

Doctors in Training

What you need to know about: delirium in older adults in hospital

Howell T Jones<sup>1,2</sup>, Daniel HJ Davis<sup>1,2</sup>

<sup>1</sup>NHS Foundation Trust, University College Hospital, University College Hospital, London, UK

<sup>2</sup> MRC Unit for Lifelong Health and Ageing at UCL, London, UK

Correspondence to: Howell T Jones (howell.jones@ucl.ac.uk)

Abstract

Delirium is a clinical syndrome characterised by disturbed perception, consciousness and/or cognitive function, which has an acute onset and fluctuating course with a severe deterioration arising over hours or days. Delirium is usually triggered by a combination of influences including acute illness, surgery, drugs and environmental factors. It is commonly seen in older people presenting to hospital but can also develop while hospitalised. There are three types of delirium: hypoactive, hyperactive and mixed. All patients over 65 years old presenting to hospital should be screened for delirium using the '4AT' tool. An alternate method for the diagnosis of hospital-acquired delirium is described.

This article outlines a 10-stage method for diagnosing, managing and preventing delirium, with emphasis on what areas of the history and examination should be prioritised, what the salient investigations are and both non-pharmacological and pharmacological approaches to prevent and treat delirium. Finally, this article explores which patients require specialist referrals or investigations and how to best follow up patients with delirium.

Key words Confusion; Delirium; Disorientation; Elderly; Geriatrics; Inattentiveness; Older adult; Older people

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What is delirium?

Delirium is a clinical syndrome characterised by disturbed perception, consciousness and/or cognitive function, which has an acute onset and fluctuating course with a severe deterioration arising over hours or days. Delirium is usually triggered by a combination of influences including acute illness, surgery, drugs and environmental factors (Marcantonio, [2017](#)). Delirium is common among hospitalised individuals, with approximately 20% of adult inpatients having delirium at any one time (Gibb et al, [2020](#); Wilson et al, [2020](#)). Delirium may be present when a person is admitted to hospital (prevalent delirium) or may develop during a hospital admission (incident delirium) (National Institute for Health and Care Excellence, [2010](#)).

The three subtypes of delirium can be distinguished by a person's level of arousal and motor activity. Hypoactive delirium, where patients are drowsy or withdrawn, is the most common form, with 50–70% of cases being hypoactive delirium. However, hypoactive delirium is often missed when compared to hyperactive delirium, where patients are restless or agitated, or the mixed type, where patients fluctuate between the two (Gibb et al, [2020](#)). Predisposing factors include cognitive impairment, frailty and severity of illness (Ahmed et al, [2014](#)).

If an older person presents confused, it can be challenging to discriminate between delirium and dementia. It is best to assess for delirium so an acute illness is not missed or overlooked. Delirium is distressing for patients and their families, but is also associated with increased morbidity and mortality, prolonged hospital stays, increased likelihood of being discharged to a care home and with developing dementia (McCusker et al, [2003](#); Kiely et al, [2009](#); Davis et al, [2012](#); Wilson et al, [2020](#)). It can take a long time to fully recover from delirium and, in some cases, it never completely resolves (Marcantonio, [2017](#)).

National guidance advises that all patients 65 years old and over should be screened for delirium on presentation to hospital (National Institute for Health and Care Excellence, [2010](#); Scottish Intercollegiate Guidelines Network [2019](#)). The 4AT tool (available from [www.the4AT.com](http://www.the4AT.com)) is currently recommended to screen for delirium (Bellelli et al, [2014](#)).

Figure 1. 4AT Assessment tool for the diagnosis of delirium ([www.the4AT.com](http://www.the4AT.com)) (Bellelli et al, [2014](#)).

