

# A confused and febrile elderly man

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**When an elderly man presents with fever and confusion on a background of likely dementia, a thorough assessment is required to recognise the cause and respond appropriately and promptly.**

**A**s a GP working the local emergency department, you often assess and treat elderly patients presenting with fever and confusion. Sepsis and delirium are important presentations in this age group and often coincide. Recognising and managing both conditions is important because they each have attributable morbidity and mortality.

## The case

One evening, ambulance officers wheel an elderly man into the emergency department. He is shouting and is disorientated. His daughter is accompanying him and very distressed. She says that he has not been well for two days and has been becoming increasingly agitated. She also mentions that he has had a fever today.

You record the patient's temperature (38.4°C), heart rate (130 beats/minute and irregular), respiratory rate (28 breaths/minute) and blood pressure (90/60 mmHg). He has oxygen saturation of 95% on room air. His blood glucose is 9.4 mmol/L.

**Medicine**Today 2017; 18(6): 65-69

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While taking a further history, you insert an intravenous cannula and prescribe a 500 mL bolus of normal saline. You also send blood samples for measurement of venous blood gas, full blood count, electrolytes, creatinine and urea.

## The history

You learn from the patient's daughter that he is 82 years of age and has a history of benign prostatic hypertrophy, hypertension, type 2 diabetes, mild renal impairment, osteoarthritis and atrial fibrillation. She explains that he has been becoming increasingly forgetful over the past two years, and he recently moved in with his daughter and her family because she was concerned about him living alone with deteriorating memory. The memory decline first began with names, but it has become worse in the past year. She performs all the domestic activities of daily living. Her father completes personal care such as showering and toileting but sometimes requires prompting. His GP has informed her that the diagnosis is likely dementia; he has been referred to a cognitive disorders clinic but has not yet attended.

The patient's regular medications include tamsulosin, metformin, perindopril and warfarin, as well as paracetamol as needed. He has no allergies. He worked as a civil engineer but retired 20 years previously; his wife passed away 10 years ago. He has a glass of whisky every night and is an ex-smoker (quit 30 years ago with a 10 pack-year history). He has not travelled recently.

The patient has had urinary tract infections in the past, but the last was three years ago. His daughter does not recall her father describing any urinary symptoms or headache and she has not noticed any diarrhoea. He has not had a cough but she noticed some rapid breathing today. He has not recently commenced any new medication and there has not been any disruption to his normal routine. She has not seen him having any falls; he has not reported any pain. He has not opened his

**TABLE 1. THE PATIENT'S RELEVANT BLOOD TESTS RESULTS**

| Test                       | Result                 |
|----------------------------|------------------------|
| Haemoglobin (g/L)          | 140                    |
| Platelets (cells/L)        | 500 x 10 <sup>9</sup>  |
| White cell count (cells/L) | 25.2 x 10 <sup>9</sup> |
| Neutrophils (cells/L)      | 17.1 x 10 <sup>9</sup> |
| Potassium (mmol/L)         | 3.8                    |
| Sodium (mmol/L)            | 146                    |
| Urea (mmol/L)              | 13.8                   |
| Creatinine (µmol/L)        | 120<br>(baseline ~110) |
| INR                        | 2.3                    |
| Lactate (mmol/L)           | 1.4                    |

bowels in three days. He is not receiving any immunosuppression. He is up to date with influenza and pneumococcal vaccinations.

### Physical examination

On general observation you notice that the patient is pulling at his bedsheets and is unable to maintain attention. He does not answer your questions but is not aggressive. He repeatedly asks where he is and what is happening, so you reorientate him. He is moving his head freely without any neck stiffness. You palpate an irregularly irregular radial pulse. He seems to be more settled when his daughter is present, so you ask her if she will sit beside her father while you examine him. She readily agrees.

The patient's chest is clear and his abdomen is soft with some mild suprapubic tenderness but no renal angle tenderness. His heart sounds are dual with no murmur, and there is no rash. He has no areas of cellulitis and no pressure sores. He is moving all limbs appropriately and occasionally follows commands. His eye movements appear normal and his reflexes are brisk and normal. The plantar reflex causes a downward response bilaterally.

### Test results and provisional diagnosis

You are concerned about the possibility of sepsis and delirium in this older man and arrange some additional investigations. Chest x-ray shows bilateral atelectasis. Abdominal x-ray shows no obstruction but a large amount of faeces in the sigmoid colon and rectum. ECG shows atrial fibrillation with rapid ventricular response (130 beats/minute), with no other changes consistent with myocardial ischaemia. A bladder scan is performed and shows 800 mL residual volume. A catheter is placed; urinalysis shows moderate leucocytes and a urine test for nitrites is positive.

