Implementation of a System-Wide Quality Improvement Project to Prevent Delirium in Hospitalized Patients

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Abstract

- **Objective:** To describe a hospital and health system-wide continuous quality improvement project to improve early detection, treatment, and prevention of delirium.

- **Methods:** Protocols were pilot tested then built into daily work processes for all hospitalized medical-surgical patients. All patients admitted to the Acute Care for Elders unit were included in the pilot (n = 102 pre-protocol, n = 97 post-protocol).

- **Results:** After implementing the protocols, there was a significant reduction in average length of stay for patients with delirium (7.6 days pre versus 4.0 days post). Decreases were also seen in rates of death (23% vs 9.5%), ICU transfers (18% vs 0%), and 30-day readmissions (31% vs 5%).

- **Conclusions:** Implementation of delirium prevention and treatment protocols can decrease the incidence and negative consequences of delirium in the acute care hospital. These protocols are easily incorporated into daily work processes.

Delirium is an acute, fluctuating disturbance of consciousness, attention, cognition, and perception that can affect sleep, psychomotor activity, and emotions. It is the most common psychiatric syndrome seen in the hospital setting, affecting up to 20% of elderly patients, with even higher rates found on intensive care units (ICUs) and oncology and surgical wards [1,2]. Patients who develop delirium have higher rates of morbidity and mortality, rates comparable to those seen in patients with sepsis or myocardial infarction [1,3]. They also have longer hospital stays and higher rates of posthospital institutional care [4,5].

Delirium can be prevented. Studies have shown that the incidence of delirium can be reduced by a third through avoiding sleep deprivation, enhancing mobility, addressing visual and hearing impairments, avoiding dehydration, and cognitively stimulating at-risk elderly patients [6]. When the avoidance of medications precipitating delirium is part of the prevention protocol, delirium can be decreased by more than half [7]. If delirium does develop, early recognition and prompt identification of the underlying cause may decrease severity and associated morbidity [8].

Summa Health System (SHS) is one of the largest integrated health care delivery systems in Ohio with over 2000 licensed beds, 6 community hospitals, 4 community health centers, 10,000 employees, and its own health plan. SHS maintains a strong commitment to patient safety and quality. In 2007, the division of geriatric medicine approached the patient safety committee with a concern about the incidence and underrecognition of delirium by nursing and medical staff. An audit revealed that delirium was being identified by the primary care team only 30% of the time compared to what was documented by the inpatient geriatric consult service. Although SHS had an Acute Care for Elders (ACE) unit [9] that employed a guideline for the prevention and treatment of delirium, the guideline was not regularly used in the unit or available outside the unit. After a presentation demonstrating the poor outcomes and increased resource consumption associated with delirium and evidence showing the effectiveness of prevention practices, the patient safety committee decided to make prevention and treatment of delirium a key clinical quality improvement project for the system. This paper describes the implementation and outcomes of our project.

The ABCs of Implementation

**A: Agree**

After endorsement by the patient safety committee, the next step was to obtain agreement among stakeholders. To achieve this, a steering group was assembled whose membership included senior management, board members, physician leadership, the vice president of medical affairs, key
Delirium Prevention

Department chairs, senior and mid management nursing leadership, laboratory, pharmacy, and emergency medicine leadership, and quality office personnel. A 1-hour kickoff presentation made to the steering committee by the chief of geriatric medicine and leader of the delirium prevention and treatment project provided background information on delirium, barriers to detection and treatment, and the poor outcomes associated with the condition. A multidisciplinary task force from the division of geriatric medicine had previously outlined a strategy for improvement and identified potential outcomes that could result from an improvement plan. The presentation secured buy-in from the top down and was key to obtaining the agreement of those who would be needed to participate in and provide support for the project.

B: Build
Once the Agree phase was completed and there was assurance of widespread support, a multidisciplinary delirium workgroup was established that included physician leadership from medicine, neurology, geropsychiatry, geriatric medicine, emergency medicine, and surgery; nursing leadership from the ACE unit, including advance practice nursing and staff nurses; medical, surgical, emergency department, and behavioral health staff nurses; and social work. The team also included the director of hospital quality, nurse quality management and leadership, nurses from clinical informatics, geriatric pharmacy, and geriatric medicine fellows. The geriatrics department provided the chair and facilitation leadership for this group along with the quality office.

The group met monthly over about half a year to outline the scope of work, define outcome measures, discuss how to integrate screening and monitoring into daily nursing work flow, and devise a computerized physician order set for the management of delirium, including diagnostic workup and medication management protocols for antipsychotic use. Key objectives were to develop protocols to identify patients at risk for delirium, to implement evidence-based measures to decrease the incidence of this syndrome, and to develop a standardized treatment intervention for active delirium.