- 1 Alertness
  - 0 – Normal (fully alert but not agitated)
  - 0 – Mild sleepiness for <10 seconds after waking then normal
  - 0 – Clearly abnormal
- 2 Abbreviated Mental Test 4 (AMT-4) (age, date of birth, place, year)
  - 0 – No mistakes
  - 1 – One mistake
  - 2 – Two or more mistakes, or untestable
- 3 Attention
  - Ask patients to say the months of the year backwards from December
  - 0 – Achieves 7 or more months correctly
  - 1 – Starts correctly but scores <7 months or refuses to start
  - 2 – Untestable (cannot start because unwell, drowsy, inattentive)
- 4 Acute change or fluctuating course
  - 0 – No
  - 4 – Yes

Total

4+ – Possible delirium and/or cognitive impairment

1–3 – Possible cognitive impairment

0 – Delirium or severe cognitive impairment unlikely

The 4AT assessment is the recommended tool when screening for delirium as it is brief, easy to use without specialist training and has been validated in multiple hospital environments such as the emergency department, medical, stroke and surgical wards (De and Wand, [2015](#); De et al, [2017](#); Tiegies et al, [2020](#)). Compared to other screening tools, the 4AT tool performed well for sensitivity and validity when detecting delirium superimposed on dementia (Tiegies et al, [2021](#)). The main limitation of the 4AT tool is that it assesses a single point in time and thus, because of the fluctuant nature of delirium, the 4AT tool may not always successfully diagnose it (MacLulich et al, [2019](#)). Additionally, the 4AT tool can be challenging to use if the patient and the tester do not speak the same language (MacLulich et al, [2019](#)).

To detect and diagnose incident delirium, the Royal College of Physicians advises the use of the National Early Warning Score-2 tool. A parameter of the National Early Warning Score-2 tool assesses a change in the level of consciousness or the presence of new confusion. The presence of these symptoms would score a '3' and would prompt urgent escalation (Royal College of Physicians, [2020](#)). To determine what is 'new confusion' the Royal College of Physicians recommends the National Early Warning Score-2 tool be used in combination with the Single Question to identify Delirium test, which is where an able family, friend or staff member answers 'is the patient more confused than before?' (Sands et al, [2010](#); Royal College of Physicians, [2020](#)). If the answer is 'Yes' the 4AT should then be completed (Royal College of Physicians, [2020](#)).

## Delirium precipitants

The mnemonic 'DELIRIUM' inspired by the American Delirium Society (American Delirium Society, [2015](#)) can be used to help remember the common precipitants (Figure 2).

Figure 2. A mnemonic for the precipitants of delirium (American Delirium Society, [2015](#)).

- Drugs (withdrawal or toxicity, anticholinergics) or Dehydration
- Electrolyte imbalance or Environmental factors (eg ward or staff changes, noise and lighting)
- Level of pain
- Infection (eg chest, urine, skin, or pressure ulcers) or Inflammation (post-surgery) or Impaction of faeces (constipation)
- Respiratory failure (hypoxia or hypercapnia)
- Intracranial event, eg head injury, stroke, seizure, infection or subdural haematoma
- Urinary retention
- Metabolic disorder (hypothyroidism or hyperthyroidism, hypoglycaemia, liver or renal failure) or Myocardial infarction

Drugs which are known to cause delirium include opioids, steroids, benzodiazepines, antidepressants, antipsychotics, anticholinergics and medications used to treat Parkinson's disease and its associated symptoms.

## How to assess for and manage delirium

To explore how to assess and manage delirium, this article will work through a case study (Case study) which follows the structure of a 10-step approach to diagnosing and treating delirium.

## Case study

### Background

Mr Smith is an 80-year-old gentleman with a diagnosis of vascular dementia who lives alone. He has carers attending twice a day. He is usually able to walk with a stick but is reliant on his daughter to do his shopping. Mr Smith's daughter, Theresa, had gone to see him as he was not answering his telephone and found him drowsy at home. She called for an ambulance which took him to the emergency department. Theresa informs the medical team that despite a diagnosis of dementia he can usually converse normally and that he is not his normal self. A 4AT is performed.

