Synopsis of the National Institute for Health and Clinical Excellence Guideline for Prevention of Delirium

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Description: Delirium is common, is often underrecognized, and is associated with poor outcomes and high costs. In July 2010, the National Institute for Health and Clinical Excellence released a guideline that addressed diagnosis, prevention, and management of delirium. This synopsis focuses on the main recommendations about prevention of delirium.

Methods: The National Clinical Guideline Centre developed these guidelines by using standard methodology of the National Institute for Health and Clinical Excellence. A multidisciplinary guideline development group posed review questions, discussed evidence, and formulated the recommendations. To underpin the guideline, a technical team from the National Clinical Guideline Centre systematically reviewed and graded pertinent evidence identified from literature searches of studies published in English to August 2009 and performed health economic modeling. Stakeholder and public comment informed guideline development and modifications.

Recommendations: Considering prevention a feasible and cost-effective health strategy, the guideline development group made 13 specific recommendations that addressed the stability of the care environment (both the care team and location) and the provision of a multicomponent intervention package tailored for persons at risk for delirium. The multicomponent intervention package included assessment and modification of key clinical factors that may precipitate delirium, including cognitive impairment or disorientation, dehydration or constipation, hypoxia, infection, immobility or limited mobility, several medications, pain, poor nutrition, sensory impairment, and sleep disturbance.

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* The guideline development group and technical team members are listed in the Appendix (available at www.annals.org).

Delirium is a common disorder characterized by a recent onset of fluctuating awareness, impairment of memory, attention, and disorganized thinking. It is associated with poor outcomes and causes considerable stress to patients and families. Although common, particularly in patients who are hospitalized after surgery and in illnesses developing over a short period, delirium is often underrecognized and underdiagnosed. It is expensive to treat because consequences, such as longer lengths of hospital stay and an increased need for long-term care, are resource-intensive. For example, an estimated additional $2500 per patient or a $6.9 billion annual expenditure for Medicare (2004 U.S. dollars) is incurred when treating patients with delirium (1). Given the high occurrence rates and high treatment costs of delirium, effective strategies that prevent it should be a high priority for health care systems.

Guideline Focus

These recommendations focus on prevention, which was 1 of several questions addressed in the recent guideline on the diagnosis, prevention, and management of delirium produced by the National Institute for Health and Clinical Excellence (NICE) (2, 3). The full version of the guideline, including details about methods (clinical guideline 103) (3), is available at http://guidance.nice.org.uk/CG103/Guidance/pdf/English.

Target Population

The guideline is directed at persons aged 18 years or older who are in a hospital or long-term residential care setting. It does not cover persons receiving end-of-life care or persons who are intoxicated or withdrawing from drugs or alcohol.

Guideline Development Process

The guideline was developed by using standard NICE methodology (4). The multidisciplinary guideline development group included health care professionals from secondary care (physicians, psychiatrists, and specialist nurses), a care home manager, and patient representatives. The group met regularly with a supporting technical team from the National Clinical Guideline Centre, which included persons with specific expertise in literature-search techniques, systematic reviewing, health economics, and project management. The guideline development group drafted the review questions for the technical team; discussed the evidence, including the systematic reviews and
economic analyses prepared by the technical team; and formulated the clinical and research recommendations. Each group member completed a potential conflicts of interest form, updated the form throughout the development process, and managed potential conflicts of interest in accordance with the NICE policy.

**EVIDENCE REVIEW AND GRADING**

Review questions addressed the efficacy and safety of pharmacologic and single-component and multicomponent nonpharmacologic interventions for prevention for patients in a hospital setting and persons in long-term care. Because evidence about pharmacologic and single-component interventions was weak and inconclusive, this particular synopsis focuses on multicomponent interventions.

The technical team searched MEDLINE, EMBASE, CINAHL, and the Cochrane Library for articles published from 1994 to 17 August 2009 to identify pertinent studies published in English. They selected studies on the basis of study design (randomized, controlled trials; quasi-randomized, controlled trials; and trials with before–after designs), study population (at-risk adults in a hospital setting or long-term care), intervention, and sample size (excluded if fewer than 20 persons were in each group). They checked studies for methodological rigor and risk for bias, applicability to the United Kingdom, and clinical significance. The primary outcome of interest for the review was incidence of delirium, as determined by assessments using criteria of the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV) or the revised third edition (DSM-III-R) or standardized instruments validated against these criteria. For interventions involving patients in a hospital setting, the primary outcome had to be measured during the hospital stay. Other outcomes that were extracted included duration and severity of delirium, length of hospital stay, mortality, and need for admission to long-term care.