The workgroup reviewed the literature to identify practical and validated delirium screening and diagnostic tools. The emergency medicine research center at SHS had been evaluating cognitive screening tools for use in the ED and had participated in testing and validating the Six-Item Screener (SIS) [10] to detect cognitive impairment in ED patients. The SIS has a sensitivity of 69% to 94% and a specificity of 81% to 86% for detecting cognitive impairment when compared with a structured diagnostic clinical assessment in community-dwelling elderly African Americans and patients referred to an Alzheimer's clinic [10]. A group of medical-surgical nurses pilot tested the SIS, and the SIS was found to be acceptable for use in our system. In addition, prior research at our institution [11] had shown that a positive answer to the admission assessment question “have you been confused in prior hospitalizations” was a strong predictor for incident delirium. This question together with the SIS were the 2 screening tools we incorporated into our protocol. For patients with a positive score on SIS or “yes” answer to the assessment question, the delirium prevention protocol (called an interdisciplinary plan of care) was initiated (Figure 1).

A number of validated delirium assessment instruments are available. The geriatric medicine health services research office had previously evaluated the Confusion Assessment Method (CAM) [12] and the Neelon and Champagne Confusion Scale (NEECHAM) [13] and had found that neither of these instruments, though evidenced-based, met our needs. The workgroup considered other instruments, including the Nursing Delirium Screening Scale (NuDESC) [14], which was being used in some other health systems. The NuDESC was pilot tested on the ACE unit by nursing and was found to be an acceptable tool to help identify patients with active delirium.

Since medications are a causative and/or contributory factor in most cases of delirium, the workgroup designed a pharmacy notification process for patients identified with positive SIS and/or NuDESC. Upon receipt of the notification, the pharmacist reviews the current medication regimen and the patient’s history. Delirium can be the result of sudden withdrawal of home medications like benzodiazepines, SSRIs, or narcotics. The pharmacy review is able to identify the cases in which this has occurred. In addition, new medication orders are assessed for delirium risk by a computerized check for drug–disease interactions, with a notification to the pharmacist. Prescribers are contacted and advised to offer alternatives.

Lastly, the workgroup developed a computerized delirium treatment order set. The order set standardizes diagnostic tests and procedures, standardizes nonpharmacologic interventions, eliminates the use of benzodiazepines as a treatment option, eliminates the intravenous route for haloperidol, encourages that antipsychotics be used only when patients place themselves or others at risk, limits antipsychotic choices to those with best evidence of safety, and of that group, those that are most cost-effective, and encourages appropriate dosing of antipsychotics including the use of a loading dose of haloperidol.

C: Commence
Once these processes were mapped, pre-pilot tested, and modified, the workgroup proceeded with a formal pilot demonstration on the ACE unit. Three of the authors (EB, LB
The first step was education of all ACE unit staff. Several training modules and case studies were developed that assessed staff’s knowledge and provided education in delirium recognition, treatment, and prevention. The unit manager played a key role in ensuring staff participation. The screening instruments were introduced sequentially to accommodate nursing workload. Initially the nurses were taught how to use the SIS tool and it was used for every admission for several weeks until nurses were comfortable

Figure 1. Summa Health System nursing interventions for delirium protocol.
using it. Then the NuDESC tool was introduced and nurses were given several weeks to practice with it. Nurses were required to complete competencies for both tools. Education and support were provided to nurses on all shifts. Master users from across shifts were identified and trained.

Once the education on the use of assessment tools was completed, the pre-intervention phase was started. For this phase, 100 patients consecutively admitted to the ACE unit were screened for incident or prevalent delirium using the SIS and NuDESC. There were no delirium prevention or treatment protocols in place at this time, no pharmacy intervention, and no delirium computerized order sets. Care was provided as usual except that physicians were notified of a positive NuDESC that their patient “may have delirium and needs further assessment.” This process took about 2 weeks. The physicians had been notified about the pilot through department meetings, notifications, and medical staff newsletters. The results of the pre-intervention phase showed the incidence of delirium to be 8.8%.

After the pre-pilot was completed, ACE nurses were educated regarding the delirium prevention and treatment protocols. The post-intervention outcomes were measured 2 months after the protocols were introduced. Again, 100 patients consecutively admitted to the ACE unit were screened for delirium risk using the SIS and incident or prevalent delirium using the NuDESC. For patients with a positive SIS, the prevention protocols were initiated and for patients with a positive NuDESC, the treatment protocols were implemented.

