Early Identification of Delirium in Intensive Care Unit Patients: Improving the Quality of Care

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**BACKGROUND.** Delirium has long-term consequences for intensive care unit patients. The project site, an urban academic hospital, did not previously use a validated delirium screening tool, and patients commonly received sedative medications to treat agitation.

**OBJECTIVE.** To minimize the risk of delirium by implementing the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) as the standard-of-care delirium assessment tool in the intensive care unit and by decreasing use of high-risk medications (ie, opioids and benzodiazepines).

**METHODS.** An observational pretest-posttest design was used to analyze deidentified patient data from electronic health records. The evidence-based practice intervention focused on educating nurses on high-risk medications and CAM-ICU implementation. Control charts, $\chi^2$ tests, and mixed regression models were used to evaluate the effectiveness of the intervention in reducing delirium risk by decreasing use of high-risk medications.

**RESULTS.** High-risk medication use significantly decreased after intervention among patients at low risk for delirium (before intervention, 7.37%; after intervention, 3.92%; $P < .001$) and at high risk for delirium (before intervention, 4.73%; after intervention, 2.99%; $P < .001$). Hospital stays were significantly shorter in patients at low risk than at high risk for delirium ($P < .001$) but increased by a mean of 0.13 days with each additional high-risk medication used ($P < .001$).

**CONCLUSIONS.** The variation of high-risk medication use was significantly controlled with the implementation of CAM-ICU and education. Nurses felt that hands-on training with the CAM-ICU increased their comfort in identifying patients at risk for delirium. Future work will focus on assessment accuracy. (*Critical Care Nurse*. 2020;40[2]:33-43)

Delirium, which is characterized by alterations of consciousness, attention, and perception, occurs in at least one-third of patients in the intensive care unit (ICU) and nearly 80% of patients receiving mechanical ventilation. Delirium symptoms can linger for weeks or months in some cases and resolve when the underlying condition is treated. Predisposing risk factors include severe medical conditions (sepsis, respiratory failure, metabolic imbalances, trauma, etc), age greater than 65 years, history of dementia, and use of high-risk medications (HRMs). Opioid and benzodiazepine drugs are potentially inappropriate medication classes for older adult patients because...
they disinhibit behavior and cause oversedation, leading to confusion.6-9 Delirium predisposes patients to longer hospital stays, increased risk for reintubation, increased morbidity and mortality, more likely discharge to a long-term care facility after hospitalization, development of posttraumatic stress disorder, and decreased quality of life, all contributing to a tremendous financial burden to society.1,10-14

The prevalence of delirium and its numerous contributing factors make this condition a potential target for improved health care delivery. Delirium detection is a hallmark of any prevention or treatment strategy. Clinical practice guidelines recommend the routine use of valid and reliable delirium assessment tools (eg, the Confusion Assessment Method for the ICU [CAM-ICU]) in critical care practice.15,16

The Local Problem

Delirium is poorly understood because of the variety of terms used to describe the symptoms (eg, encephalopathy, ICU psychosis, altered mental status, and catatonia).2,17 At the onset of this quality improvement (QI) project, our ICU did not use delirium as a standard term and did not use a screening tool to accurately identify delirium despite recommendations to use a validated screening tool at least once per shift.15,16 In general, only one-third of nurses and physicians accurately recognize delirium by using judgment alone, resulting in prolonged delirium episodes and worse outcomes for patients.18-20 A lack of standardized screening also contributes to inconsistency in treatment methods. At our institution, symptoms of agitation and increased sedation were typically treated with HRMs, particularly opioids and benzodiazepines. Inappropriate use of HRMs can prolong confusion and increase the burden on nurses and other front-line staff.21

The purpose of this evidence-based QI project was to educate nursing staff about risk factors for delirium (such as HRM use) and consequences of delirium (such as poor outcomes and longer hospital stays). In addition, after nurses were trained to use the CAM-ICU as a standard screening tool, the CAM-ICU was implemented in the nursing standard of care and used once per shift. Our aims were to improve nurses’ awareness of delirium risk factors, achieve nurse competence in using the CAM-ICU, and decrease HRM use in the ICU to prevent delirium and decrease length of stay (LOS) in medical ICU (MICU) patients.22,23 These outcome measures were formulated on the basis of a gap analysis performed before the study to compare current practices with national standards. Opioids and benzodiazepines were selected for this project because these medication classes were found to be the most problematic in the gap analysis.