The technical team assessed evidence about complex, multicomponent interventions with a themed analysis that incorporated a qualitative aspect. They prepared narrative summaries about studies that presented the quality appraisal criteria for randomized and nonrandomized studies and reflected the risk-for-bias assessments and overall quality ratings given to studies. Quality assessment of studies for NICE guidelines is usually done by using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach; however, because of the qualitative aspect of the multicomponent interventions, it was not possible to apply the GRADE approach.

Because no existing economic evaluations that were directly applicable were found, the technical team conducted a de novo economic evaluation to help identify the prevention options with the highest incremental net benefit. They constructed decision-tree models for patients who did not elect to be hospitalized for surgical repair of hip fracture and older patients at intermediate or high risk for delirium who were hospitalized at an internal medicine service. The models were built with published data on the efficacy of different prevention strategies (5, 6); the baseline risk for delirium; and the baseline risk and relative risk for adverse consequences of delirium, including falls, pressure ulcers, additional length of stay, mortality, onset of dementia, and need for long-term care. The model used data on the cost of the interventions, as related to the U.K. National Health Service, the cost of adverse consequences, and health-related quality-of-life data. The total cost and total quality-adjusted life-years per patient were estimated and compared for usual care and for the prevention strategy. The outcomes of interest, incremental cost, and incremental quality-adjusted life-year gained were used to calculate the incremental net monetary benefit.

The guideline development group worded each recommendation to reflect the strength of the recommendation, taking into account the strength of both the underlying clinical and health economic evidence and the clinical expertise and experiences of the guideline development group, including the lay patient or care representatives.

**COMMENT AND MODIFICATIONS**

Registered stakeholders that included specialist medical societies and patient groups were invited to comment on a draft guideline that was posted on the NICE Web site in November 2009. The guideline was modified in the light of these comments, and the final version, with a range of implementation tools, was published in July 2010.

**CLINICAL RECOMMENDATIONS**

**Evidence**

Of 8 studies that investigated a multicomponent intervention for preventing delirium, 3 were randomized, controlled trials (6–8); 2 were nonrandomized designs (5, 9); and 3 were historical, controlled trials (10–12). All of the studies took place in a hospital setting. Four studies recruited patients undergoing surgery, either for hip fracture (6, 10, 11) or for elective joint replacements (12), and 4 studies included persons with short-term medical illness (5, 7–9). The interventions were largely education or management changes, or both, with structured protocols for patient care. Studies were graded as high (6), moderate (5), low (7–11), or very low (12) quality. Of the studies that reported the primary outcome (5, 6, 8–12), the effect sizes suggested that multicomponent interventions reduced delirium incidence over 7 days, although these estimates were sometimes not statistically significant (9) or were borderline statistically significant (10). Data from the 2 more reliable studies (of high and moderate quality) (5, 6) suggested statistically significant reductions in delirium incidence of about one third with multicomponent interventions. There was an inconsistent effect on reduction in hospital stay and no statistically significant effects on discharge to new long-
term care placement facilities, mortality, or duration and severity of delirium.

**Economic Analysis**

The prevention strategy was cost-effective and was a dominant strategy because it reduced cost and increased quality-adjusted life-year gains compared with the usual care strategy. It was associated with an incremental net monetary benefit of £8180 and £2200 for surgical and medical patients, respectively. The prevention strategy remained cost-effective after sensitivity analyses were conducted.

On the basis of the initial guideline development process and their experience, the guideline development group formulated 13 clinical recommendations (Table). Although there was no clinical or cost-effectiveness evidence specific to multicomponent interventions in long-term care settings, the group felt that the evidence from the hospital population might apply to the long-term care setting. They thought that a multicomponent intervention for long-term care was unlikely to do any harm to patients and could probably be easily accommodated in current care without incurring high costs. Thus, the following recommendations are for hospitalized patients and at-risk adults in long-term care settings.

1. Ensure that persons at risk for delirium are cared for by a team of health care professionals who are familiar with the person at risk. Avoid moving persons within and between wards or rooms unless absolutely necessary.

