Delirium: an update on diagnosis, treatment and prevention

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Clin Med 2006;6:540–3

Delirium (or acute confusional state) has been recognised as a mental disorder with serious adverse outcomes for thousands of years. Consistent descriptions of the condition have appeared in the medical literature from the time of Hippocrates. It is even described frequently in fictional literature, epitomising serious illness and often portending death. Despite this long history, delirium has been relatively neglected in healthcare settings. Clinicians consistently underdiagnose it and vary greatly in its management.[1] Even worse, it is recognised that healthcare systems and services frequently have attributes that unintentionally precipitate or worsen delirium.[2,3] Some of these include frequent changes of environment, routines which disrupt normal day/night rhythms (with a lack of exercise during the day and disturbance from noise and light at night) and exposure to infection risks.

There is little published research: as an illustration, a word search for 'delirium' (excluding delirium tremens) on the Medline database (from 1966 to end of May 2006) yielded 3,181 results compared with 47,349 for myocardial infarction and 46,836 for stroke. Research has historically been impeded by difficulties in case definition and lack of agreement on diagnostic tools, as well as the problems inherent in studying patients who are often debilitated and lack mental capacity.[1,4]

This situation is improving following the publication of broadly similar ICD 10 and DSM IV criteria and greater consensus in diagnostic methods. There are still few trials of interventions for delirium, but taken together the evidence base is now sufficiently robust to provide clear directions for clinicians in detection, management and prevention of delirium.[2]

Key Points

- **Delirium is extremely common in a range of hospital and community settings and is often missed by healthcare professionals**
- **Prevention of delirium is feasible and can improve outcomes**
- **Because delirium is so common and has serious outcomes, all healthcare staff should be trained in its prevention, screening and detection**
- **Systematic screening for cognitive impairment should be carried out in all older people admitted to hospital**

KEY WORDS: acute confusional state, confusion, delirium, management, prevention, review

Clinical features

Delirium is characterised by four core features (Table 1). Symptoms usually appear over hours to days. There may be a prodromal phase with mild disturbance which resolves or progresses to a more florid presentation. Disturbance of the sleep-wake cycle is common; symptoms often first occur at night, with reduction of sleep, disorientation and agitation. A reduced ability to focus, sustain or shift attention may account for the cognitive deficits. Emotional disturbances are also common and include emotional lability, fear, anxiety and depression. Disorders of thought frequently include delusions of persecution. Perceptual disturbances can include distortions, illusions or frank hallucinations.[1,3] Delirium may be overlooked if delusions or hallucinations are prominent in relation to disturbance of consciousness or cognitive deficit.

Three subtypes of delirium are distinguished by psychomotor disturbances:

- hyperactive, characterised by increased arousal and agitation
- hypoactive, with withdrawal and decreased activity (more common)
- a mixed form.

The overall presentation may be determined by a range of influences such as the nature of the underlying disorder, personality, premorbid psychiatric disorder, current interpersonal relationships, events and surroundings.[1]

Occurrence and outcomes

Reporting of delirium prevalence and incidence varies considerably due to methodological differences between studies. However, delirium is known to be extremely common in a range of hospital and community settings:[5]

- in up to 10% of patients presenting to emergency departments and

Table 1. DSM IV diagnostic criteria for delirium.

1	Disturbance of consciousness (ie reduced clarity of awareness of the environment), with reduced ability to focus, sustain or shift attention
2	Change in cognition (eg memory deficit, disorientation, language disturbance) or development of perceptual disturbance not better accounted for by pre-existing, established or evolving dementia
3	The disturbance develops over a short period of time (usually hours to days), tending to fluctuate during the course of the day
4	Evidence from the history, physical examination or laboratory findings that the disturbance is caused by the direct physiological consequences of a general medical condition

10–30% of all admissions to general hospitals
- in a third or more of inpatients in general medical settings[6]
- it is also common in surgical inpatients, occurring in almost two-thirds of hip fracture patients
- in over half of all admissions to intensive care units and in advanced cancer and palliative care[5]
- there are only a few studies of delirium in social care institutions, but studies in old peoples' and nursing homes have found surprisingly high rates (60%)
- in all settings, it is associated with increasing age, the very elderly being at greatest risk.[5]

Serious adverse outcomes for delirium have been demonstrated, with increased mortality, functional decline, institutionalisation and length of hospital stay. It is usually considered to be a transient condition but symptoms can persist for at least a year and long-term cognitive decline has been demonstrated.[5] The negative impact of delirium on carers and staff is also recognised.