You feel confident that he has sepsis and the likely source of the infection is the urine. After checking drug interactions and referring to local guidelines for dosing principles, you administer a single dose of intravenous gentamicin and commence treatment with intravenous ampicillin (2 g). You are pleased that you were able to commence antibiotic treatment within 30 minutes of the patient's arrival in the emergency department.

A repeat blood pressure measurement performed after the fluid bolus shows improvement in the blood pressure to 105/45 mmHg; after excluding any new signs of fluid overload you prescribe another 500 mL of fluid. Results of the urine microscopy are returned (>100 x 10<sup>6</sup>/L white cells and red cells, organisms present, no epithelial cells). This reassures you that you have made the right diagnosis and you continue the current treatment.

The patient is admitted to hospital. Results of his initial blood tests are returned and demonstrate a prominent neutrophilia and mild acute kidney injury (Table 1).

You explain to the daughter that her father is unwell with a urinary tract infection and that the cause of his increasing confusion is likely multifactorial, with contributing factors being the infection, constipation and urinary retention, as well as his new environment. Use of the

Abbreviated Mental Test Score screen and Confusion Assessment Method tool confirms a diagnosis of delirium (superimposed on pre-existing dementia) and you explain to the daughter that your aim will be to address all contributing factors to help manage this.

You attempt to open a discussion with the daughter about care preferences, including high dependency care in case it is required. She is not aware of her father's care preferences, so the discussion is deferred to the next day.

### Management and discussion

#### Sepsis

Sepsis is an important cause of morbidity and mortality in elderly populations.<sup>1</sup> Several useful definitions are summarised in Table 2.<sup>2-3</sup> The initial definitions, developed by a consensus conference and published in 1992, defined sepsis as the presence of the systemic inflammatory response syndrome (SIRS) to infection.<sup>2</sup> These definitions were reviewed by a 2001 taskforce but the definitions were not altered.<sup>4</sup>

The Third International Consensus Definitions for Sepsis and Septic Shock ('Sepsis-3') were published in 2016 and defined sepsis as a 'life-threatening organ dysfunction caused by a dysregulated host response to infection', and also removed the subcategory of severe sepsis.<sup>3</sup>

There is ongoing research and comment in the literature about the new definitions and prognostic indicators, and this is likely to be a changing area. For example, bedside scores were described in Sepsis-3 that can identify patients with infection who are at increased risk of death.<sup>3</sup> The authors of the consensus report found that these patients had two or more of: altered mental status, systolic blood pressure ≤100 mmHg or respiratory rate ≥22 breaths/min (criteria of the 'Quick Sequential Organ Failure Assessment' score [qSOFA]). It is important to emphasise that this score was described as a prognostic indicator and it should not currently be used as a definition or screening tool. The SIRS criteria

**TABLE 2. SEPSIS CONSENSUS DEFINITIONS<sup>2,3</sup>**

| Category      | American College of Chest Physicians and Society of Critical Care Medicine Consensus, 1992 <sup>2</sup>  | Third International Consensus (Sepsis-3), 2016 <sup>3</sup>   |
|---------------|--|---|
| Sepsis        | Systemic inflammatory response syndrome (SIRS) to infection, which is two or more of: <ul style="list-style-type: none"> <li>• temperature &gt;38°C or &lt;36°C</li> <li>• heart rate &gt;90 beats/min</li> <li>• respiratory rate &gt;20 breaths/min or PaCO<sub>2</sub> &lt;32 mmHg (4.3 kPa)</li> <li>• white blood cell count &gt;12,000 cells/mm<sup>3</sup> or &lt;4000 cells/mm<sup>3</sup> or &gt;10% immature bands</li> </ul> Plus infection | Life-threatening organ dysfunction caused by dysregulated host response to infection  |
| Severe sepsis | Sepsis complicated by organ dysfunction  | –   |
| Septic shock  | Sepsis-induced hypotension persisting despite adequate fluid resuscitation   | Subset of sepsis in which underlying circulatory and cellular/metabolic abnormalities are profound enough to substantially increase mortality |

are still a useful tool for recognition of sepsis.<sup>5</sup>

In the USA, the most common causes of sepsis in elderly patients have been found to be respiratory and genitourinary infections.<sup>1</sup> Infection can be difficult to recognise in the elderly because patients often present without typical signs (e.g. fever), and the only clues may be delirium or functional decline.<sup>6,7</sup> Australian hospitals generally have clinical pathways that help clinicians recognise and respond to sepsis, and local guidelines should be consulted (see, for example, the NSW Clinical Excellence Commission's patient safety program 'Sepsis Kills'; [www.ccc.health.nsw.gov.au/patient-safety-programs/adult-patient-safety/sepsis-kills](http://www.ccc.health.nsw.gov.au/patient-safety-programs/adult-patient-safety/sepsis-kills)).<sup>8</sup>

For the case patient described above, a thorough assessment was required to recognise sepsis and find the infectious cause in order to respond with appropriate fluid resuscitation, collection of two sets of blood cultures and commencement of antibiotics within half an hour. For all patients, local guidelines such as the Australian *Therapeutic Guidelines: Antibiotic* should be consulted regarding antibiotic choice.<sup>9</sup> It is important to ensure there are no drug interactions between the antibiotics chosen and the patient's regular medications, which can be a particular challenge in the elderly.

