Australian and New Zealand Society for Geriatric Medicine

Position Statement 13

Delirium in Older People

Revised 2021

1. Delirium is a syndrome characterised by the rapid onset of impaired attention and awareness that fluctuates, together with impaired cognition and/or altered consciousness. It may be the only sign of serious medical illness in an older person and should be urgently assessed. Misdiagnosis of delirium may have dire consequences.

2. Better prevention and treatment are needed to avoid the poor outcomes that result from delirium, including patient and caregiver distress, cognitive and functional decline, prolonged hospital stay, institutionalisation and mortality.

3. All older people should be assessed for risk factors for delirium on admission to hospital. These include dementia, polypharmacy, visual and hearing impairment, dehydration, functional disability, alcohol abuse, depression and advanced age. Many precipitating factors are described. Iatrogenic factors, particularly medications, are unfortunately common and potentially avoidable.

4. Delirium is very common but is often not detected or misdiagnosed. Cognition should be considered a “vital sign” and cognitive assessment routinely performed. Those who display altered cognition should be screened for delirium using a validated tool such as the Confusion Assessment Method or 4 A’s Test.

5. Preventative strategies have been demonstrated to be very effective and should be adopted by all healthcare institutions. These are based on multicomponent interventions targeting risk factors which are managed with care protocols and environmental strategies. Education programmes are also effective in prevention.

6. Investigations for common precipitating factors are usually needed unless clear, recent causes are identified. Specialised investigations may be needed in specific circumstances. A thorough medication review should be performed.

7. Management of delirium involves identifying and treating risk factors and precipitating factors, managing neuropsychiatric manifestations, preventing complications and monitoring progress.

8. Tailored multimodal management measures should always be implemented. These include correction of dehydration, malnutrition and sensory deficits, optimisation of bladder and bowel function, assessment and management of pain, provision of reorientation and good quality communication, undisturbed sleep, encouraging self-care and mobility, avoiding the use of physical restraints, and limiting room changes.

9. Pharmacological management of the neuropsychiatric symptoms of delirium is

not supported by evidence and should only be considered when non-drug strategies have failed to control distressing symptoms or when safety is compromised. Small doses of antipsychotics are first-line in the short term. When patients with an extrapyramidal syndrome require treatment, atypical antipsychotics should be considered. Benzodiazepines are useful only in alcohol and benzodiazepine withdrawal.

10. Delirium is best managed by a multidisciplinary team utilising multicomponent interventions in an appropriate environment with adequate staffing levels. Specialised Delirium Units provide effective and safe care for older people, can help raise awareness of delirium as a serious condition, and enhance delirium research. However, given the high overall rates of delirium, it is important to have hospital-wide strategies to manage delirious patients. The Delirium Clinical Care Standards, developed by the Australian Commission on Safety and Quality in Health Care, provides a reference for the clinical care delirious patients should be offered during hospitalisation.

11. Delirium may persist for weeks to months and patients presenting with delirium often have undiagnosed mild cognitive impairment or dementia. In addition, delirium itself can cause new cognitive impairment and accelerated dementia. Prior to discharge, patient and carer education should occur describing ongoing care requirements and follow up. This may include changes in medicines, behavioural management strategies, safety considerations and outpatient clinic and primary care follow up.

This Position Statement represents the views of the Australian and New Zealand Society for Geriatric Medicine. This Statement was approved by the Federal Council of the ANZSGM on 14 May 2005 and this revision was approved by the Federal Council on …….and coordinated by Drs Anita Nitchingham and Gideon Caplan. The original paper was coordinated by Dr Sean Maher and revised by Drs Teck Yew and Sean Maher in 2012.

BACKGROUND PAPER

Delirium is a syndrome characterised by the rapid onset of impairment of attention that fluctuates, together with impaired cognition and/or altered consciousness. Behavioural disturbance and psychotic features may also feature. As a result, delirium is often a distressing experience for both patients and caregivers. Delirium is commonly encountered in older people and is associated with increased rates of cognitive and functional decline, prolonged hospital stay, relocation to residential care and mortality. It is frequently either undiagnosed or misdiagnosed. There is often a strong iatrogenic element in the precipitating factors contributing to many episodes of delirium, emphasising the need for better quality of care of older people. Good quality studies regarding risk factors, prevention and prognosis exist for hospitalised patients. Comprehensive Geriatric Assessment with a multidisciplinary approach aimed at prevention, and education programmes, improve delirium outcomes. The potential exists for better targeted pharmacological interventions in delirium management.

