. If we do not monitor the brain how will we know if it fails?

But how can we do so?

Any critically ill patient who responds to a verbal stimulus such as calling their name can be screened for delirium in less than two minutes whether intubated or not, on or off sedation.

Delirium is a clinical syndrome and is diagnosed at the bedside, but it is not always easy to recognize. The majority of delirious patients are not agitated, pulling at lines and tubes, climbing out of bed; in fact they are lethargic and sleepy. If you want to know if your patient's brain is healthy you will need to check for function.

Fortunately this is quick and easy.

Does it affect the outcome?

Back to our patient with respiratory failure, 4 months later. He attends the follow-up clinic with his wife. His

wife reports that he can't concentrate; he keeps forgetting friend's names, even those he has known for years. He can't remember where he has left things; all his vitality seems to have gone. Cardiovascular and respiratory functions are back to normal. Heart and lungs cured, brain irreversibly damaged…

Recognizing delirium allows initiation of treatment

Delirium is associated with serious adverse outcomes including death; your delirious patient is a medical emergency.

History

One syndrome, delirium, has been given many names. While Hippocrates is credited with the first description of delirium even he used about 16 different words! Amongst them were *phrenitis* (or frenzy) and *lethargus* and he described patients that would oscillate between the two delirious states. In today's terminology these are now called hyperactive, hypoactive and mixed motoric subtypes. Hippocrates also noted that patients were often fidgety, plucking at the air and at their bedclothes. Clinical signs observed nearly 2500 years ago are still present today – just the bedclothes are different!

The word delirium appears for the first time in *De Medicina*. This document is what is left of a large encyclopaedia compiled by Celsus, a Roman living under the reign of Tiberius (around AD 1). It was only rediscovered

Figure 1.1 Aulus Cornelius Celsus *De Medicina* 1478, Florentine. Courtesy of the Historical Medical Library of The College of Physicians of Philadelphia.

around 1480 in Milan. *De Medicina* was soon widely published, and became one of the most important ancient sources for Renaissance medicine. Celsus used the word delirium to describe mental disorders during fever or head trauma. He reported that wine could be used as part of the treatment when not associated with fever (recognizing alcohol dependence as a possible cause of delirium). The word delirium derives from the Latin *deliro-delirare* that literally means going off track, a sharp description of a wandering brain!

The historian Procopius comes next and has left us a precise description of delirium during the bubonic plague when reporting about a possible epidemic in Constantinople in AD 542:

> For there ensued with some a deep coma, with others a violent delirium, and in either case they suffered the characteristic symptoms of the disease. For those who were under the spell of coma forgot all those who were familiar to them and seemed to lie sleeping constantly … those who were seized with delirium suffered from insomnia and were victims of a distorted imagination.

It was not until the early 1800s that Greiner suggested that clouding of consciousness was the main pathogenic feature of delirium. This led Hughlings Jackson to define consciousness at the turn of the last century, as one function of the central nervous system that could be disturbed by different agents leading to positive and negative signs of disturbance.

Engel and Romano were the first to show that the reduction in the level of consciousness seen in delirious patients could be correlated to electroencephalogram (EEG) activity. This

'unifying' interpretation was based on psychopathological characteristics and concluded that the disturbance in consciousness results in the failure of different cognitive tasks, fluctuating levels of awareness, psychomotor hyper- or hypoactivity, agitation or lethargy. In 1959 they complained that clinicians were ill-equipped to recognize delirium and that more should be done to train them to recognize the problem. They declared that a physician's concerns are to 'protect the functional integrity of the heart, liver and kidneys of his patient but has not learnt to have similar regard for the functional integrity of the brain'.

Dr Lipowski, a Polish-born, Irish-trained psychiatrist who settled in North America, proposed a definition of delirium in 1990 that has been very influential in the most recent psychiatric classifications. Delirium is 'a transient, global disorder of cognition, consciousness and attention regardless of the level of consciousness (awareness) or psychomotor activity that a given patient exhibits which may often change from one extreme to another in the course of a single day'; or a 'transient organic mental syndrome of acute onset, characterized by global impairment of cognitive functions, a reduced level of consciousness, attentional abnormalities, increased or decreased psychomotor activity and disordered sleep–wake cycle' (adapted from Lipowski [1]).

Throughout history delirium has been acknowledged as a serious clinical condition with a poor prognosis. Hippocrates noted 'cases of silent delirium, with restlessness, a changing gaze … are likely to prove fatal'. Also delirium associated with gnashing, meant almost certain death. Philip Barrough

in 1593 noted that it is an incurable and deadly condition in most cases. Importantly he added, that in the rare cases where it did resolve, it might be followed by memory loss and an inability to reason.