Risk factors

A range of predisposing and precipitating factors have been identified (Table 2).[1,3,5] It is notable that many of the modifiable factors are prevalent in health and social care institutions. The extent to which they are ameliorated is related to the quality of care in such settings.[3]

Screening

About two-thirds of delirium is currently missed by nurses and doctors.[2,4] This may be partly because of expectations that it only presents with agitation and hyperarousal, leading to failure to detect the hypoactive form. Delirium symptoms fluctuate so it can be missed if assessments take place during lucid intervals and are not repeated.

With such high incidence and prevalence rates, detection and management clearly cannot rely on referral to specialist services such as liaison psychiatry or consultation geriatrics alone; the whole team will need to be skilled up to recognise delirium, with referral only of more complex or behaviourally challenging presentations.[6]

Detection of delirium can be improved by educational programmes and implementation of systematic screening for cognitive impairment using standardised tools. The effectiveness of systematic detection and treatment has been demonstrated in improving outcomes for delirium in surgical settings.[7] Routine screening should be carried out in all older patients admitted to hospital using tools to detect cognitive impairment such as the Mini-Mental State Examination.[2,3]

Diagnosis

Given its fluctuating course, the diagnosis of delirium must combine bedside observation with an informant history from nursing staff and carers (who are more likely to note changes over the course of the day). Different types of healthcare professionals can make an accurate diagnosis using structured instruments such as the Confusion Assessment Method. This is a brief and reliable screening and diagnostic tool which can be used in a variety of settings. Repeated assessments predictably increase detection.

Differential diagnosis

The differential diagnosis includes depression and dementia. With considerable overlap in symptoms, delirium may be confused with dementia and can be particularly difficult to distinguish from Lewy-body dementia (in which visual hallucinations and cognitive fluctuation also occur).[1] Dementia is in fact the strongest risk factor for delirium; its presence increases the risk fivefold.[5] The distinction is important, given the considerably poorer outcomes for dementia associated with superimposed delirium. A reasonable approach may be to assume that all new cognitive or behavioural problems are due to delirium until a thorough search excludes any underlying medical illness or drug toxicity.

Treatment

The Royal College of Physicians and the British Geriatric Society have recently

Table 2. Delirium risk factors.

Predisposing factors	Precipitating factors
Older age	Immobility
Male	Dehydration
Dementia	Anticholinergic or psychoactive medication
Previous delirium	Use of bladder catheter
Infections	Use of physical restraint
Dehydration	Hypoxia
Polypharmacy	Intercurrent illness
Severity of illness	Malnutrition
Comorbidity	Change of environment
Impaired ADL and mobility	
Surgery	
Alcohol excess	
Visual impairment	
Hearing impairment	
Depression	
Renal failure	
Hypoalbuminaemia	
Hypokalaemia	

ADL = activities of daily living.

completed an update of comprehensive evidence-based national guidelines.[2] The most important action in delirium management is the timely search for underlying causes, their identification and treatment. Delirium may frequently be the sole manifestation of serious underlying disease, particularly in older people.[3] Some common potential causes are listed in Table 3 and appropriate investigations for delirium in Table 4.

Management should also be directed at the relief of symptoms and strategies to minimise aggravating factors, essentially incorporating simple – commonly neglected – good practice measures. These address individual patient risk factors (Table 5) and reduce the propensity of the environment to worsen delirium by providing a good sensory environment, appropriate lighting levels, adequate signs, continuity of care and minimising change.[2,3]

Multicomponent interventions for treatment

Given its multifactorial and diverse aetiology, simple interventions for delirium are likely to be only limited in their impact. Thus, a multicomponent approach targeting change to clinical practice at individual and organisational levels seems most appropriate. In a non-randomised controlled study (non-RCT), an educational programme combined with reorganisation of nursing and medical care was effective in reducing duration of delirium, length of hospital stay and mortality.[8] However, two RCTs did not demonstrate effectiveness of an intensive medical and nursing consultation intervention.[9,10]

Sedation

Delirium should be managed using the least restrictive options. Provision of a side room, one-to-one care or information and help from relatives can often reduce agitation or wandering. The use of sedation and major tranquillisers should be kept to a minimum.[2,3]

When necessary to manage distressing or dangerous behavioural disturbance, one drug should be used with dosage kept to a minimum. Haloperidol is the preferred option, 0.5 mg orally up to two hourly (if not possible, 1–2 mg intramuscularly), with a maximum dose of 5 mg in 24 hours (rarely, this may need to be exceeded, depending on severity of symptoms and previous neuroleptic use).[2] Atypicals such as risperidone have been suggested as an alternative: one randomised trial comparing haloperidol

Table 3. Potential causes of delirium.