Epidemiology

The overall occurrence of delirium arising during a hospital stay is reported to be as high as 50%.[1] In older patients, delirium prevalence (present on admission) is 25% and incidence (develops during admission) is 20-29%.[1] Postoperative delirium occurs in 15-50% of patients aged over 65 years and the incidence in older patients admitted to the Intensive Care Unit (ICU) is as high as 82%.[1, 2] Reports on the prevalence of delirium in long term care facilities range from 0.5-57%, with a mean of 14.2%.[3] Nursing home residents are more likely (odds ratio [OR] 10.2) to present to ED with delirium compared to community-dwelling older people.[4]

Aetiology

Delirium represents a true geriatric syndrome with a defined phenotype, resulting from

interactions between individual risk or predisposing factors ("vulnerability") and precipitating factors. Thus, a vulnerable patient may easily develop delirium with a minor event such as a urinary tract infection. In contrast, a person with few or no risk factors would require severe or multiple precipitating events before their cognitive reserves are overwhelmed. Acutely unwell older patients have an average of 5.2 predisposing and 3 precipitating factors.[5]

Common predisposing factors include older age, cognitive impairment, dementia, functional impairment, severe illness, multimorbidity, visual impairment, deafness, polypharmacy and depression.[1] In General Medical patients, older age, dementia and alcohol misuse are the strongest predisposing risk factors for developing delirium, conveying a relative risk [RR] of 4.0, 2.3-4.7 and 5.7 respectively.[1] Extra risk factors multiply, rather than add, the relative risks for developing delirium.[6] These data point to approaches for risk stratification as well as prevention.

Precipitants for delirium include infections (most frequently chest and urinary), constipation, electrolyte disturbance, medications, organ failure, hypoxia, alcohol withdrawal, uncontrolled pain, neurological insults, sleep deprivation and surgery.[6] Restraint use, malnutrition and urinary catheterisation significantly increase the risk of developing delirium. Any iatrogenic event doubles the risk.[7]

Medications contribute to about 40% of cases of delirium.[8] Older people have diminished renal excretion and hepatic metabolism and are more likely to have adverse effects even at lower doses. Psychoactive drugs and those that cross the blood-brain barrier are most likely to cause delirium. A systematic review identified increased delirium risk with benzodiazepines (OR 3.0) dihydropyridines (OR 2.4) and possibly antihistamines (OR 1.8).[9] Overall opioids were also associated with delirium (OR 2.5) but this relationship is likely drug specific; with pethidine demonstrating a significant association while morphine and endone did not.[9] Other implicated drug classes include antiparkinsonians, lithium, antidepressants, antipsychotics, anticonvulsants, antiarrhythmics, antihypertensives, corticosteroids, non-steroidal anti-inflammatories, over the counter and herbal preparations, and antispasmodics.

The usual predisposing factors contributing to delirium apply to surgical patients, however, some specific risk factors need consideration. Trauma or unplanned surgery such as repair of fractured neck of femur carries a higher risk of Postoperative Delirium (POD).[10, 11] Anaesthesia type (general vs regional) does not appear to impact the risk of POD.[12] Monitoring depth of anaesthesia to avoid excessively deep sedation has been shown to reduce the rate of POD and postoperative cognitive dysfunction in older elective surgical cohorts.[13, 14] However, in multimorbid older patients with hip fracture avoiding deep anaesthesia did not reduce POD.[15] The presence of both preoperative and postoperative pain increases the risk of developing POD.[16, 17] Preoperative depressive symptoms also predict POD.[17]

Pathophysiology

The pathophysiology of delirium is incompletely understood, although several hypotheses exist. It is likely multiple pathogenic mechanisms contribute to the development of delirium with varying effect depending on pre-existing patient vulnerabilities and the aetiology of the acute precipitant.[18]

Previously described neurotransmitter disruptions include a relative deficiency of acetylcholine and dopamine excess.[18, 19] As disturbed circadian rhythm and "sundowning" are features of delirium, melatonin deficiency has also been identified as a possible contributor.[20]

The neuroinflammatory hypothesis suggests that medical insults lead to peripheral inflammation and the release of inflammatory mediators, including IL-6, IL-8 and TNF-alpha. These circulating inflammatory mediators exert effects on the central nervous system leading to neuronal dysfunction and the clinical manifestations of delirium.[21] This hypothesis has been primarily developed in animal models.