When entering the cubicle Mr Smith's eyes are closed and he did not open them when asked. When asked his name he was able to answer after several seconds. He could not answer any of the questions of the Abbreviated Mental Test 4 (AMT-4). When asked to name the months backwards he just repeated December several times then stopped.

Level of alertness = 4 (clearly abnormal - hypoactive)

AMT-4 = 2 (no correct answers)

Months backwards = 1 (able to start but not complete)

Acute change or fluctuation = 4 (acute change as per Mr Smith's daughter)

4AT total score: 11/12

#### Step 1

Mr Smith was unable to provide a history as he was too drowsy. His daughter was able to inform the team about his diagnosis of dementia, his current care package and functional status. She informed them he only takes amlodipine for hypertension. He has no allergies and does not drink alcohol. She had spoken to him the previous day and he was his normal self; however, he had been experiencing constipation for 5 days. There was no evidence at home that he had fallen.

#### Step 2

Mr Smith was responsive to pain with a fever of 38°C. There was no evidence of head or bony injury. He had a palpable bladder on examination of the abdomen and impacted faeces found on rectal examination.

#### Step 3

Mr Smith had an elevated white cell count with neutrophilia and an elevated C-reactive protein. His urea level was raised and his creatinine level was double that of his most recent previous result. Liver function, calcium, glucose and thyroid tests were normal. An electrocardiogram (ECG) showed normal sinus rhythm and a chest radiograph was unremarkable. He was commenced on intravenous fluids to manage acute kidney injury secondary to dehydration.

#### Step 4

A bladder scan confirmed urinary retention and a urinary catheter was inserted with a residual volume of 750 ml. Blood and urine cultures were sent to the laboratory before the initiation of antibiotics for a presumed urinary tract infection caused by water retention secondary to constipation.

#### Step 5

Mr Smith is reviewed on admission by Dr Black, consultant geriatrician, who is happy that the diagnosis is consistent with hypoactive delirium secondary to urinary tract infection. Mr Smith does not meet the criteria for a Computed Tomography (CT) scan of his head at present, but Dr Black requests that it is noted to reconsider this if no improvement is seen after treatment with antibiotics and fluids.

#### Step 6

Dr Black explains to Theresa that her father has delirium as a result of an infection. Theresa asks if this is a sign that his dementia is getting worse and Dr Black explains the difference between delirium and dementia. She also provides Theresa with a leaflet explaining delirium and arranges to meet her the next day to answer any further questions.

#### Step 7

Dr Black arranged for Mr Smith to move directly from the emergency department to a ward especially for older people to prevent him moving wards several times. The nurses supported him with eating and drinking as well as moving him in bed while drowsy to avoid the development of pressure ulcers. They ensured he was orientated and that at night the ward was made as quiet as possible to aid his sleep. The medical team prescribe an enema as well as oral laxatives. Once he was opening his bowels regularly, the catheter was removed. His admission urine culture grew a fully sensitive *Escherichia coli*. Twenty-four hours after admission he was more alert so his intravenous antibiotics were converted to oral ones based on local guidelines. He was seen by the therapy team daily, initially assisting him to sit in a chair to maintain his muscle strength and after 2 days they helped him to begin walking again. Theresa was encouraged to visit as much as possible. With these measures in place, like most patients with delirium, Mr Smith did not require sedation

#### Step 8

Initially Mr Smith is deemed to lack capacity to make decisions about his care so after consultation with his daughter a deprivation of liberty safeguard is applied for. After 3 days of treatment, he regains capacity so the deprivation of liberty safeguard is rescinded.

#### Step 9

Mr Smith did not require a specialist referral.