2. Give a tailored, multicomponent intervention package. Within 24 hours of hospitalization, assess persons at risk for clinical factors contributing to delirium. On the basis of the results of this assessment, provide a multicomponent intervention tailored to the person’s individual needs and care setting.

3. The tailored, multicomponent intervention package should be delivered by a multidisciplinary team trained and competent in delirium prevention.

4. Address cognitive impairment or disorientation by providing appropriate lighting and clear signage, ensuring that a clock (consider providing a 24-hour clock in the critical care unit) and a calendar are easily visible to the person at risk; talking to the person to reorient them by explaining where they are, who they are, and what your role is; introducing cognitively stimulating activities (for example, reminiscence); and facilitating regular visits from family and friends.

5. Address dehydration and constipation by ensuring adequate fluid intake to prevent dehydration by encouraging the person to drink—consider offering subcutaneous or intravenous fluids, if necessary, and taking advice when managing fluid balance in persons with comorbid conditions (for example, heart failure or chronic kidney disease).

6. Assess for hypoxia and optimize oxygen saturation, if necessary, as clinically appropriate.

7. Address infection by looking for and treating infection, avoiding unnecessary catheterization, and implementing infection-control procedures in line with the NICE clinical guideline on infection control (13).

8. Assess immobility or limited mobility through the following actions: Encourage persons to mobilize soon after surgery and walk (provide appropriate walking aids that are accessible at all times) and encourage all persons, including persons who are unable to walk, to carry out active, range-of-motion exercises.

9. Address pain by assessing for pain; looking for nonverbal signs of pain, particularly in persons with communication difficulties (for example, persons with learning difficulties or dementia or persons on a ventilator or who have a tracheostomy); and initiating and reviewing appropriate pain management in any person in whom pain is identified or suspected.

10. Carry out a medication review for persons receiving several drugs, taking into account both the type and the number of medications.

11. Address poor nutrition by following the advice given in the nutrition support in adults section in the NICE clinical guideline 32 (14) and ensuring that dentures fit properly in persons who have them.

12. Address sensory impairment by resolving any reversible cause of the impairment, such as impacted ear wax, and ensuring hearing and visual aids are available to and used by persons who need them, and check that such aids are in good working order.

13. Promote good sleep patterns and sleep hygiene by avoiding nursing or medical procedures during sleeping hours, if possible; scheduling medication rounds to avoid disturbing sleep; and reducing noise to a minimum during sleep periods.

**Table. 2010 NICE Recommendations for Prevention of Delirium in At-Risk Adults**

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Four studies used clocks and calendars to help orient patients. One study augmented these techniques by specific reorienting communication and therapeutic activities. Disorientation was considered important because it is a specific manifestation of persons who have underlying cognitive impairment or dementia. The guideline development group therefore recommended that persons at risk for delirium be provided calendars and clocks that are easily visible. Because some wards (particularly intensive care units) have no natural light that might help patients ascertain whether it is day or night, the group thought that it was important to consider providing a 24-hour clock for persons in the critical care unit. On the basis of their experience, the group also noted the importance of family and friends in helping with patient reorientation.

5. Address dehydration and constipation by ensuring adequate fluid intake to prevent dehydration by encouraging the person to drink—consider offering subcutaneous or intravenous fluids, if necessary, and taking advice when managing fluid balance in persons with comorbid conditions (for example, heart failure or chronic kidney disease).

The group recognized the importance of hydration during the review discussions of the single-component intervention. Although hydration was a component in only 2 of 8 studies in the multicomponent intervention review, the group considered it essential that patients had their hydration needs addressed. The group also considered that constipation, a common complication of dehydration, needed highlighting in this recommendation.

6. Assess for hypoxia and optimize oxygen saturation, if necessary, as clinically appropriate.

This recommendation was based on evidence from 1 study in patients who had undergone surgery for fractured hips and group members’ clinical expertise.

7. Address infection by looking for and treating infection, avoiding unnecessary catheterization, and implementing infection-control procedures in line with the NICE clinical guideline 2 on infection control (13).

The group noted that urinary catheterization posed potential problems both as an iatrogenic procedure and as a form of restraint. The presence of a bladder catheter was shown to be a risk factor for the incidence of delirium in the nonpharmacologic risk-factor review, although the quality of the contributing studies was poor to moderate. Low-quality evidence was found in the risk-factor review, which suggested that physical restraint was associated with delirium incidence. Three of the studies in the multicomponent intervention review had included specific clinical protocols to minimize the use of catheterization.