Neuroimaging studies have identified abnormalities within the posterior cingulate cortex (PCC), the central node of the default mode network (DMN), which may account for the clinical manifestation of delirium. Delirious patients demonstrate disturbed functional connectivity within the DMN.[22] Reversible whole brain and bilateral PCC hypometabolism are also observed.[23] Abnormalities in cerebral perfusion and metabolism have been observed in cerebrospinal fluid and a variety of neuroimaging studies.[24, 25]

Whilst it is well established that delirium is a strong risk factor for both incident and accelerated dementia, autopsy studies suggest this relationship is not mediated by classical dementia neuropathologies including amyloid, alpha-synucleinopathy and presence of infarcts. This suggests a unique mechanism of neuronal injury.[26, 27] Trials investigating the relationship between APOE4 status and risk of delirium demonstrate mixed results.[28, 29]

Prevention

It is now well established that up to 40% of incident delirium is preventable.[30] The majority of studies rely on nonpharmacological measures such as identifying and managing risk factors as well as education programmes.

A Cochrane Review found multicomponent interventions decrease the incidence of delirium compared to usual care (RR 0.69) with effect sizes being similar in medical and surgical cohorts.[31] Pooled data suggest a shorter length of hospital stay and lower odds of institutionalisation.[30] Multicomponent interventions are also cost-effective.[32, 33]

In 1999, Inouye et al. published one of the most influential delirium prevention studies targeting six key delirium risk factors (cognitive impairment, vision/hearing impairment, immobilisation, psychoactive drug use, dehydration and sleep deprivation). [34] Using this protocol, delirium developed in 9.9% of the intervention group as compared with 15.0% of the usual-care group (OR 0.6). The Hospital Elder Life Program (HELP) was developed based on the model of screening and targeting these 6 key risk factors.[35] This approach is multidisciplinary in nature and includes a geriatric nurse specialist, Elder Life Specialists, trained volunteers, and geriatricians. A similar programme (ReViVe) has been successfully trialled in Australia.[32]

Geriatric consultation has been demonstrated to reduce delirium in patients with hip fracture (RR 0.64).[36] The consultation included review of analgesia, fluid/electrolyte balance, appropriate oxygen delivery, medications, bowel/bladder function, nutrition, early mobilisation and rehabilitation, prevention, detection and treatment of postoperative complications, appropriate environmental stimuli and treatment of hyperactive delirium.

There have been several publications showing that delirium education programmes directed at health care workers in the hospital setting significantly reduce the prevalence of delirium. [37-41] Providing base-line data on the prevalence and outcome of delirious patients, training in methods of mental assessments and introducing guidelines on medical management through a series of small group meetings and grand rounds prevents delirium.[39]

The rate of incident delirium is increasingly seen as a proxy measure of quality inpatient care. In 2016, the Australian Commission on Safety and Quality in Health Care developed the Delirium Clinical Care Standard aimed to ensure patients at risk of delirium during hospitalisation are identified and receive preventive strategies.[42]

Evidence does not support the use of pharmacological preventive interventions. [31] Trials assessing cholinesterase inhibitors, including donepezil and rivastigmine, have all occurred in the perioperative setting and demonstrate no reduction in incident delirium.[43, 44] A meta-analysis of seven randomised control trials found no preventative effect from antipsychotic administration on incident delirium.[45] Trials assessing melatonin and ramelteon in delirium prevention demonstrate mixed results and more robust trials are needed to inform practice.[31, 46] Use of dexmedetomidine, an alpha2-adrenergic receptor agonist with sedative and analgesic properties, in the ICU and perioperative settings has been associated with reduced incidence

and duration of delirium. However, it is unclear whether the reduced incidence of delirium results from the effect of dexmedetomidine itself or avoidance of drugs likely to cause delirium including benzodiazepines.[47] Side effects including bradycardia and hypotension, as well as the requirement for intravenous administration prohibit further assessment on general medical wards.