Conceptual Model

The Iowa model of evidence-based practice to improve quality of care is a 7-step process involving a team approach for organizational change.24 We used the Iowa model to organize the phases of this project and keep implementation on schedule. We used the Institute for Healthcare Improvement model, a plan-do-study-act cycle, to test whether we achieved our aims of improving nurses’ awareness of delirium symptoms and decreasing HRM use. We used the Vanderbilt University Medical Center training manual for the CAM-ICU25 as a framework to implement the CAM-ICU into nursing practice.

Methods

Context

In this QI project, we evaluated the effects of a delirium screening and education intervention by comparing data
The CAM-ICU is valid and reliable, with 80% sensitivity and 96% specificity in patients receiving mechanical ventilation,\textsuperscript{14,22} making it ideal for the ICU setting. At the time this QI project began, the study unit was already using the Richmond Agitation-Sedation Scale (RASS), a component of the CAM-ICU, to evaluate level of consciousness. The hospital was also in the early stages of a merger with another hospital system that had already implemented the CAM-ICU. The use of the CAM-ICU, therefore, aligned with efforts to synchronize assessment tools across all of the hospitals in the system for the long term. The high quality of the CAM-ICU and its familiarity within the hospital system made it ideal for this QI project.

**Intervention**

This project had 2 phases. Phase 1, from January through September 2017, included baseline data collection and preparation for the intervention. Phase 2, from October 2017 through March 2018, included implementation of the CAM-ICU in the electronic health record (EHR) and CAM-ICU spot checks with nurses (Figure 1).

Phase 1 was the longer phase (9 months) to allow time to collect baseline data on nurses’ knowledge and MICU patient demographics and to provide online education for nurses. A team was formed to organize the upcoming change, and multiple meetings were held with administrators to garner support to use the CAM-ICU and build the tool into the EHR. The team consisted of the following MICU personnel: 1 nurse practitioner, 1 nurse manager, 1 nurse educator, 2 nurse champions from the day shift, and 2 nurse champions from the night shift. This nursing team met regularly throughout phase 1 to develop strategies to implement the project. This team also led plan-do-study-act cycles\textsuperscript{27} to promote rapid-cycle changes during the phase 2 implementation process.

As part of a needs assessment to evaluate nurses’ baseline knowledge and perceptions, an electronic survey (Qualtrics) was sent to the nursing staff during the pre-implementation phase. The 18-question survey included items from the American Nurses Association (ANA) Delirium Work Group survey,\textsuperscript{28} a nationwide survey of more than 1500 registered nurses in a variety of settings that was designed to help develop resources to improve nurses’ delirium identification and management. The ANA Delirium Work Group provided permission to use their survey for this QI initiative. Our survey included all of the original ANA survey questions and added 3 demographic questions (sex, age range, and ethnicity). All 59 MICU nurses received the survey via employee email accounts and received twice-weekly reminders during the 2-week survey period. The baseline survey gave the planning team insight into areas for improvement according to recommended guidelines for delirium monitoring.