8. Address immobility or limited mobility through the following actions: Encourage persons to mobilize soon after surgery and walk (provide appropriate walking aids that are accessible at all times) and encourage all persons, including persons who are unable to walk, to carry out active, range-of-motion exercises.

Although evidence from the nonpharmacologic risk-factor reviews was limited for immobility as a risk factor, 6 of 8 multicomponent intervention studies had included specific protocols to address immobility. The group recognized that mobilization is a well-established aspect of good care for frail, older persons.

9. Address pain by assessing for pain; looking for nonverbal signs of pain, particularly in persons with communication difficulties (for example, persons with learning difficulties or dementia or persons on a ventilator or who have a tracheostomy); and initiating and reviewing appropriate pain management in any person in whom pain is identified or suspected.

The group noted the inconsistency in the evidence (from the pharmacologic risk-factor review) relating to opioids as a risk factor for delirium and deliberated whether untreated pain was itself an independent risk factor. The group considered this as indirect evidence. However, evidence from 1 study (as well as group expertise) suggested that pain was a risk factor for delirium. The group was also mindful that pain can be difficult to detect in persons with dementia (an important group at risk for delirium). Hence, they recommended that patients be assessed for both verbal and nonverbal signs of pain, and, if signs are present, a pain-management plan should be put in place.

10. Carry out a medication review for persons receiving several drugs, taking into account both the type and the number of medications.

The risk-factor review concluded that the evidence for polypharmacy was conflicting and difficult to interpret because of the interaction between drug classes, doses, combinations, and the number of agents received. Nonetheless, the clinical experience of the group indicated that drugs were often a contributing cause for episodes of delirium and that a drug review is part of good practice in the management of frail, older persons. Some support for this view came from the multicomponent intervention review because 4 of 8 studies had included a drug review. The group therefore recommended a drug review for all persons at risk for delirium that addressed the type of drugs as well as the number, supporting the principle that if a new long-term drug therapy is required, another should be discontinued to prevent a gradually increasing drug burden.

11. Address poor nutrition by following the advice given in the nutrition support in adults section in the NICE clinical guideline 32 (14) and ensuring that dentures fit properly in persons who have them.

Four of 8 studies included in the multicomponent intervention review included a nutritional component. The previously published NICE nutrition guideline (14) was available, and the group referred to this guidance. The group also made a practical recommendation about den-
tures because they had observed this to be a common problem in clinical practice that led to undernutrition.

12. Address sensory impairment by resolving any reversible cause of the impairment, such as impacted ear wax, ensure hearing and visual aids are available to and used by persons who need them, and check that such aids are in good working order.

There was evidence for visual impairment (but not for hearing impairment) as a statistically significant risk factor for delirium in the risk-factor review. Four of the multicomponent intervention studies included vision and hearing protocols. The group therefore recommended simple measures to improve sensory function and thereby optimize communication and prevent disorientation.

13. Promote good sleep patterns and sleep hygiene by avoiding nursing or medical procedures during sleeping hours, if possible; scheduling medication rounds to avoid disturbing sleep; and reducing noise to a minimum during sleep periods.

The group was aware that inadequate duration and quality of sleep is common in older persons. Two of the multicomponent intervention studies had addressed this issue, although only 1 had provided an adequate description. The group gave some practical recommendations to minimize sleep disruption. Because the NICE guideline for Parkinson disease had already reviewed the evidence on sleep hygiene, the group referred to it (NICE clinical guideline 35 [15]). The group was reluctant to recommend the use of pharmacologic sleep enhancers because the pharmacologic risk-factor review had suggested that benzodiazepines may be associated with delirium.

**RECOMMENDATIONS FOR FUTURE RESEARCH**

The group proposed additional research that would look at both the clinical effectiveness of multicomponent interventions and the cost to the National Health Service of implementing a multicomponent prevention intervention compared with the care that persons in a hospital and long-term care setting currently receive. The group also noted that some of the low-quality, multicomponent prevention studies examined the effectiveness of an educational intervention for staff. They felt that this showed some potential, mostly in the prevention of delirium resulting from increased staff awareness. Thus, the group recommended research to address whether an education program for staff would reduce the incidence of delirium and improve the recording of delirium for patients in the hospital compared with an education leaflet or usual care.