Clinical Features

Delirium develops over hours to days and fluctuates, often with lucid periods during the day and maximal disturbance at night.[1] Impaired attention may result in a distractible or inert patient. Disorientation to time and short-term memory impairment often occur. Thinking is disordered reflected by rambling, incoherent speech. Patients may exhibit obvious distress with paranoid delusions, misperceptions and visual hallucinations. Altered consciousness is reflected by impaired awareness and alertness ranging from vigilant through to coma.[1]

The clinical presentation of delirium can be divided into hyperactive and hypoactive subtypes although the presentation can be mixed.[48] Hyperactive delirium is easily recognised. It is characterised by hyperarousal with increased sensitivity to immediate surroundings to the point where patients can be verbally and physically aggressive. Restlessness and wandering are common features. Psychotic symptoms may also be present. Patients with hypoactive delirium may appear lethargic, sluggish, confused and with discernibly low mood.[48] Hypoactive delirium is more common and associated with a worse prognosis; careful beside observation and questioning of an informant about whether the patient is “different” is required for detection, otherwise it is easily missed.[49]

Detection

Various bedside screening tools have been validated to detect delirium.[50, 51] It is important to consider the setting in which the tool has been developed and validated. The most widely used in clinical practice is the short form Confusion Assessment Method (CAM), a four-item instrument based on the DSM-III-R criteria:[52, 53]

Acute onset & fluctuating course AND
Inattention AND
Disorganised thinking OR
Altered level of consciousness.

The CAM algorithm has a sensitivity of 94-100% and a specificity of 90-95% when administered by trained interviewers. However, in the absence of formal training, the CAM carries a lower sensitivity.[54]

The 4 ‘A’s Test (4AT) is increasingly used in the clinical setting as a brief cognitive screen for both delirium and cognitive impairment. Validation studies found a sensitivity of 89.7% and specificity of 84.1% for delirium. It requires no training, is simple to administer, allows assessment of those who cannot engage with an interview (due to drowsiness or agitation) and has no subjective judgments of mental status.[55]

At risk patients should be screened using a validated test on presentation to hospital and retested if an acute change in behaviour is noted during their hospital stay.

Diagnosis

Delirium remains a clinical diagnosis made on the basis of a detailed history, examination and relevant investigations. Establishing previous functional and cognitive status is essential. A formal diagnosis can be made by using the Diagnostic and Statistical Manual of Mental Disorders, 5th revision (DSM-V) criteria or International Classification of Diseases 10 (ICD-10).

DSM-V (all criteria to be met):

A) Disturbance in attention and awareness.
B) Disturbance develops acutely and tends to fluctuate in severity.
C) At least one additional disturbance in a cognitive domain.
D) Disturbances are not better explained by a pre-existing dementia and do not occur in the context of severely reduced level of arousal or coma.
E) Evidence of an underlying medical cause or causes.[56]

A diagnosis of delirium must prompt clinicians to systematically identify and mitigate contributory predisposing and precipitating factors.

Misdiagnosis

Mistaking delirium for behavioural and psychological symptoms of dementia (BPSD) is common and may have dire consequences.[57] A collateral history suggesting an acute change in behaviour should be considered delirium until proven otherwise.[57] Hypoactive delirium can be erroneously diagnosed as depression. Features of hyperactive delirium such as agitation and hallucinations can be mistaken for late-onset schizophrenia or mania.[58]

Investigations

The clinical picture should guide investigations, but if there are no obvious clues then a routine "screen" should be used to detect common causes. A reasonable screen includes complete blood count, electrolytes and renal function, glucose, calcium, liver function tests, C-reactive protein, oxygen saturation, midstream urine culture if urinalysis is abnormal, chest x-ray and electrocardiogram. Other tests to consider include blood cultures, thyroid function tests, arterial blood gases, cardiac enzymes and erythrocyte sedimentation rate. CT brain should not be routine unless there is a positive history of fall or head injury, anticoagulation therapy, focal neurological signs or where no other cause of altered mental status is identified.[59-61] Lumbar puncture should be considered (after CT brain) if there is headache, meningism or no other source of fever. Electroencephalogram (EEG) may be helpful if the diagnosis is in doubt and occasionally assists in determining aetiology e.g. non-convulsive status epilepticus.[62] MRI Brain may assist with diagnosis of ischaemic stroke not visualised on CT in the acute phase.[63]

In the absence of symptoms or signs of urinary tract infection or generalised sepsis, attributing delirium to otherwise asymptomatic bacteriuria should be avoided.[64] A lack of systemic inflammatory response (fever, high white cell count or CRP) should prompt further investigation of other possible causes of delirium.