Each nurse was required to view a 30-minute voice-over slide presentation (PowerPoint, Microsoft) that covered delirium risk and contributing factors, HRMs, CAM-ICU assessment instructions, nonpharmacological nursing interventions, and deidentified case examples. This presentation was available as an enduring education activity on the hospital’s education portal. This asynchronous online education was adapted from the CAM-ICU training manual\textsuperscript{25} and was paired with hands-on CAM-ICU training, which took place during day and night shifts over the course of 1 week. In the hands-on training, every nurse working during the 1-week immersion period participated in a “see one, do one, teach one” education initiative to ensure reliability of CAM-ICU assessment. First, each nurse observed a trained nurse performing the CAM-ICU assessment with a patient. Next, each nurse was observed performing an independent CAM-ICU assessment. Last, each nurse was observed teaching another nurse how to perform a CAM-ICU assessment. A trained nurse champion oversaw each of these scenarios. The spot checks provided an opportunity for each bedside nurse to...
perform a patient assessment and obtain immediate feedback from the nurse champion to correct errors and clarify confusion right at the bedside.29

In phase 2, following this multimodal training, the CAM-ICU tool went live in the EHR critical care standard of care to be completed by nurses once per 12-hour shift for all ICU patients. All MICU nurses received a pocket card to help them remember risk factors, especially HRMs, that contribute to delirium (Figure 2). Two months after implementing the CAM-ICU, we redistributed the modified ANA Delirium Work Group survey that we used in phase 1 to evaluate the impact of our education intervention on nurses’ knowledge and perceptions. We added 2 questions regarding the feasibility of the CAM-ICU tool to the baseline survey, resulting in a total of 20 questions. This follow-up survey was open for 2 weeks, and all 59 MICU nurses received regular reminders via employee email accounts.

Patients were not identified as having delirium before CAM-ICU implementation, so during phase 1 we collected data only on deidentified MICU admitting diagnoses,2,5 HRM use, LOS, and disposition location.8,9 On the basis of admitting diagnosis data, we formed 2 patient groups: patients at high risk for delirium and

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**Figure 1** Flow chart of phases and outcomes of quality improvement project.

**Phase 1 (January through September 2017)**
- Baseline data collection:
  - Baseline survey of nurses’ knowledge of delirium conducted (January 2017)
  - Patients at risk for delirium identified
  - Data on LOS and HRM use collected in 272 patients grouped by delirium risk (high or low)
- Prepare for intervention:
  - Multidisciplinary team built
  - Online nursing education conducted
  - CAM-ICU hands-on training conducted
  - Pocket cards with delirium risk factors distributed
  - CAM-ICU documentation built into electronic health record

**Phase 2 (October 2017 through March 2018)**
- CAM-ICU documentation activated in electronic health record
- Nursing CAM-ICU spot checks conducted
- Survey of nurses’ knowledge of delirium conducted (January 2018)
- Data on LOS and HRM use collected in 191 patients grouped by delirium risk (high or low)

**Primary outcomes**
- Awareness of delirium risk factors
- Nursing competence in using the CAM-ICU
- HRM use
- LOS

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Abbreviations: CAM-ICU, Confusion Assessment Method for the Intensive Care Unit; HRM, high-risk medication; LOS, length of stay.
patients at low risk for delirium. The high-risk group was defined by admitting diagnoses of encephalopathy, sepsis, respiratory failure, altered mental status, and drug withdrawal. Patients in the low-risk group had admitting diagnoses such as gastrointestinal bleeding, suicidal ideation, and cardiac arrhythmias and did not receive HRMs. Medications were grouped into 2 categories: HRMs and non-HRMs. For this QI project, benzodiazepines and opioids were classified as HRMs and all other medications were considered to be non-HRMs.

Study of the Intervention

We used the Model for Improvement to evaluate progress and outcomes in a rapid-cycle change process. This QI study serves as the first plan-do-study-act cycle implementing the CAM-ICU and evaluating initial outcomes. We compared deidentified information from patient charts (eg, diagnosis, HRM use, and LOS) entered before and after the study intervention (HRM education and CAM-ICU implementation). Online education, hands-on training with the CAM-ICU, and risk factor pocket cards were all designed to improve the primary outcomes of nurses’ awareness of delirium risk factors, nurse competence with using the CAM-ICU, and decreased use of HRMs for all MICU patients.