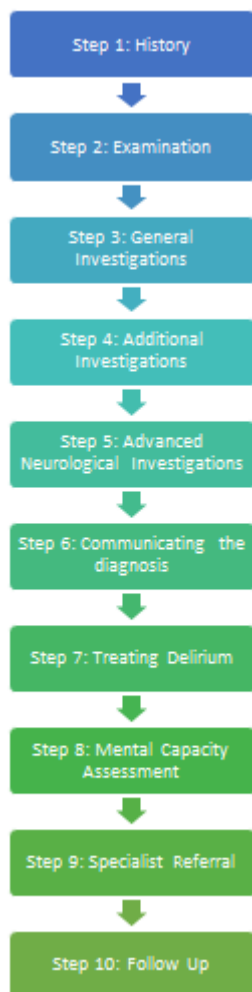
#### Step 10

After 1 week in hospital Mr Smith was ready to return home with reestablishment of his care package. The diagnosis of delirium was clearly documented in his discharge letter which was sent to his GP. Dr Black arranged to review him with Theresa in her outpatient clinic in 4 weeks' time

The 4AT score provided in the above case study suggests Mr Smith has hypoactive delirium. How is the cause of Mr Smith's delirium and the next steps to be taken decided upon?

This article explores how to assess for and manage delirium using a 10-step approach (Figure 3). Recommendations based from the National Institute for Health and Care Excellence (2010) and Scottish Intercollegiate Guidelines Network (2019) guidance are available, as well as current best clinical practice. As a fundamental standard of care is assumed in trials there is little evidence supporting the use of basic investigations (Scottish Intercollegiate Guidelines Network, 2019).

Figure 3. A strategy for assessing and managing delirium.



### Step 1: history

In addition to the standard questions included in any medical history, it is important to obtain as much of the following information from either the patient or from a relative or carer.

1. The cognitive baseline of the patient and if they have a diagnosis of dementia
2. The onset and course of the patient's confusion, and whether they have suffered from previous episodes of delirium
3. Symptoms of hallucinations, delusions or distress
4. Whether the patient suffers from any sensory deficits, such as hearing, sight and speech deficits, and whether any and what aids are used
5. Any symptoms which suggest an underlying cause of the delirium, such as an infection (symptoms would include a fever, cough, dysuria and falls), retention (investigation should cover bowel and bladder habits) and dehydration (questions should address changes to the patients eating and drinking habits)
6. The patient's pre-admission social circumstances and their care package if applicable
7. The functional status of the individual, for example their mobility, transfers and whether ambulation aids are used
8. A full drug history including non-prescribed drugs and allergies
9. An alcohol and illicit drug history.

### Step 2: examination

In addition to a standard examination ensure to:

1. Assess the patient's level of consciousness, for example 'alert, verbal, pain and unresponsive' (AVPU)
2. Take the patient's temperature
3. Conduct a neurological examination including an assessment for head or cervical spine injuries
4. Assess for evidence of fractures including hip and other relevant joint examinations
5. Check for evidence of urinary retention, for example a palpable bladder
6. Check for evidence of constipation and if necessary, consider a rectal examination
7. Check pressure areas and the patient's skin for evidence of ulcers
8. Check for signs of alcohol abuse or withdrawal.

### **Step 3: general investigations**

The following investigations are almost always conducted in patients with delirium to identify the underlying cause:

1. A full blood count to test for anaemia or infection
2. Urea and electrolytes to test for dehydration or electrolyte disturbance
3. Liver function tests
4. C-reactive protein levels to test for infection or inflammation
5. Calcium levels to test for hypo or hypercalcemia
6. Glucose levels to test for hypo or hyperglycaemia
7. Thyroid function tests to check for hypo or hyperthyroidism
8. An electrocardiogram (ECG) to investigate for arrhythmias or ischaemia
9. A chest X-ray to assess whether the patient is suffering from an infection or rib fracture

### **Step 4: additional investigations**

Other investigations may be conducted depending on the findings from the history and examination:

1. Blood cultures if an infection is suspected
2. A coagulation screen if anticoagulation is suspected, or the history found evidence of excessive alcohol abuse and/or chronic liver disease
3. Serum vitamin B<sub>12</sub> and folate concentrations
4. Arterial blood gas if hypoxia or hypercapnia is suspected
5. Urine culture as older people are more susceptible to asymptomatic bacteriuria
6. Other microbiological tests such as sputum cultures, faeces cultures for bacteria and *Clostridium difficile*, and respiratory virus nasal swabs
7. A bladder scan to test for the presence of urinary retention
8. Joint X-rays if there is a concern about fractures
9. Silver Trauma Whole computed tomography body (CT) scan if the patient presents with chest discomfort following a fall. However, this should be carried out at a low threshold (Nickel et al, [2021](#)).