Classification

The American Psychiatric Association developed in the 1970s the *Diagnostic and Statistical Manual of Mental Disorders*, better known as DSM, to provide diagnostic criteria for mental disorders. Updated versions have been published, the most common being DSM-III, DSM-IV and DSM-IV-TR (Table 1.1) and these will continue to evolve as new data from research and clinical experience emerge.

The alternative *International Classification of Diseases* (ICD) by the World Health Organization (WHO) has a broader remit as the international standard diagnostic classification for all general epidemiological use, many health management purposes and clinical use. It is now at its tenth revision (ICD-10).

The ICD-10 is overall similar to the DSM, but DSM-IV criteria are in general more inclusive for delirium compared with ICD-10. Both are classifications of mental disorders based on diagnostic criteria, i.e. history, examination and clinical tests, and were compiled from a need to bring order to the chaotic psychiatric terminology, a result of the different theoretical models and 'schools' of thought that have existed for a long period. In practice, the medical literature on delirium almost always quote the DSM-IV criteria.

Table 1.1 Diagnostic criteria for delirium

1. Disturbance of consciousness: Reduced clarity of awareness of the environment with reduced ability to focus, sustain or shift attention
2. A change in cognition: Memory deficit, disorientation, language disturbance or the development of a perceptual disturbance that is not better accounted for by a pre-existing, established or evolving dementia
3. Develops over a short period of time and fluctuates: Usually hours to days. Tends to fluctuate during the course of the day
4. There is evidence that the disturbance is caused by the direct physiological consequences of a general medical condition. History, physical examination or laboratory finding

DSM-IV-TR criteria

The DSM-IV, the fourth edition, was published in 1994 to complement the ICD-10 released in 1992 by the WHO. In 2000 additional descriptive information and corrections were added and this was released as the DSM-IV-TR (TR for text revision). In this vade mecum of neuropsychiatric disorders, the essential characteristic of delirium is considered to be disturbance of consciousness – i.e. reduced clarity of awareness of the environment. This manifests as 'a reduced ability to focus, sustain or shift attention' (or more simply, inattention). In addition the patient should have a change in cognition such as memory deficit, disorientation, language disturbance; or the development of a perceptual disturbance, such as hallucinations or delusional thoughts, that is not thought to be due to dementia either established or developing. So while in practice hallucinations are relatively common in delirium they are not needed for the

diagnosis. What is needed is that the disorder develops over a short period of time, hours to days, and tends to fluctuate. In this way the DSM distinguishes delirium from dementia; with dementia developing more slowly. Finally there must be clinical evidence that the delirium is directly caused by a medical condition.

After establishing the signs and symptoms, the DSM classifies delirium into groups dependent on the presumed cause. These are: delirium due to a general medical condition although the specific condition may not be identified; substance-induced delirium (either intoxication or withdrawal); and delirium due to multiple aetiologies (a group with multiple codes reflecting specific causes thought to be contributory such as viral encephalitis, hyponatraemia). There is a group 'delirium not otherwise specified' for those patients in whom a cause cannot be identified but the diagnostic features are present. This classification differentiates delirium from dementia but it is important to note that patients with dementia are particularly vulnerable to delirium, presenting with delirium superimposed on top of dementia (Table 1.2).

Terminology in critical care

In 1990, over 30 terms used to refer to delirium were identified in the medical literature (Figure 1.2). It is tempting to bring back terms such as 'subacute befuddlement' or maybe 'dysergastic reaction' but of course it is unlikely this would lead to intensivists taking delirium more seriously. Critical care lent its name to ICU psychosis and ICU

Table 1.2 Broad division of delirium as per DSM-IV-TR classification

Name	Comments
General medical condition	Specific cause does not need to be identified if evidence for medical disorder present
Substance-induced	Intoxication or withdrawal
Multiple aetiologies	More than one cause identified
Not otherwise specified	Diagnostic criteria present, no cause identified

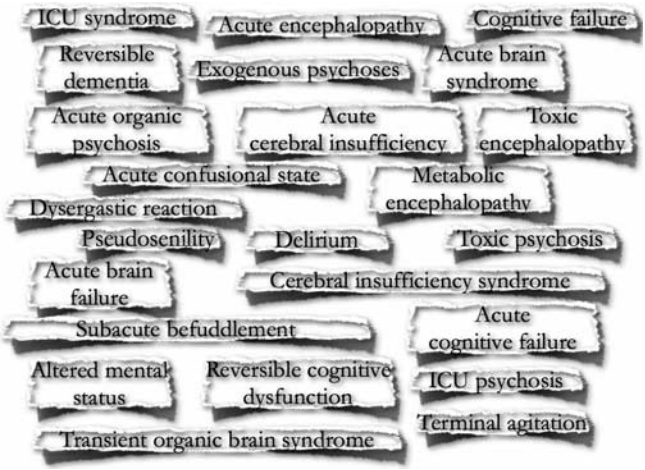

Figure 1.2 Non-exhaustive list of some of the numerous terms used to refer to delirium.