### Delirium

Delirium is a syndrome that has an acute onset (hours to days) and a fluctuating course. It is characterised by disturbed consciousness, impaired attention and awareness, and change in cognition.<sup>10</sup>

Delirium can manifest as:

- agitation, restlessness and/or aggression (hyperactive delirium) – as in this patient
- withdrawn, less communicative and/or drowsiness (hypoactive delirium)
- features that fluctuate between hyperactive and hypoactive subtypes (mixed delirium).<sup>10</sup>

Delirium is very common: 10 to 18% of people in Australia aged over 65 years of age have delirium on admission to hospital and a further 2 to 8% develop delirium during their hospital stay.<sup>11,12</sup>

Factors that predispose an individual to delirium include cognitive impairment, dementia and sensory impairment (visual and auditory).<sup>13</sup> For the patient described above, sepsis was likely the main trigger for his delirium. However, delirium is commonly triggered by a combination of factors and a comprehensive assessment should be performed to identify all possible causes (Box 1).<sup>13-16</sup> This assessment can be commenced in the emergency department and is important because

delirium contributes to longer hospital stays, and to a patient's risk of falls, dementia and likelihood of admission to an aged care facility.<sup>12</sup>

To avoid missing a diagnosis of delirium, all patients presenting to hospital

### 1. COMMON PRECIPITANTS OF DELIRIUM<sup>12-15</sup>

- Pain and discomfort (e.g. urinary retention, constipation)
- Infections
- Metabolic disturbances (e.g. hypo- or hyperglycaemia, hypo- or hypernatraemia)
- Dehydration
- Medications and polypharmacy (e.g. centrally-acting medications such as benzodiazepines, anticholinergics, opioids)
- Hip fracture or other fracture
- Intracerebral events (e.g. subdural haematoma, haemorrhage, stroke, infection)
- Cardiac events (e.g. myocardial infarction, arrhythmia, congestive cardiac failure)
- Seizures and postictal states
- Withdrawal states (especially from alcohol and benzodiazepines)
- Organ failure
- Medication withdrawal or overdose

## 2. MANAGING DELIRIUM: NONPHARMACOLOGICAL APPROACHES<sup>20</sup>

- Observe patients closely because behaviour can be unpredictable
- Reorientate the patient by providing appropriate lighting with a clearly visible clock and calendar
- Use clear communication – talk to the patient and explain where they are, who they are and your role in their care
- Facilitate regular visits from family and friends to assist with reassurance and reorientation
- Ensure adequate fluid intake to prevent dehydration (consider subcutaneous or intravenous fluids if necessary)
- Ensure hearing and visual aids are easily available to the patient
- Reduce noise to a minimum during sleep periods and encourage usual sleep–wake patterns
- Assess for hypoxia and optimise oxygen saturation if necessary
- Address infection with appropriate antibiotics
- Encourage mobilisation
- Address pain (remember to look for nonverbal signs of pain)
- Perform a medication review
- Monitor for constipation and treat as necessary

with one or more key risk factors for delirium should receive cognitive screening – useful tools are available online, such as the 4AT ([www.the4at.com](http://www.the4at.com))<sup>17</sup> and the Abbreviated Mental Test Score ([www.racgp.org.au/your-practice/guidelines/silverbook/tools/abbreviated-mental-test-score](http://www.racgp.org.au/your-practice/guidelines/silverbook/tools/abbreviated-mental-test-score)).<sup>17,18</sup> A validated diagnostic tool for delirium, such as the Confusion Assessment Method (CAM), should then be undertaken to confirm the diagnosis ([www.hospitalelderlifeprogram.org/delirium-instruments](http://www.hospitalelderlifeprogram.org/delirium-instruments)).<sup>19</sup> Using the CAM, the diagnosis of delirium requires the presence of:

- acute onset of changes or fluctuations in the course of mental status, and

- inattention, plus
- either disorganised thinking or an altered level of consciousness.<sup>19</sup>

For the case patient described above, all four of these features were present.