The NICE guidelines are used as care-quality standards by which inspecting and regulating authority providers assess health care organizations in the United Kingdom. The delirium guideline was purposefully developed to include long-term care facilities, where delirium is likely to be common because of clustering of risk factors, particularly old age and dementia. However, long-term care facilities in the United Kingdom are not part of the National Health Service, and how the guideline will be received or implemented in this sector is unclear because there are no well-developed systems for guideline dissemination into care homes.

The guideline development group examined possible prevention strategies that included pharmacologic, single-component, and multicomponent interventions. Because the research evidence base was sufficiently robust for only complex, multicomponent interventions, these approaches were deemed suitable for uptake into routine care, both in hospitals (reasonable evidence) and long-term care settings (indirect evidence only). The lack of evidence for the long-term care setting was expected, but addressing persons in long-term care was considered important because of their high risk for delirium from clustering and high prevalence of known risk factors for the condition, especially older age and dementia. Multicomponent prevention interventions typically target and modify risk factors associated with delirium. Although the overall quality of most of the individual studies was poor, the 8 reviewed studies collectively indicate that risk-factor modification for delirium is clinically feasible and acceptable to patients and staff.

The systematic review suggested that about one third of cases of incident delirium in hospitals (and perhaps long-term care homes) could be prevented by the multicomponent prevention approach. It is acknowledged, however, that the evidence is largely explanatory, with proof-of-concept studies conducted by enthusiastic experts in experimental situations in which follow-up was limited. Larger, pragmatic, multicenter trials should be conducted to confirm these provisional findings, as well as trials in long-term care settings. Nevertheless, the general approach of risk-factor modification for delirium seems highly attractive from the health economic perspective. Models that assessed the economic effect of delirium prevention in at-risk patients admitted to medical wards and patients hospitalized with a hip fracture showed that delirium prevention was a cost-effective strategy that reduced cost and improved health outcome compared with usual care. Thus, a widely deployed delirium-prevention strategy in hospitals and long-term care homes would be expected to save money.

Some groups of patients are at higher risk for delirium than others. It may make sense to target delirium prevention to these groups. The guideline development group identified 4 easy-to-define clinical groups that individually had a greater than 5-fold increased risk for delirium from the systematic review of nonpharmacologic risk factors (full version of the NICE delirium guideline [16]). These groups were persons aged 65 years or older and persons with cognitive impairment or dementia, severe illness, and current hip fracture. Because most persons in long-term care settings are older than 65 years and many have cognitive impairment, most residents will be at high risk.
for delirium, and therefore, the prevention program should be widely implemented.

Several moves within an acute care hospital are now common. Many patients will move subsequently from the emergency department to assessment units to acute care wards and sometimes to post–acute care wards. Constant moving is an example of how the whole hospital environment does not promote a person-centered approach. Moving could make it difficult for a sick person on the brink of a delirium episode to maintain his or her orientation and contact with reality. Another example is the excessive noise in hospital wards that disrupts sleep—an important risk factor for delirium. By systematically attending to issues such as these, the occurrence and effect of delirium can be reduced.

The key components of the multicomponent intervention package (Table) may not seem challenging. They may even be considered basic care. However, the challenge for delirium prevention is one of high fidelity. Some of these components are provided to some of the patients some of the time, but prevention of delirium requires that we do all of these things all the time to all of the patients who are at risk. In other words, we need to provide a tailored intervention to meet each patient’s needs. This enhanced approach goes beyond well-trained and prepared staff. It requires a health care system or systems that support comprehensive and reliable delivery of specific tasks. This aspect was incorporated into the guideline-implementation tools that accompanied the publication of the guideline.

**CONCLUSION**

Delirium is a neglected condition relative to its frequency and serious consequences. The recently published NICE guideline contained 3 headline conclusions: Delirium is underrecognized and underdiagnosed, about one third of all delirium episodes could be prevented, and delirium prevention would be a cost-effective strategy. Herein, we summarized effective strategies recommended for delirium prevention in this synopsis, including orienting communication, therapeutic activities, early mobilization and walking, nonpharmacologic approaches to sleep, maintaining nutrition and hydration, adaptive equipment for vision and hearing impairment, medication review, infection control, preventing hypoxia, and pain management.

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APPENDIX

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