Analysis

We used graphical and descriptive statistical methods to summarize and evaluate data distributions. Frequency distributions summarized nominal and categorical data. Several extreme outliers in the data led to large standard deviations. We used an observational pretest-posttest design to compare patterns of medication use and LOS between MICU patients at high risk and those at low risk for delirium. We used control charts to evaluate HRM use and LOS (QI Charts, version 2.0, Process Improvement Products). We used a mixed regression model and \( \chi^2 \) tests, calculated with statistics software (SAS 9.4, SAS...
Institute Inc), to evaluate the effects of intervention, risk of delirium, and HRM use on LOS. The equation for the mixed regression model for LOS was as follows: 

\[ \text{LOS} = \beta_0 + \beta_1 \times \text{delirium risk} + \beta_2 \times \text{phase} + \beta_3 \times \text{number of HRMs used}. \]

We conducted a comparative analysis to show changes in survey responses before and after CAM-ICU implementation. These results were not paired because of low response numbers. We used a 2-tailed t test to identify significant changes in survey responses collected before and after implementation. Outlier data points for HRM use and LOS were reviewed individually to identify trends from the raw patient data and accounted for variability in HRM use. Tests of statistical significance maintained a type I error rate of .05 (P < .05).

**Ethical Considerations**

This study received approval as a nonresearch project from the Texas Tech University Health Sciences Center QI review board. Because this was a QI study, it was not subject to oversight by the institutional review board. No identifiable patient information was used during data collection.

**Results**

During baseline data collection (phase 1), 288 patient-stay records from 272 unduplicated patient records were deidentified and divided into 2 categories: 164 stays (153 patients) in the high-risk group and 124 stays (119 patients) in the low-risk group. After the QI initiative began (phase 2), 199 stays by 191 unduplicated patients were divided into 2 categories: 84 stays (78 patients) in the high-risk group and 115 stays (113 patients) in the low-risk group. The total sample of 463 patients was mostly white, non-Hispanic, and evenly distributed between sexes (Table 1). The 2 groups of patients were not significantly different. We received 24 completed surveys in phase 1 and 15 responses in phase 2. Most nurse survey respondents

### Table 1 Patient characteristics before (phase 1) and after (phase 2) implementation of the Confusion Assessment Method for the Intensive Care Unit

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Phase I (n=272)</th>
<th>Phase II (n=191)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y, mean (SD)</td>
<td>55 (19)</td>
<td>58 (18)</td>
</tr>
<tr>
<td>Female sex, No. (%)</td>
<td>142 (52)</td>
<td>90 (47)</td>
</tr>
<tr>
<td>Race, No. (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>17 (6)</td>
<td>16 (8)</td>
</tr>
<tr>
<td>White</td>
<td>164 (60)</td>
<td>121 (64)</td>
</tr>
<tr>
<td>Other</td>
<td>91 (34)</td>
<td>54 (28)</td>
</tr>
<tr>
<td>Ethnicity, No. (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>101 (37)</td>
<td>58 (30)</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>168 (62)</td>
<td>131 (69)</td>
</tr>
<tr>
<td>Unknown</td>
<td>3 (1)</td>
<td>2 (1)</td>
</tr>
<tr>
<td>Payment, No. (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>133 (49)</td>
<td>83 (44)</td>
</tr>
<tr>
<td>Commercial/PPO/HMO</td>
<td>98 (36)</td>
<td>75 (39)</td>
</tr>
<tr>
<td>Self-pay</td>
<td>41 (15)</td>
<td>33 (17)</td>
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<tr>
<td>ICU admitting diagnosis,a No. (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infected (sepsis)</td>
<td>60 (21)</td>
<td>50 (25)</td>
</tr>
<tr>
<td>Respiratory</td>
<td>57 (20)</td>
<td>41 (21)</td>
</tr>
<tr>
<td>Psychiatric (overdose, drug abuse)</td>
<td>57 (20)</td>
<td>34 (17)</td>
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<tr>
<td>Cardiac</td>
<td>34 (12)</td>
<td>22 (11)</td>
</tr>
<tr>
<td>Renal/metabolic</td>
<td>34 (12)</td>
<td>13 (7)</td>
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<tr>
<td>Gastrointestinal/liver</td>
<td>30 (10)</td>
<td>15 (8)</td>
</tr>
<tr>
<td>Neurological</td>
<td>10 (4)</td>
<td>15 (8)</td>
</tr>
<tr>
<td>Cancer</td>
<td>4 (1)</td>
<td>4 (2)</td>
</tr>
<tr>
<td>Musculoskeletal (pain, integumentary)</td>
<td>2 (&lt;1)</td>
<td>2 (1)</td>
</tr>
<tr>
<td>Length of stay, d, median (IQR)</td>
<td>3.0 (2-7)</td>
<td>3.0 (1-6)</td>
</tr>
</tbody>
</table>