### **Step 5: advanced neurological investigations**

Advanced neurological investigations should only be performed after the involvement of a senior clinician with experience in the management of delirium. CT brain scans should not be routinely performed for patients with delirium as they are unlikely to identify a cause of the delirium or change the management (Theisen-Toupal et al, [2014](#)). Scottish Intercollegiate Guidelines Network ([2019](#))

guidance recommends to proceed with advanced neurological investigations in the following situations:

- When the patient presents with new focal neurological signs
- If the patient presents with a reduced level of consciousness
- If there is a history of recent falls
- If a head injury occurs
- If the person is taking an anticoagulant medication

An electroencephalogram (EEG) should be considered when there is a suspicion of epileptic activity or non-convulsive status epilepticus (Scottish Intercollegiate Guidelines Network, [2019](#)).

A lumbar puncture should not be routinely performed on patients with delirium due to the limited evidence of benefit and the associated risks. Unless, the history and examination findings suggest an infection of the central nervous system including headaches, a fever, photophobia or meningism (Scottish Intercollegiate Guidelines Network, [2019](#)).

### **Step 6: communicating the diagnosis**

When delirium is detected, patients and their family or carers should be informed of the diagnosis and be offered written information. The diagnosis should be clearly documented and communicated to all members of the multidisciplinary team, including typically overlooked staff such as healthcare assistants, porters, culinary workers and domestic staff. This allows them to modify their interactions with the patient in a way that encourages recovery.

### **Step 7: treating and preventing delirium**

Treatment of delirium is often divided into non-pharmacological and pharmacological interventions.

#### Non-pharmacological treatment

The mainstay treatment and prevention is non-pharmacological. Evidence shows that routine care which avoids iatrogenic harm while maintaining physiology and a good psychological environment can both prevent and shorten episodes of delirium (Ludolph et al, [2020](#)). Scottish Intercollegiate Guidelines Network ([2019](#)) highlights the following steps when treating someone with delirium:

- Relieve exacerbating symptoms such as pain, retention, constipation and thirst
- Optimise comorbidities
- Get a pharmacist review of medication and withdraw drugs that could be causing the delirium
- Optimise the environment for example, adjust the lighting and noise of the patient's environment and consider the use of orientation devices
- Avoid non-essential investigations or bed moves overnight to aid a normal sleep cycle
- Prevent complications such as immobility, falls, pressure ulcers, dehydration and malnourishment
- Avoid the use of restraints
- Involve the relatives.

#### Pharmacological treatment



There is insufficient evidence to support the routine use of medications in the treatment or prevention of delirium. However, both National Institute for Health and Care Excellence (2010) and Scottish Intercollegiate Guidelines Network (2019) recognise there may be cases when pharmacotherapy is required:

When to sedate?

Sedation should only be used when de-escalation techniques have been attempted and failed, as sedation can increase the risk of falls and the use of antipsychotics can increase the patient's risk of suffering a stroke. However, there are circumstances when sedation may be necessary including, when conducting essential investigations and/or treatment, when preventing the patient from endangering themselves or others and to relieve distress in highly agitated or hallucinating patients.

Choice of sedation

If sedation is necessary, all prescriptions should be reviewed every 24 hours with clear documentation of the reasons for the initiation and continuation of pharmacotherapy. Prescriptions should be made via the 'as required' section of the drug chart with clear instructions for the nursing staff.

