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Delirium: assessment and prevention

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Overview

- what is delirium?
- epidemiology
- causes
- assessment and delirium screening
- approaches to prevention
- management
- outcomes



Why is delirium important?

- common presentation of illness in older people
- unpleasant experience for patients (and their families)
- causes distress or difficult behaviour
- serious consequences
- may be partly preventable
- slow recovery, high mortality, impact on function
- increasing public awareness



What is delirium?

... a decompensation of cerebral function in response to one or more pathophysiological stressors

(EDA & ADS, 2014, *BMC Medicine*)



History (4000 years in one slide)

- association of fever with altered behaviour has been known since ancient times
- the term 'delirium' was used more widely during C18 and 19
- overlap with 'insanity'
- gradually became separate with increasing focus on symptoms such as confusion, attention, altered cognition etc
- in mid C20, multiple competing terms
 - e.g. acute confusional state, acute brain failure, encephalopathy, ICU psychosis
- DSM-III (1980) adopted delirium as a single term



ICD10

- impairment of consciousness and attention
 - global disturbance of cognition
 - includes memory, orientation, perceptual disturbance (hallucinations)
 - psychomotor disturbance
 - hyper- or hypo-activity, or a mixture of both
 - disturbed sleep-wake cycle
 - emotional disturbance, e.g. fear, irritability, apathy
- also: rapid onset, diurnal fluctuation, course of <6 months



DSM5

- disturbance in attention and awareness
- change in cognition
 - over and on top of any pre-existing dementia
- develops over a short period (usually hours to days), tends to fluctuate during the course of the day
- appears to be caused by a direct physiologic consequence of a general medical condition, an intoxicating substance, medication use, or more than one cause



ICD10 v DSM5

- the 6 months criterion in ICD10 looks out of date
- ICD10 excludes intoxication with psychoactive substances
- DSM5 avoids using the word 'consciousness'
 - instead emphasises 'attention' and 'arousal'
 - arousal = level of consciousness
 - attention = content of consciousness
 - therefore, need sufficient arousal before attention can be assessed
- DSM5 also requires evidence of a direct cause



In short

- disturbance of consciousness (level and content)
 - this feature is crucial in making a distinction from dementia
- acute onset, often fluctuating
- cognitive, perceptual and emotional changes
- due to an underlying physiological disturbance



How common?

- most prevalence studies are in hospitals
 - community prevalence is low, associated with dementia and care homes
- in hospital, associated with older age and dementia
- around 15-20% of adult in-patients
- but much higher in certain groups
 - e.g. acute medical admissions, hip fractures, intensive care, palliative care, patients with known or undiagnosed dementia
 - may be over 50% in some settings



Causes of delirium 1

Various hypotheses of underlying pathophysiology:

- direct toxic brain insults
- neurotransmitters, mainly acetylcholine disturbance
- neuro-inflammation and exaggerated sickness behaviour
- oxidative stress
- neuroendocrine (hypothalamic-pituitary-adrenal (HPA) axis)
- melatonin dysregulation



Causes of delirium 2

- innumerable!
- in many (most?) cases, more than one cause may be present
 - difficult to determine the relative contribution of any one factor to the overall picture
- in about 15-20% of cases, despite investigations, no clear cause is identified
- finding a cause is harder in complex cases
 - e.g. multimorbidity, frailty, agitation, dementia, dying patients
- simply ascribing undiagnosed cases to urinary tract infections is not good practice



Causes of delirium 3

A conventional list includes:

- brain diseases
- infections
- drugs and/or drug withdrawal
- hypoxia
- metabolic disorders
- acute severe illness, e.g. myocardial infarction
- post-operative
- trauma (head injury, hip fracture)
- etc etc



Causes of delirium 4

A less conventional but more realistic list:

- meds
- meds
- meds
- infections
- hypoxia
- metabolic
- brain diseases
- some combination
- something else

after Rockwood (2001), courtesy of Prof Rowan Harwood

Diagnosing delirium

- high index of probability in high risk groups
 - patients aged 80+, people with dementia, hip fractures, intensive care
- initial assessment and ongoing observation
- delirium screening
- investigations aimed at identifying underlying causes
- hypoactive delirium is easy to overlook as patients do not demand attention