Abbreviations: HMO, health maintenance organization; ICU, intensive care unit; IQR, interquartile range; PPO, preferred provider organization.

a Phase 1, 288 admissions from 272 unduplicated patients. Phase 2, 199 admissions from 191 unduplicated patients.
were female (phase 1, 22 [92%]; phase 2, 13 [87%]), had a bachelor’s degree (phase 1, 16 [67%]; phase 2, 12 [80%]), and had 5 or fewer years of nursing experience (phase 1, 15 [63%]; phase 2, 9 [60%]).

High-Risk Medication Use, LOS, and Discharge Disposition

Phase 1. Two-way analysis of variance (ANOVA) showed that HRM use and high risk of delirium significantly affected patient LOS ($P = .01$ and $P < .001$, respectively) during phase 1. High-risk medication use and delirium risk were binary variables in the ANOVA. Among patients at high risk for delirium, the mean (SD) LOS was 8.15 (7.38) days for those who received HRMs and 5.73 (5.29) days for those who never received HRMs ($P = .02$). Among patients at low risk for delirium, the average LOS was 3.89 (3.16) days for those who received HRMs and 3.12 (4.58) days for those who never received HRMs ($P = .02$). High-risk medication use was assessed as the percentage of all medications given during each stay that included HRMs. During phase 1, mean HRM use per month was lower in patients at low risk for delirium than in patients at high risk for delirium, but the difference was not significant (mean [SD], 4.99% [3.66%] vs 7.34% [3.68%]; $P = .19$). Because HRM use significantly affected LOS during phase 1, our goal during the intervention was to decrease the use of HRMs.

Phase 2. High-risk medication use and delirium risk were binary variables in this ANOVA. After the intervention began, LOS was no longer significantly affected by whether the patient received an HRM ($P = .06$) or was at high risk for delirium ($P = .09$). Among patients at high risk for delirium, HRM use fell from 4.73% in phase 1 to 2.99% in phase 2 ($\chi^2 = 19.83$, $P < .001$; Figure 3). Among patients at low risk for delirium, HRM use also significantly decreased, from 7.37% in phase 1 to 3.92% in phase 2 ($\chi^2 = 40.21$, $P < .001$; Figure 4).

An analysis of covariance (the number of HRMs used is 1 of the independent variables in the model with 2 categorical independent variables: delirium risk and phase) found that LOS was significantly affected by the number of HRMs used during the ICU stay for all patients regardless of delirium risk (Table 2). Each additional HRM used increased LOS by 0.13 days ($P < .001$).

We reviewed the disposition location of patients in both delirium risk groups before and after intervention. Of the patients at high risk for delirium who were receiving HRMs, 40% died before discharge and 20% were transferred to long-term acute care hospitals. Of those at low...
risk for delirium who were receiving HRMs during their ICU stay, 30% were discharged home and 19% died during hospitalization.