The key principle to delirium management is the identification and treatment of underlying causes. In this case, treatment of the urinary tract infection and sepsis, insertion of the urinary catheter to relieve retention, and the use of aperients to assist in bowel motions were key medical management strategies. At the same time, nonpharmacological measures for delirium should be used (Box 2).<sup>13,20</sup> The use of physical restraints should be avoided because these can prolong delirium and increase agitation, leading to injuries and falls.<sup>20</sup>

Pharmacological management is sometimes required to control aggression or delusions and hallucinations when these become significantly distressing for the patient and when nonpharmacological management has been exhausted.<sup>20</sup> There is no evidence that the use of antipsychotics or sedatives in delirium improves prognosis.<sup>20</sup> As such, there are no universally accepted guidelines around pharmacological management of delirium, and the institution's practice guidelines should always be consulted. Consideration of the individual patient's comorbidities is important.<sup>15</sup>

If delusions or hallucinations are causing distress or if behavioural disturbances are significantly interfering with patient care or safety then an antipsychotic can be used to relieve these symptoms.<sup>15-17</sup> Oral options include haloperidol (0.25 mg to 0.5 mg), risperidone (0.25 mg to 0.5 mg) and quetiapine (12.5 mg). Quetiapine should be used in patients with Parkinson's disease as other options are contraindicated. If oral administration is not possible, intramuscular haloperidol (0.125 mg to 0.25 mg) may be considered. Treatment should be commenced from the lowest dose possible and titrated slowly, with use limited to the shortest period possible (usually for one week or less).<sup>15</sup> A single

## 3. ADVERSE EFFECTS OF ANTIPSYCHOTICS<sup>16</sup>

- Aggravation of delirium
- Extrapyramidal symptoms (e.g. tardive dyskinesia)
- Orthostatic hypotension
- Falls
- Sedation
- Prolonged QT interval
- Increased risk of death

dose is often adequate. The onset of action can be delayed 30 to 60 minutes, so if a second dose is required then this should not be given until at least 30 minutes after the first dose.<sup>15</sup>

Antipsychotics have significant side effects (Box 3), and patients should be monitored for these.<sup>15,16</sup> Given the propensity for antipsychotic medications to cause adverse effects and little evidence for substantial efficacy in controlling symptoms of delirium, it is important that consent be obtained from a surrogate decision maker, particularly for medications used on a regular basis.

If there is no response to an antipsychotic, a single dose of oral oxazepam (7.5 to 15 mg) may be considered. Benzodiazepines are not recommended as first line treatment unless the cause of delirium is alcohol or benzodiazepine withdrawal.

## Progress

The next day, you continue to treat the patient with intravenous antibiotic. Photographs of his family are placed in his room to assist with reorientation, and his daughter visits him regularly. His confusion settles considerably on the second day of admission and his fever subsides. Urine and blood cultures grow *Escherichia coli*, which is sensitive to ampicillin, so ampicillin is continued. You monitor the patient's INR closely as the INR may increase with the use of ampicillin.

A renal ultrasound is performed, which

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demonstrates no renal obstruction, mild prostatomegaly and no abscess. He opens his bowels, and has a successful trial of void on day two of admission.

Treatment with intravenous ampicillin is continued and is changed to oral amoxicillin after five days. He completes 14 days of treatment in total. The allied health team sees him and he mobilises safely with the physiotherapist. The occupational therapist notes that he needs some prompting with personal care but knows that the patient is well supported at home by his daughter. The pharmacist reviews his medications and arranges a medication administration aid. His daughter feels she is coping well at home and does not require any further services.

The management team opens discussions with the daughter about care preferences and she states she will have a discussion with her father at home when

he is well and will follow up the matter with his GP. She is given written information about advanced care directives, and referred to the Advanced Care Planning Australia website for further information ([www.advancecareplanning.org.au](http://www.advancecareplanning.org.au)).

### Outcome

The patient is discharged home and his confusion continues to reduce over the next week. Once his delirium is resolved, his daughter discusses with him his future health care wishes and documents his preferences in the event that he is ever unable to communicate his wishes. With legal assistance, and after completing a capacity assessment with his GP, he appoints his daughter as his enduring guardian so that she can make medical decisions on his behalf if he loses capacity to make those decisions at some time in the future. At the same time, he also

appoints her as his power of attorney so that she can make financial decisions on his behalf if he loses capacity to manage his finances himself.

### Conclusion

Sepsis and delirium are important presentations in the geriatric population and often coincide, as in this patient. Delirium can be easily missed and clinical tools are available that can assist in diagnosis. An understanding of sepsis definitions can be helpful as typical signs may be absent. Managing both conditions is important because they each contribute to morbidity and mortality. MT

### References

A list of references is included in the website version of this article ([www.medicinetoday.com.au](http://www.medicinetoday.com.au)).

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COMPETING INTERESTS: None.

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