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## Delirium Screening of Patients on a Neuroscience Step-Down Unit

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### Abstract

This project aimed to identify patients who had experienced a stroke and were at risk for delirium earlier, and implement evidence-based protocols to reduce overall length of stay and mortality. Nurses were motivated to perform screening and implement strategies that benefit patients who had experienced acute stroke. Results suggest early identification and treatment of delirium, use of prevention strategies, and treatment of the underlying etiology can improve patient outcomes and reduce cost of care.

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Delirium is an acute change in cognition and disturbance of consciousness that develops over a short period, typically hours to days (Mulkey, Hardin et al., 2018). While delirium occurs in up to 65% of hospitalized older adults, less than 5% are diagnosed (van Velthuisen et al., 2018). Delirium increases mortality, hospital length of stay (LOS), and long-term cognitive and functional impairment, with direct annual costs of approximately \$165 billion to care for survivors (Mulkey, Hardin et al., 2018; van Montfort et al., 2019). The four key characteristics of delirium include inability to pay attention or to think clearly, disorientation, and fluctuations in level of alertness (Mulkey, Hardin et al., 2018).

Acute stroke and prior cognitive impairment increase vulnerability and pose unique challenges to early identification (Mulkey, Hardin et al., 2018; Pasinska et al., 2018). Variations in study design and significant treatment changes (e.g., thrombolysis) limit comparison of findings (Pasinska et al., 2018; Song et al., 2018; Stangeland et al., 2018). In patients who have experienced stroke, applying the Diagnostic and Statistical Manual V (DSM-5) definition is not straightforward due to the potential for overlapping symptoms and concern for psychiatric disorders (American Psychiatric Association, 2013; Infante et al., 2017; Pasinska et al., 2018). Symptom overlap, inaccurate assessment (e.g., wrong instrument), and lack of proper training and standardized protocols result in dramatic under-recognition of delirium (Infante et al., 2017; Mansutti et al., 2019). While frequent routine screening and individualized multicomponent programs (e.g., early mobility, establishment

of day and night routines, promotion of sleep hygiene) are the most effective intervention, they are challenging to implement in this population (Hosoya et al., 2018; Mansutti et al., 2019; Mulkey, 2019).

## Project Site and Reason for Change

The neuroscience step-down unit at the project site primarily houses patients diagnosed with stroke. Patient acuity on this unit is high, including patients with cardiac monitoring, intravenous medications (e.g., alteplase and vasoactive drips), invasive lines such as arterial lines and lumbar drains. Typical nurse-to-patient ratios of 1:3-4 may be reduced to 1:2 for higher-acuity patient assignments.

During a review of hospital mortality, a common factor was identified; many deceased patients had developed delirium. Interestingly, patients who developed delirium before hospital admission fared better than those whose delirium was identified initially during their hospital stay, with a risk-adjusted mortality rate of 0.96 and 1.40, respectively. Patients with delirium also experienced extended hospital LOS even after risk adjustment, with rates of 1.38 compared to 1.05 for patients without delirium. Further investigation revealed no process for delirium screening outside the intensive care unit (ICU) had been established. An opportunity existed to improve outcomes and reduce mortality. While an approach for non-ICUs was needed, it was essential to identify feasible strategies for patients considered more challenging to diagnose. Because some symptoms overlap, delirium identification in patients experiencing acute stroke was particularly concerning.

## Program

Delirium was determined to be underdiagnosed significantly; prevention and intervention strategies were lacking. Therefore, the goal of this project was early identification of patients who had experienced a stroke and were at risk for delirium, and implementation of evidence-based protocols to reduce overall LOS and mortality. Project goals included adherence to using a validated delirium assessment tool, implementing a standardized delirium plan of care, and comparing delirium-positive rates to reports in the literature.

The interprofessional team included clinical staff from nursing, physical therapy, occupational therapy, and medicine, and quality and data management departments, and senior leaders. They agreed a routine delirium screening with multicomponent prevention and intervention strategies should be implemented as standard of care. By increasing awareness through education, members believed these practices would be implemented routinely and earlier. Patient outcomes, mortality rates, and overall healthcare costs would improve. Nurse champions provided local clinical oversight. Unit-based leaders, clinical nurse specialists, nurse educators, and the interprofessional team coordinated quality improvement efforts. However, clinical oversight was provided by nurse champions who were clinical nurses interested in delirium and assigned by the unit manager.

## Evaluation and Action Plan

Ensuring best practices focused on prevention, recognition, and management, along with team adherence, was the priority. The project was launched through presentations at unit staff meetings by increasing staff awareness and describing needed practice changes. Subsequently, education developed by the interprofessional team based on delirium education from Nurses Improving Care for Healthsystem Elders (NICHE) in the form of role-specific online modules (nurse, allied health, provider) was offered. Content consisted of basic delirium knowledge and patient-associated outcomes. Because nurses were not familiar with the delirium screening process, a second educational initiative on screening was required before implementation. On-the-unit training was provided by the clinical nurse specialist and nurse champions to complete patient assessments using the delirium screening tool and answer staff questions.