**Compliance With the CAM-ICU**

Six weeks after the CAM-ICU documentation was added to the EHR, the CAM-ICU completion rate was 83%. The rate of CAM-ICU completion by nurses was obtained by chart review and compared with periodic spot checks. Spot checks (eg, CAM-ICU competence evaluations) were performed by the nurse practitioner and nurse champions on the day and night shifts. A high number of “unable to assess” results and fewer positive screening results than expected were noted during the review and spot-check assessments.

**Nurse Survey Results**

We achieved a 41% response rate (24 of 59 nurses) for the phase 1 nurse survey. Several nurses (14 [58%]) reported comfort assessing patients at risk for delirium but believed that the organization lacked protocols to detect patients with delirium (10 [42%]). Most respondents (18 [75%]) reported frequent use of HRMs to control confusion and agitation. The most commonly identified challenge was lack of a quick and easy-to-use screening tool to detect symptoms of delirium (identified by 9 nurses [38%]).

We achieved a 25% response rate (15 of 59 nurses) for the phase 2 nurse survey. Fourteen respondents reported more comfort identifying patients at risk for delirium after education and hands-on CAM-ICU use and reported routinely using the CAM-ICU. Respondents reported using nonpharmacological interventions such as physical activity and ambulation (10 [67%]) instead of HRMs (7 [47%]). Most respondents (13 [87%]) believed the CAM-ICU appropriately identified patients...
at risk for delirium and provided nurses with objective data for participating in multidisciplinary rounds with providers. Underutilization of CAM-ICU findings during multidisciplinary rounds was the most frequently reported challenge (reported by 8 nurses [53%]). Despite 14 of 15 respondents reporting more confidence identifying patients at risk for delirium with a screening tool and successful completion of the CAM-ICU, these findings were not consistent with the findings of periodic spot checks.

**Discussion**

This QI project aimed to decrease HRM use and LOS by building nurse competence in recognizing delirium risk factors and implementing the CAM-ICU via online and hands-on education. After implementation of multimodal delirium education and delirium screening, HRM use significantly decreased in patients at high risk and in those at low risk for delirium, and we found a noticeable decrease in special cause variation of HRM use, especially among patients with low risk of delirium. Furthermore, we found that LOS increased by a mean of 0.13 days with each additional HRM used. The LOS for patients at high risk for delirium remained higher than for patients at low risk for delirium throughout all phases of the project. This initiative changed clinical practice and resulted in a more judicious use of HRMs in ICU patients. After the pilot study was completed, the CAM-ICU remained in the critical care standard of care to be completed by ICU nurses for all patients once per shift. Training on the CAM-ICU was added to new nurse onboarding and as an annual ICU review topic.

Despite a decrease in HRM use, patient LOS did not significantly decrease during phase 2. As identified in other investigations,5,30 patients in the ICU who are at risk for delirium are also more likely to be older and have severe illnesses, factors that also contribute to prolonged hospital stays. This QI project was limited in the number of delirium risk factors for consideration. However, before the intervention, hospital stays were longer for patients at high risk for delirium than for those at low risk for delirium. After the intervention, LOS did not significantly differ between the 2 groups, indicating improvement within the group of patients at high risk for delirium. Use of HRMs is only 1 of many confounding factors that contribute to delirium and increased LOS. Because ICUs care for the most vulnerable patient populations, decreasing use of HRMs and regular CAM-ICU screenings are important steps to minimize the devastating effects of delirium.

Although delirium assessment documentation was sustainably high 6 weeks after implementation, many CAM-ICU assessments were missing, which revealed a work-around option to opt out of CAM-ICU documentation in the EHR. Before implementation of the CAM-ICU, the ICUs used the RASS to evaluate level of consciousness in patients receiving sedative medications. When the RASS was incorporated into CAM-ICU screening, nurses may have selected the “unable to assess” option or skipped the level-of-consciousness step (ie, the RASS) altogether for patients who were not receiving mechanical ventilation or sedatives. This work-around may have accounted for a portion of the CAM-ICU findings of “unable to assess” during EHR spot checks. This discovery highlights a key area for work in the next phases of the plan-do-study-act cycle for this QI project, which will specifically target education on all elements of the CAM-ICU, including assessing the RASS for all patients.