Assessment

- history should include talking to relatives about recent events
 - dementia, previous episodes of delirium
- mental state examination of patient
 - including cognitive testing
- look for key features of delirium
 - especially level of alertness
 - ability to maintain and switch attention appropriately
 - evidence of perceptual disturbance
 - changes in affect and mood



Delirium screening

- SQiD: the Single Question in Delirium
 - ‘Do you feel your relative has been more confused lately?’
 - however, this is more like a useful question than a proper screening method
- tests for arousal
 - the most basic is whether you can wake the patient up!
- tests for attention
 - e.g. months of the year backwards (doesn't rely too much on educational level)
- brief instruments for delirium
 - Confusion Assessment Method (CAM) (Inouye et al, 1990)
 - The 4AT (MacLulich et al, 2019)



Confusion Assessment Method (CAM)

The Confusion Assessment Method (CAM) Diagnostic Algorithm

Feature 1: *Acute Onset or Fluctuating Course*

This feature is usually obtained from a family member or nurse and is shown by positive responses to the following questions: Is there evidence of an acute change in mental status from the patient's baseline? Did the (abnormal) behavior fluctuate during the day, that is, tend to come and go, or increase and decrease in severity?

Feature 2: *Inattention*

This feature is shown by a positive response to the following question: Did the patient have difficulty focusing attention, for example, being easily distractible, or having difficulty keeping track of what was being said?

Feature 3: *Disorganized thinking*

This feature is shown by a positive response to the following question: Was the patient's thinking disorganized or incoherent, such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject?

Feature 4: *Altered Level of consciousness*

This feature is shown by any answer other than "alert" to the following question: Overall, how would you rate this patient's level of consciousness? (alert [normal]), vigilant [hyperalert], lethargic [drowsy, easily aroused], stupor [difficult to arouse], or coma [unarousable])

The diagnosis of delirium by CAM requires the presence of features 1 and 2 and either 3 or 4.

The 4AT



The 4A Test: screening instrument for cognitive impairment and delirium

(label)

Patient name: _____

Date of birth: _____

Patient number: _____

Date: _____ Time: _____

Tester: _____

[1] ALERTNESS

This includes patients who may be markedly drowsy (eg. difficult to rouse and/or obviously sleepy during assessment) or agitated/hyperactive. Observe the patient. If asleep, attempt to wake with speech or gentle touch on shoulder. Ask the patient to state their name and address to assist rating.

CIRCLE

Normal (fully alert, but not agitated, throughout assessment)	0
Mild sleepiness for <10 seconds after waking, then normal	0
Clearly abnormal	4

[2] AMT4

Age, date of birth, place (name of the hospital or building), current year.

CIRCLE

No mistakes	0
1 mistake	1
2 or more mistakes/untestable	2

[3] ATTENTION

Ask the patient: "Please tell me the months of the year in backwards order, starting at December." To assist initial understanding one prompt of "what is the month before December?" is permitted.

CIRCLE

Months of the year backwards	Achieves 7 months or more correctly	0
	Starts but scores < 7 months / refuses to start	1
	Untestable (cannot start because unwell, drowsy, inattentive)	2

[4] ACUTE CHANGE OR FLUCTUATING COURSE

Evidence of significant change or fluctuation in: alertness, cognition, other mental function (eg. paranoia, hallucinations) arising over the last 2 weeks and still evident in last 24hrs

CIRCLE

No	0
Yes	4

4 or above: possible delirium +/- cognitive impairment
 1-3: possible cognitive impairment
 0: delirium or cognitive impairment unlikely (but delirium still possible if [4] information incomplete)

4AT SCORE

- Alertness
- AMT4: Cognition
- Attention: months of year
- Acute change: SQiD

max score = 12

4+ = possible delirium and/or cognitive impairment

compared to CAM, the 4AT has higher sensitivity and lower specificity, so ?4AT is the better choice for screening