Various screening assessment tools (e.g., 4 A's Test, Confusion Assessment Method, Nursing Delirium Screening Checklist [NuDESC]) were evaluated and presented to the clinical nursing practice shared governance committee for approval (Bellelli et al., 2014; Inouye et al., 1990; Mulkey, Roberson et al., 2018; Neufeld et al., 2013). Committee members selected the NuDESC because it is used widely in the literature, has high reliability across a wide number of non-ICU patient populations, and is used readily by clinical staff (Mulkey, Roberson et al., 2018). The NuDESC has high sensitivity and specificity (86% and 87%, respectively) in various patient populations (Gaudreau et al., 2005). It requires a 1-2-minute retrospective (24-hour) behavioral assessment without the need for active patient participation. Five features are evaluated: disorientation, inappropriate behavior, inappropriate communication, illusions/hallucinations, and psychomotor retardation (Mulkey, Roberson et al., 2018). Each item is scored based on symptom severity (0=*absent*, 1=*mild*, 2=*severe*). A sum of 2 or higher is positive for delirium.

Clinical nurse educators and clinical nurse specialists at the project site provided initial delirium education. Content included use of the NuDESC and intervention strategies for delirium-positive patients. The nurse champion described alignment with organizational goals, provided education and real-time support, and reminded staff to complete assessments, mobilize, and sustain protocols and practice changes. Once educated, nurses were required to assess patients for delirium using the NuDESC on admission, every shift, and with any change in the patient's cognitive status. Results were documented. If the patient was positive for delirium, nurses were to notify the provider and implement a delirium care plan. At the top of the screen, a color-coded banner identifying delirium status was visible any time the patient's record was accessed. An at-risk best practice alert was automatic when screenings were negative, but the patient had predetermined factors that increased delirium risk (see Table 1).

Several strategies were implemented to promote use of individualized care plans. These included nurse-driven changes in patient care (e.g., uninterrupted sleep, establishment of day/night routines, early mobility) and medication review by providers and pharmacists. Recommended interventions were incorporated into care plans as strategies nurses could

select when caring for each patient (Rohatgi et al., 2019). Options within the nursing care plan included early mobilization, re-orientation, sleep promotion, hydration and nutrition support, and interprofessional collaboration (e.g., therapy, pharmacy, medicine) (see Table 2).

Post-implementation data were collected, including process metrics and rates of patients who expired and had a delirium diagnosis. All patients were included in data monitoring if they were on the unit the entire shift. The nurse champion collected data regarding assessments and care plan adherence with real-time feedback and staff meeting updates. Each clinical nurse received monthly data regarding adherence to documentation requirements, and use of selected interventions.

## Results and Limitations

Nurses on the neuroscience nursing unit screened approximately 190 patients/month for delirium ( $N=963$ ). Over 8 months following implementation, the neuroscience unit consistently maintained greater than 80% adherence to screening patients and implementing nursing care plans for delirium, exceeding the project goal. Additionally, less than 1% of all patients were documented as *unable to assess*. Reason for not screening was patients were in a minimally conscious state. Of those screened, approximately 10% ( $n=104$ ) of patients screened positive for delirium. Mortality for patients with a diagnosis of delirium decreased 33.7%. Hospital LOS decreased 6.1%, and delirium-associated 30-day readmission decreased 40.9%.

The project site is a quaternary care and comprehensive stroke center with a higher number of patients with hemorrhagic or severe ischemic stroke, and higher overall mortality than other stroke types was likely. While Mc Manus and coauthors (2011) found delirium worsened clinical outcomes in approximately 48% of all patients who experienced a stroke, other factors may have impacted reducing overall mortality at the project site. A decrease in the percentage of patients with more severe strokes may have decreased the case mix index (proportion of patients with higher acuity), possibly contributing to mortality and hospital LOS reduction. The decline in mortality also may have been due partially to implementation of delirium prevention strategies on all patients on the unit rather than only those with confirmed delirium.

## Lesson Learned/Nursing Implications

Providing education regarding delirium increased awareness. A standardized screening process high-lighted behavior consistent with delirium and improved detection. Implementation of nursing care plans and medication review by providers and pharmacists also likely played a role in reduced LOS, mortality index (ratio of observed/expected based on illness severity), and 30-day readmissions. Although identifying delirium in 10% of patients screened might seem small, it represents a positive impact and provides more opportunities for improvement. Project data reflect the work of Mansutti and colleagues (2019), who reported delirium rates in patients experiencing a stroke as 10%-48%. Results suggest early identification and treatment of delirium, use of prevention strategies, and

treatment of the underlying etiology can improve patient outcomes and reduce cost of care. This project demonstrated nurses were motivated to perform screening and implement strategies that benefit patients who experienced an acute stroke.

Combining systematic screening with a comprehensive delirium management program is feasible to implement within the daily routine of a busy acute stroke unit. Routine screening can guide changes to treatment plans for newly identified delirious patients and lead to earlier delirium resolution. A standardized approach to detection, prevention, and intervention increased early delirium detection. By identifying delirium earlier, the care team can implement appropriate treatment strategies.

Nurse champions and unit leaders serve as process owners. Ownership includes implementation, ongoing evaluation, educational support, and real-time feedback. Clinical staff in the champion role to support and provide real-time 1:1 rounding and feedback were critical to project success.