D,E,F: Document, Evaluate, Feedback

After implementing the protocols there was a decrease in the incidence of delirium from 8.8% to 7.2% (1.6% difference; 95% CI = –5.9% to 9.1%). There was also a significant reduction in average length of stay for patients with delirium (7.6 days pre vs. 4.0 days post [3.6-day difference; 95% CI = 0.66 to 6.49]). Post-implementation outcomes also included fewer deaths (23% vs. 9.5% [13.5% difference; 95% CI = 3.4% to 23.5%]), fewer transfers to the ICU (18% vs 0% [18% difference; 95% CI = 10.5% to 25.4%]) and fewer 30-day readmissions (31% to 5% [26% difference; 95% CI = 16% to 36%]). A higher percentage of post-implementation patients had an antipsychotic administered during their hospital stay.

The next step was to disseminate the program to all medical-surgical floors. With the support of staff development and nursing staff from the ACE unit, 2000 hours of nursing education and staff development were provided to all medical-surgical nurses. In addition, the Rapid Response Team was educated regarding the protocols and tools and established as a 24-7 resource for delirium issues. This aligned with treating delirium as a medical emergency, thus elevating the importance of this syndrome throughout the system.

The workgroup has established ongoing audits of the processes through the nursing quality office. Variances in use of the SIS, NuDESC, prevention protocol, treatment order set, pharmacy notification and physician notification are all monitored and reports are provided to the workgroup and the unit managers of the various medical-surgical units.

Delirium as a diagnosis is recorded in the administrative database less than 15% of the time, thus making use of administrative databases inadequate to measure quality. Thus the workgroup designed a scorecard to track the variables that would most likely be impacted by decreasing the incidence and prevalence of delirium (Figure 2). The workgroup is also tracking financial and utilization outcomes with the assistance of the financial analysts. Preliminary results show a decrease in average variable costs and increasing use of the delirium order set.

Communication has played an important role. Newsletters were developed for nursing, pharmacy, and medical staff and are sent out regularly with updates or focused education reviews such as appropriate medication management. A full lecture was presented at medical grand rounds on delirium and the protocol. Also, all the educational materials, Powerpoint presentations, reference articles, tools and frequently asked questions have been uploaded on the system intranet for easy access by any Summa Health System employee or medical staff.

Successes

We have received positive feedback from nurses regarding use of the NuDESC. Another sign of success is that a number of our physicians are taking the protocol to other hospitals. In addition, physician acceptance and use of the delirium order set has been high. The system has benefited by better recognition and understanding of the seriousness of delirium and embracing it as a quality improvement area.

Challenges

A major challenge to all new processes is ensuring consistent incorporation of the process into daily procedures. Continuous reinforcement of the initial education is essential. Champions have been identified on each nursing unit to assist with education. Process issues identified through audits offer opportunities to identify barriers and to develop action plans to improve the process. Outcome measures would ideally be monitored via computerized tracking of delirium risk and delirium incidence. Summa Health System is currently incorporating the NuDESC score into the computerized order entry process and the electronic medical record to facilitate outcome measurement.
Next Steps

Other hospitals within Summa Health System have created their own work teams and have begun the process to adapt the above-described processes into their workflow. Our critical care department has organized a delirium work team and has adapted the above tools and process to their workflow. Preliminary reports by nursing staff have been extremely positive and they have recognized that critical

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**MRN**

**Admission date**

**Sex:** M or F

**Age:** 65 or older

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**Discharge destination:**

- Home
- Extended care facility
- Death
- Other (write in)

**(check box)**

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**Figure 2.** Scorecard used to track process and outcome variables.
Delirium prevention care was not appreciating this condition and oversedating with the use of benzodiazepines and other medications. A detailed chart audit and retrospective analysis of the process and protocols is planned for the non-ACE unit floors to evaluate the impact on incidence, prevalence, and clinical outcomes. Other audits are being done regarding haloperidol dosing and administration, and the inappropriate use of lorazepam for delirium.

Discussion
Improving hospital care of older adults and those with chronic illness is a major focus for the quality improvement and patient safety movement. By the year 2030, the U.S. population aged 65 and older will exceed 70 million. More than two-thirds of Medicare beneficiaries have 2 or more chronic illnesses, which require extensive inpatient and outpatient medical care. Acute care hospital processes have largely been organized around the treatment of acute conditions and are procedure-oriented. However, they lack the innovation, education, and insight on how to improve the care of this large demographic of the population who are typically admitted to the hospital with an acute exacerbation of a chronic illness superimposed on other comorbid conditions as well as decreased physiologic reserves. This population is particularly vulnerable to poor outcomes and iatrogenic illnesses that could be improved with changes in how hospital care is delivered. Several innovative programs like the Hospital Elder Life Program (HELP) [15] and the ACE units [16] have demonstrated how quality of care can be improved, but these models have been challenged by organizational barriers, health policy, and health care reimbursement issues. Our report demonstrates that a system-wide continuous quality improvement process can be applied and evidence-based models can be adapted and amplified to overcome some of these barriers to improving the quality and process of care for older adults at risk of developing delirium during an acute hospitalization.

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References