<https://www.the4at.com/>

Investigations

- blood tests
 - full blood count, electrolytes, calcium, inflammatory markers, renal and liver function
- chest X-ray, ECG
- cultures (urine, blood, CSF etc) if infection suspected
- neuroimaging (CT or MRI) often performed (but diagnostic yield tends to be low)
- other investigations, as indicated
- review of medication, including over-the-counter drugs
 - alcohol and illicit substances
 - use of anticholinergic burden scales to assess delirium risk



Differential diagnosis

- fluctuations in Lewy body dementia
- stepwise deterioration in vascular dementia
- intoxication
- coma
- post-ictal states
- rapidly progressive neurological conditions
 - e.g. Creutzfeld-Jakob disease
- functional psychosis
- decompensation of dementia in unfamiliar environment



Prevention and management of delirium

- prevention is the best form of management
- this may not be possible if delirium already present
- however, there is considerable overlap between measures for prevention and treatment



Prevention: non-pharmacological interventions

- usually used as multicomponent interventions
- appear to be effective (risk ratio = 0.69) (Siddiqi et al, 2016)
- recommended in national guidance (NICE, 2010)
- however, the content of these vary so an optimal strategy is not yet available
- elements include: e.g. early mobilisation, re-orientation, attention to nutrition and hydration, sleep hygiene, reducing sensory deprivation
- cautionary note: strategies do not seem to affect long-term outcomes



Attention to the care environment

- Goldberg et al (2013) *BMJ*, 347:f4132
Care in specialist medical and mental health unit compared with standard care for older people with cognitive impairment admitted to general hospital: randomised controlled trial
- led to improved patient experience and carer satisfaction
- but no effect on health status or service use
 - perhaps due to the advanced age and frailty of the patients, therefore resembled an end of life study
- https://www.youtube.com/watch?v=kp_rGKFAiBI



Pharmacological interventions for prevention

- cholinesterase inhibitors: no evidence for effectiveness
 - treatment trial of rivastigmine was stopped because of excess deaths in treatment group (van Eijk et al, 2010)
- other drugs, e.g. antipsychotics, melatonin: no evidence of effectiveness
- one trial of dexmedetomidine (α -2 agonist) in ICU had modest effects
- overall, no drug can be recommended for delirium prevention



Management of delirium

- mainly based on custom and practice rather than hard evidence
- general approach along the lines of Comprehensive Geriatric Assessment (CGA)
 - medical, functional, mental health, social and environmental aspects



Principles of management

- treat underlying cause, if identified
- appropriate supportive care (hydration, nutrition, psychological support etc)
- maintain or improve function
- avoid complications, e.g. falls, pressure sores, aspiration, injury
- engage families
- wait for improvement as recovery may be slow



Delirium and decision making

- obviously delirium may affect a patient's mental capacity
 - their ability to understand and give or withhold consent to care & treatment
- can treat a patient who lacks capacity
 - the relevant law in England is the Mental Capacity Act 2005
 - can use the concept of 'best interests' to make treatment decisions
 - this generally involves consulting with pt's family
 - take into account any advance directives or statements of pt's prior wishes
 - this may be important in terms of refusing treatment
- capacity can fluctuate
 - therefore use moments of lucidity if they occur



Delirium awareness

- often limited among patients' families, in which case sudden change in behaviour may be very distressing
 - therefore time is needed for explanation
 - families may contribute, either by giving useful information or becoming involved in care
- also low among many hospital staff
- therefore, considerable need to raise delirium awareness among public and staff working with older people
- requires good printed and online information, also campaigns
e.g. World Delirium Day



Behavioural and psychological symptoms

- many behaviours reflect the patient's distress
 - e.g. 'wandering', shouting and calling out
- or their misinterpretation of the situation
 - e.g. aggressive resistance to care, assaulting other people in room
- person-centred approach to care is essential
- also attention to communication
 - keep things simple
 - see the world from the patient's viewpoint
 - be encouraging, avoid confrontation
 - non-verbal communication often at least as important



Pharmacological treatment of delirium

Antipsychotic drugs often used:

- no hard evidence that low-dose antipsychotics prevent or shorten episodes of delirium
- in many cases, psychotic symptoms (delusions, hallucinations, misidentifications) don't require drug treatment
- could be used in acute behavioural disturbance but benzodiazepines (lorazepam) seem to be preferred
- don't forget that this group of drugs can have very serious side effects in frail older people (sedation, falls, stroke, death)



Antipsychotics for treatment of delirium

Reviewed by Nikooie et al (2019)

- 16 RCTs and 10 observational studies
- no difference between haloperidol or second-generation antipsychotics vs. placebo for:
 - sedation
 - delirium duration,
 - hospital length of stay
 - mortality
- no difference for haloperidol vs. second-generation antipsychotics or in direct comparisons of different second generation antipsychotics
- therefore, antipsychotics cannot be recommended in routine treatment of delirium



Other drugs

- Cholinesterase inhibitors: no evidence of effectiveness (Yu et al, 2018)
 - NB also Van Eijk et al (2010) rivastigmine trial
- Some forms of delirium require drug treatment
 - alcohol withdrawal (benzodiazepines)
 - Wernicke's encephalopathy (thiamine)
 - auto-immune and inflammatory encephalopathies (often steroids)



Outcomes of delirium

- increased mortality
 - approx. x2 (95% CI 1.5-2.5) adjusted for comorbidity and frailty
- increased hospital complications
 - falls, dehydration, aspiration, pressure sores
 - increased length of stay
 - less likely to return to own home:
 - x2 increased risk of institutionalisation
- increased costs of care



Outcomes 2

Delirium may persist:

- 30% of cases last >1 month
- 20% >6 months, most of these do not fully recover

Reasons for persisting:

- recurrent or persisting cause
- multiple causes
- evolves into dementia
- mistaken diagnosis, e.g. Lewy body dementia



Outcomes 3: cognition

- hospital cohort studies show strong association with dementia at follow-up
 - however, this may not take account of dementia that was present but not diagnosed before admission
 - hospital cohorts may be biased towards more severe delirium with worse outcomes
- anecdotal evidence suggests that delirium may have led to irreversible change
- more recent studies of cognitive decline show delirium associated with cognitive decline
 - mechanism is unclear ?makes more evident the effects of existing brain pathology rather than causing accelerated β -amyloid etc



Resources

- Alzheimer's Society <https://www.alzheimers.org.uk/get-support/daily-living/delirium>
- I Can Prevent Delirium video <https://vimeo.com/166857802>
- NICE (2010) Delirium guidelines <https://www.nice.org.uk/guidance/CG103>
- NICE guide for care home managers contains many general points in accessible form <https://www.nice.org.uk/Media/Default/About/NICE-Communities/Social-care/quick-guides/Delirium-quick-guide-1.pdf>





'The effect was mind-blowing,' says Ian. 'I didn't realise how dramatic a change it could be. It was like he wasn't my dad – he was a completely different person.'

'He was a reasonably quiet and private man who was calling out in the [hospital](#). We found him lying at 90 degrees across the bed or trying to push himself out of it.'

'I was unprepared for the franticness of it all.'

<https://www.alzheimers.org.uk/dementia-together-magazine/april-may-2018/deliriums-impact>

'He would get obsessed with particular things, like the radiator near his bed,' says Ian. 'For a period he was fascinated about France and his sister-in-law who was over there.'

'It was very distressing, seeing a completely different character within the same person. I was balancing the emotion of seeing my father like that with having to keep stable because Mum was there too.'

It was a very tough time for Ian and his family.

'When Dad went home from hospital in July 2014 I went back to my parents' house thinking I would only be lending a hand for a couple of months. But for 20 months I lived there,' he says.

Conclusions

- delirium is a common and serious clinical syndrome especially in older patients
 - people with dementia and/or frailty are at very high risk
- prevention is worthwhile but not always possible
- management is about finding cause of delirium and supporting the patient
- outcomes are often poor
- frequently persists and associated with subsequent cognitive decline
- staff training and public awareness are essential



Thank you!

Please remember to fill in your evaluation form

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