Management

The mainstay of managing a patient with delirium is supportive by identifying and treating precipitating factors and reducing the impact of predisposing factors (e.g. sensory impairment). Physiological conditions should be optimised (e.g. ensuring adequate oxygenation and treating dehydration). New prescription of drugs likely to cause delirium should be avoided. Pain should be assessed and optimised.[65] It is important to actively prevent complications such as pressure sores, malnutrition, falls and deconditioning. Patients who deteriorate further or have persistent delirium require active re-evaluation. Clear communication and education of family members and carers are vital. Following recovery, patients should be offered rehabilitation where appropriate.[66]

Evidence-based clinical practice guidelines have been developed and are widely available[42, 67].

Non-Pharmacological Management

The evidence base to support multimodal and non-pharmacological management in delirium treatment is limited, however, most guidelines promote person centred multicomponent interventions as fundamental good practice.[42, 67, 68].

Multicomponent geriatric intervention broadly consists of multidisciplinary staff education focusing on the assessment, prevention and treatment of delirium, comprehensive geriatric assessment, environmental optimisation and enhanced caregiver-patient interaction to provide individualized care. Trials of such interventions have demonstrated mixed results in regards to altering the trajectory of established delirium and improving other health-related outcomes.[69-71] Some studies have shown faster alleviation of delirium symptoms and improved health-related quality of life without increasing overall inpatient cost.[72, 73] Multicomponent intervention also reduces the rate of inpatients falls by up to 64%.[30]

There have been a limited number of trials examining the efficacy of cognitive and environmental interventions in delirium management.[68] Cognitive stimulation was associated with reduced length of stay on post-acute care units (36 vs 53 days, p=0.01) but did not reduce delirium duration or severity.[74] Physical restraints can precipitate and increase the severity of delirium and should be avoided.[75, 76] Room transfers should also be limited.[77] At night, there should be low-level lighting and a quiet setting to promote sleep. Psychoactive sedatives should be avoided if possible and non-pharmacological sleep protocols should be used instead.[78] Family members can be helpful in settling and reassuring agitated patients.

Medication review focussed on polypharmacy and drugs likely to cause delirium has been shown to significantly decrease the duration of delirium in older people.[79]

Some positive results have been reported in regards to specialised dementia/delirium units. These units are often secure with specialist geriatric input, enhanced training for nurses, a higher staff to patient ratio, environmental modifications, diversional therapy and proactive inclusion of caregivers. Such units may reduce the duration of delirium, hospital length of stay, falls rate, use of physical restraints, whilst being cost-effective.[80, 81] A randomised control trial demonstrated improved patient experience and caregiver satisfaction, however, health care status and service use were unchanged compared to standard care on geriatric and general medicine wards.[82]

Whilst specialised units play a role, given the high prevalence of delirium it is important to have hospital-wide strategies to manage delirious patients.

Delirium may persist for several months (see below) and over a third of older patients presenting with delirium have undiagnosed cognitive impairment or dementia.[83] Patients with delirium may require additional physical and cognitive support on discharge. Prior to discharge, patient and carer education should occur describing ongoing care requirements and follow up. This may include changes in medicines, behavioural management strategies, safety considerations and outpatient/GP clinic follow up.[42]

Pharmacological Management

Presently, there are no licenced pharmacological agents to treat delirium. Medications should be reserved for patients in whom a non-pharmacological approach has been ineffective in managing distressing symptoms or where safety is compromised.

Traditionally, antipsychotics have been used, although this practice is not supported by evidence. A systematic review including 19 studies across hospital settings found antipsychotics do not change delirium duration, severity, length of stay or mortality.[45, 84] A Cochrane review of antipsychotics for treatment of delirium in hospitalised non-ICU patients reached similar conclusions.[84] Despite this, many geriatricians find that in select cases these medications may by useful in alleviating distressing symptoms of delirium or when safety is compromised and chemical restraint is required. In such instances, expert consensus is to prescribe the lowest starting dose and titrate the medication slowly whilst monitoring for evidence of improvement.[66] Haloperidol and risperidone are often favoured by clinicians, although there is insufficient evidence to recommend one antipsychotic over another.[66] Atypical antipsychotics, particularly quetiapine, have less extrapyramidal side effects and should be considered for delirious patients with an extrapyramidal syndrome.[85]