Infection (eg UTI or pneumonia)
Cerebrovascular illness (eg stroke)
Cardiovascular disorder (eg MI)
Respiratory disorder (eg pulmonary embolus, COPD)
Neurological problems (eg epilepsy, encephalitis)
Constipation
Urinary retention
Drug side effects or interactions
Drug or alcohol withdrawal
Electrolyte imbalance
Endocrine and metabolic disorder
Uncontrolled pain
A combination of causes

COPD = chronic obstructive pulmonary disease; MI = myocardial infarction; UTI = urinary tract infection.

Table 4. Investigations for delirium.

Routinely indicated	Full physical examination including assessment of cognitive function (MMSE or AMT) Full blood count CRP Urea and electrolytes Glucose Calcium LFTs Chest X-ray ECG Urinalysis Blood cultures Pulse oximetry
May be indicated depending on findings from history and examination	Arterial blood gases Vitamin B12 and folate Thyroid function tests Specific cultures (eg sputum, urine) CT of the head Lumbar puncture EEG

AMT = Abbreviated Mental Test; CRP = C-reactive protein; CT = computed tomography; ECG = electrocardiography; EEG = electroencephalography; LFT = liver function test; MMSE = Mini-Mental State Examination.

Table 5. Simple, commonly neglected measures to address risk factors for delirium.

Maintaining orientation by using clocks, clear signs, repeating information about time and date
Ensuring glasses and hearing aids are available and used
Avoiding dehydration by encouraging oral intake or ensuring iv fluids are adequate
Checking for pain and giving adequate analgesia
Avoiding catheterisation
Avoiding constipation
Reviewing medication and avoiding anticholinergic drugs
Minimising infection risk (eg hand washing)
Encouraging mobilisation
Limiting room and staff changes

iv = intravenous.

and risperidone showed similar effectiveness and no difference in adverse outcomes.[11] Clinical experience with these agents is more limited and there are concerns about their safety in dementia.[3]

Benzodiazepines should generally be avoided because they may worsen delirium, but they may be necessary to control severe sleep disturbance. They are an alternative to antipsychotics in patients with Lewy-body dementia or Parkinson's disease.[2,3]

Prevention of delirium

Most evidence for successful interventions for delirium has been for preventive programmes, targeting multiple risk factors. Inouye *et al* intensively screened and addressed patient risk factors in medical inpatients and demonstrated a 40% relative risk reduction in delirium incidence with improved outcomes.[12] A trial in which surgical patients were visited pre-operatively to make recommendations to the surgical team achieved a reduction of over one-third in delirium.[7] Recognition and modification of risk factors seems to be the most effective approach to managing delirium.

Guidelines

Dissemination of delirium protocols and guidelines has so far been disappointing due to problems with adherence. Guidelines usually consist of a daunting list of 'do's' and 'don'ts'. Successful implementation requires changes to professional practice not only at individual but also at organisational and policy levels. Such wide-ranging changes can be effected only by careful attention to mechanisms to increase uptake and adherence. These include involving key stakeholders in developing guidelines and in decisions to implement them, as well as education, audit and feedback.[13] Inouye *et al* showed that adherence plays an important independent role in the effectiveness of intervention.[14] Educational programmes using interactive teaching methods have been successful in improving delirium management.[15] Specialist services such as liaison psychiatry may also have a role here through education and role modelling.

Conclusions

Although long neglected, delirium is now gaining recognition as a significant problem in clinical and research settings. Evidence for specific interventions to improve management is limited but, from what is known, we can be confident that improved outcomes can be delivered with systematic screening in elderly hospital admissions and attempts to modify common risk factors.[3] Delirium cannot be confined to the remit of specialist consultation services but must be the concern of all staff on a unit.[6] Education and training to skill up the whole team should be available. Moreover, as many of the strategies to improve management are essentially good practice measures, targeting delirium also presents an opportunity to drive up the quality of care offered to all patients.

Conflicts of interest

None.

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