The local hospital guidance takes precedent but Scottish Intercollegiate Guidelines Network (2019) recommends the use of the antipsychotic drug haloperidol as the first line treatment, as haloperidol is licenced for the treatment of delirium (Joint Formulary Committee, 2021). However, if Parkinson's disease, Lewy body dementia, seizures, arrhythmias, heart failure, elongated QTc (>470 ms) or alcohol withdrawal are present, treatment with a benzodiazepine is more appropriate (National Institute for Health and Care Excellence, 2010; Scottish Intercollegiate Guidelines Network, 2019), and unless contraindicated, oral route is the first line administration of medications.

If sedation is necessary, it is better to give small doses frequently rather than larger doses infrequently, and no patients should be discharged on a new antipsychotic medication without a plan for a follow up and review.

Sedation monitoring

If haloperidol is prescribed, an ECG should be performed before and after starting the medication to check for prolonged QTc (>470ms). If it is impractical to perform an ECG, for example the patient is agitated, the use of a benzodiazepine should be considered until an ECG is possible (National Institute for Health and Care Excellence, 2010; Scottish Intercollegiate Guidelines Network, 2019). Patients who are given antipsychotics should be monitored for acute dystonic reactions. This is more common if the intramuscular route is used or if the patient is antipsychotic naïve. If the patient presents with acute dystonic reactions, 5 mg of procyclidine should be given orally or intramuscularly (National Institute for Health and Care Excellence, 2010; Scottish Intercollegiate Guidelines Network, 2019). All sedated patients should have their vital signs monitored regularly.

### **Step 8: mental capacity and 'deprivation of liberty safeguards'**

When a patient has delirium a formal assessment of the patient's capacity as per the Mental Capacity Act, 2005 should be undertaken. If the patient is in England or Wales, they may qualify for a 'deprivation of liberty safeguard' with regards to the decisions of declining care and leaving hospital (Callaghan and Illsley, 2020).

### **Step 9: specialist referral**

If the patient is admitted to hospital under non-medical teams, a referral to geriatric medicine or old age psychiatry should be considered if the diagnosis of delirium is in doubt, for example if the patient presents with non-cognitive symptoms of dementia or if a diagnosis of psychotic depression is suspected. A referral should also be considered if the patient requires significant drug treatment.

### **Step 10: follow up**

The diagnosis of delirium should be communicated to the patient, their family and their GP. Delirium should be coded for in their hospital record to highlight the patient's increased risk for contracting delirium during future admissions. Patients discharged with unresolved delirium should have a plan for follow up either in hospital or with their GP. This is to monitor the symptoms and consider further investigations or treatment in prolonged cases. Those with suspected undiagnosed dementia should be referred to memory services.

### **Conclusions**

Delirium is a common problem in older adults but with screening and early detection it can be successfully managed. Management focuses on the treatment of the underlying cause, supportive care and good communication.

### **Key points**

- All patients over 65 years old who present to secondary care facilities or any adult inpatient who appears more confused should be screened for delirium using the '4AT' tool.
- For older adults who present with confusion, a management and treatment of delirium should be initiated first, rather than labelling the confusion and other symptoms as dementia.
- Computed tomography (CT) brain scans should not be routinely done for the investigation of delirium unless specific criteria is met.
- Non-pharmacological preventive measures for delirium should be undertaken for all older people admitted to hospital.
- Pharmacological agents should not be routinely prescribed to patients who are at risk of delirium.
- Relatives and carers should be informed early regarding the diagnosis of delirium. They should be provided with written information and be granted permission to visit their relative at any time to support them.
- Patients with delirium should have formal capacity assessments completed by an appropriate health care professional, for example the option to refuse medical treatment, and where indicated a 'deprivation of liberty safeguard' should be completed.
- An appropriate follow up with either the patient's GP or an appropriate outpatient appointment should be arranged for patients who have had delirium. For patients with suspected dementia a referral to memory services should be considered.

### **Curriculum checklist**

- Providing continuity of care to medical inpatients, including management of comorbidities and cognitive impairment
- Managing medical problems in patients in other specialties and special cases
- Managing a multidisciplinary team including effective discharge planning

## Conflicts of interest

The authors declare that they have no conflicts of interest.

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