There is evidence of harm from antipsychotics. A randomised controlled trial in the palliative care setting assessed the efficacy of risperidone versus haloperidol versus placebo in relieving distressing symptoms of delirium. Patients treated with risperidone and haloperidol had higher delirium symptoms scores, more extrapyramidal side effects and worse survival than patients in the placebo arm. Patients in the placebo arm also required less rescue midazolam. The results suggest that individualised supportive care reduces distressing delirium symptoms more than when antipsychotic administration.[86] In addition,

there are the well-established risks of antipsychotics including ischaemic stroke, QT prolongation, sudden cardiac death and pneumonia.[87-89] This emphasises the need to have a clear indication for antipsychotic use and employ low doses for the shortest possible duration.[90]

Controlled trials demonstrate no benefit from donepezil in treatment of delirium.[43] Rivastigmine did not decrease duration of delirium and increased mortality in critically ill delirious patients.[91]

Benzodiazepines are appropriate therapy for alcohol and drug withdrawal.[92] However, they are not recommended as first-line agents in older patients as they can worsen mental state changes.[8] Agents with a short half-life and no active metabolites are preferable (e.g. lorazepam 0.5mg or oxazepam 7.5mg daily) if needed.[92] Intramuscular or subcutaneous midazolam 1-2mg can be used for excessive agitation not responding to antipsychotics or where they are inappropriate (e.g. extrapyramidal disorders).[67]

Duration

Although the average duration in older patients was found to be 8+/-9 days,[93] delirium may be very persistent. A review found the proportion of patients with persistent delirium was 45% at discharge, 33% at one month, 26% at 3 months and 21% at 6 months. [94] This may be due to persisting chronic illness, irreversible neuronal dysfunction or delirium becoming a chronic disorder in some people.[95]

Outcomes

Delirium is an independent predictor of both short and long term mortality across various settings including paediatric, intensive care, post-operative and geriatric populations.[96-99] Inpatient mortality in older patients with delirium is as high as 36% compared to 7% without delirium (adjusted Hazard Ratio 3.5). In the same cohort, median time to death was 162 days for those with delirium compared with 1,444 days for those without (P<0.001).[100]

Rates of falls, incontinence and pressure sores are more than trebled in hospitalised patients with delirium.[101] Delirious patients have a longer hospital stay and are more likely to be discharged to a nursing home.[102] After hip fracture, delirium increases the risk of poor functional outcome, decline in ambulation and death or nursing home admission by nearly 3 times.[103]

Delirium is an independent risk factor for long-term cognitive impairment and dementia and trebles the rate of cognitive decline in people with dementia.[57] After controlling for confounders, delirium is associated with an increased rate of incident dementia (RR 5.7).[57]

In older hospitalised patients longer delirium duration, hypoactive motor subtype, increased severity and pre-existing dementia or depression predict worse outcomes.[49]

The economic impact of delirium is substantial, with total one-year healthcare costs estimated to be $8.8 billion in Australia.[104] This fact alone surely warrants the attention of health policymakers.

Patient and Carer Experience

Delirium is an inherently unpleasant and often distressing experience for patients, families and care givers. A substantial proportion of patients can recall their delirious episode (20-75%), reporting clouding of thought processes, strong emotions, lack of control, hallucinations, misperceptions and delusions commonly involving staff members [105]. Following an episode of delirium, patients may suffer from longer term psychological morbidity including distress, anxienty, depression and post-traumatic stress disorder [105]. Up to 70% of patient relatives also describe distress relating to guilt, anxiety, helplessness, exhaustion and fear. One study found that spouse/caregiver ratings of distress were higher than patients who had suffered from delirium [106]. Patient and caregiver education prior to the onset or following an episode of delirium may decrease distress and psychological morbidity [105].

Conclusion

Delirium carries a high mortality and morbidity and yet it remains a common condition that is underdiagnosed. There is strong evidence that comprehensive geriatric assessment with multicomponent intervention is effective in prevention. Education programmes are also a vital part of preventing delirium and should be obligatory. Implementation of such strategies should be in place at all health care institutions. More effort in prevention, detection and management of delirium would involve expenditure but there should be significant savings from the prevention of delirium with all of its attendant morbidities.

As we cannot prevent all cases of delirium, more research is needed to improve the diagnostic approach to delirium, aimed at early detection and better management and treatment of delirium. A research priority must be improved understanding of delirium pathophysiology so that potential therapeutic targets can be identified. The neuropathological mechanisms by which an episode of delirium leads to sustained cognitive dysfunction are not yet known and also warrant further exploration.

The combination of poor outcomes, significant health costs and distressing patient and caregiver experience demands that delirium should be a major priority for health policy makers.

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