With appropriate support, use of a prescribed interprofessional protocol can influence the course of delirium and reduce severity in patients who experienced an acute stroke. Successful sustainability and optimization after completing the pilot phase resulted from an engaged unit nurse manager throughout the processes. An environment of encouragement, collaboration, and cooperation fostered at all levels is critical to success and sustainability.

## Conclusion

Consequences of delirium among patients who experienced stroke confirm the need for nursing interventions to prevent, identify, and treat delirium. Nurses are in a distinct position to impact patient outcomes by providing high-quality care to prevent, identify, and manage delirium when it is most responsive to treatment (Owen et al., 2019). Having a team approach for delirium prevention and intervention can affect patient outcomes, mortality, and overall cost of care. Leader support for ongoing protocol adherence and patient outcomes evaluation is needed to assist with project sustainability.

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**Literature Summary**

- As many as 38% of acutely ill patients who experienced a stroke will develop delirium during hospitalization (Hosoya et al., 2018).
- Patients who have experienced a stroke are particularly vulnerable, and those who develop delirium are at higher risk of functional dependence on hospital discharge (Alvarez-Perez & Paiva, 2017; Mansutti et al., 2019).
- Implementation of delirium prevention interventions significantly affected delirium incidence and severity, stroke impact, and length of hospitalization among older adults experiencing an acute stroke (Song et al., 2018).

**CQI Model**

Lean Six Sigma Green Belt Projects (Martínez León Hilda, 2019)

**Quality Indicators with Operational Definitions and Data Collection Method**

Implementation of delirium screening and prevention/management strategies were monitored via electronic medical record reporting.

**Clinical Setting**

32-bed neuroscience step-down unit in a 900-bed quaternary care center

**Program Objectives**

- Improve risk-adjusted rates to less than 1.0, meaning length of stay and mortality were better than expected
- Greater than 80% adherence to delirium assessment using the Nursing Delirium Screening Checklist, nurse and provider completion of online interactive education modules, and 100% implementation of proposed care plan strategies



**TABLE 1.**

**Criteria for Increased Risk for Developing Delirium**

|                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Patient age &gt;80</li> <li>• <i>orage</i> &gt;65 and at least three conditions from COPD, heart disease, CAD, stroke, CKD, renal failure, psychiatric problems</li> <li>• <i>orage</i> &gt;65 and diagnosis of dementia</li> <li>• <i>orage</i> &gt;65 and NuDESC 2 during previous stay</li> <li>• <i>orage</i> &lt;65 and history of delirium diagnosis</li> </ul> |
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COPD = chronic obstructive pulmonary disease, CAD = coronary artery disease, CKD = chronic kidney disease

**Sources:** Mulkey, Hardin, et al., 2018; Mulkey, Roberson, et al., 2018; Neufeld et al., 2013

TABLE 2.

Care Plan Components for Patients at High Risk for Delirium

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <p><b>Goal:</b> <i>Prioritize delirium prevention interventions focused on mobility, orientation, hydration, rest and comfort, and communication.</i></p> <p><b>Mobility</b></p> <p><b>Goal:</b> <i>The patient will be mobile.</i></p> <ul style="list-style-type: none"> <li>• Ensure patient is out of bed for meals. If this is unsafe, then put bed in chair position as alternative.</li> <li>• All lines, catheters, monitors, and physical restraints are removed as soon as clinically indicated.</li> </ul> <p><b>Orientation</b></p> <p><b>Goal:</b> <i>The patient will be oriented to person, time, or place in the environment.</i></p> <ul style="list-style-type: none"> <li>• Ensure patient's glasses and hearing aids are available and encourage use.</li> <li>• Orient patient to day/night, including opening blinds at sunrise and offering orienting information and activities as part of daily care.</li> </ul> <p><b>Sleep, Rest, and Comfort</b></p> <p><b>Goal:</b> <i>The patient will be comfortable and rested.</i></p> <ul style="list-style-type: none"> <li>• Coordinate/cluster care to allow periods of rest and consider obtaining order for non-interrupted sleep if clinically able.</li> <li>• Work to relieve discomfort, including discomfort associated with constipation, distended bladder, and immobility.</li> </ul> <p><b>Hydration and Nutrition</b></p> <p><b>Goal:</b> <i>The patient will be hydrated and nourished.</i></p> <ul style="list-style-type: none"> <li>• Offer something to drink with each interaction as allowed, particularly in older adults due to decreased sense of thirst.</li> <li>• Establish/maintain normal fluid/electrolytes; monitor for signs and symptoms of dehydration.</li> </ul> <p><b>Collaboration and Communication</b></p> <p><b>Goal:</b> <i>The patient's status will be effectively communicated to the care team.</i></p> <ul style="list-style-type: none"> <li>• Communicate with care team on high-risk medications and other plans to prevent delirium.</li> <li>• Encourage family to stay with the patient. Educate family about delirium and how to help keep patient safe.</li> </ul> |
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Sources: Sanchez et al., 2019; Vlisides & Avidan, 2019; Woodhouse et al., 2019