Upon review of CAM-ICU completion rates, we noted that the CAM-ICU had been used by nursing staff in step-down units outside the MICU. This was an unintended consequence of the project. When patients were transferred from the ICU to step-down units, some nurses failed to close the EHR critical care standard of care. This oversight resulted in the CAM-ICU being present in step-down telemetry and medical-surgical unit EHR documentation and CAM-ICU assessments being documented for these patients. However, nurses in these other units were not trained in CAM-ICU use. Because the critical care standard of care was left active in patients’ EHRs after transfer to a step-down unit, tracking CAM-ICU changes between the ICU and medical-surgical units was difficult. This process may have contributed to some of the “unable to assess” findings and too few CAM-ICU results indicating a patient is at risk for delirium. Therefore, ICU nurses were instructed to close the EHR critical care standard of care flow sheet before transferring patients out of the MICU. This unintended consequence also

**Results of the CAM-ICU are intended to inform the clinical team and therefore should be incorporated into multidisciplinary rounds.**
stimulated discussion regarding the possibility of expanding delirium screening to the step-down units to promote continuity of care.

Hands-on training paired with online education in the pilot unit was the strength of this QI project. The team-based participation and presence of nurse champions on both day and night shifts also enhanced our success. Our QI project had limitations as well. First, we had low survey response rates. Surveys were distributed to work email addresses, which may not be checked frequently, despite the survey being open for 2 weeks. However, our survey responses were similar to those gathered from the ANA Delirium Work Group survey in 2016.28 Because surveys were distributed twice, once in each phase of the QI project, the nurses responding to each survey were not necessarily the same. This difference may explain the variation in the number of responses received for each survey. Second, this was a QI project piloted in a 16-bed MICU, limiting generalizability of the findings. However, our process may work in similarly structured units interested in implementation of evidence-based practices for delirium. Third, we divided patients into groups at high risk and low risk for delirium. The high-risk group was not further subdivided into patients with conditions such as terminal illnesses that required HRM use. Likewise, several patients were admitted with multiple comorbidities or already experiencing delirium symptoms. These patients were included in the delirium high-risk group and did not differ from patients who developed delirium during hospitalization. These outlier cases may have skewed our findings to the negative. Next, dose and frequency of HRM administration were not considered in this study. These variables may also affect the development of delirium. Last, nurses having a good experience with implementation may have been more likely to take the survey, thus biasing our results toward positive findings.

Implications

Nurse-led evidence-based practice can be successfully implemented into the workflow. This project engaged all nurses in the unit, potentially making it easier to conduct evidence-based practice in the future. Similar hospital units may consider using an interprofessional team to collect QI data on HRM use, CAM-ICU documentation, and patient outcomes for quarterly review with the ICU team.31,32 Tracking and communicating this information regularly may help identify or prevent delirium earlier in a patient’s hospitalization. Likewise, continued hands-on training and spot checks following CAM-ICU implementation are recommended to ensure sustainability. Results of the CAM-ICU are intended to inform the clinical team and therefore should be incorporated into multidisciplinary rounds. Objective identification of changes in mental status can prompt discussion of patient-centered therapeutic approaches. In addition, evaluations of patients’ mental status upon hospital admission can be used to alert clinicians of patients who may be at high risk for delirium so HRMs can be avoided if possible. Our planning team decided to focus on specific HRMs (opioids and benzodiazepines) for this project, but other units may want to include other medication classes, such as anticholinergics.

Conclusions

The CAM-ICU was successfully implemented in nursing workflow and HRM use was successfully lowered in all patients in a mixed MICU through a QI project that hinged on multimodal education. This QI project adds to the body of evidence demonstrating that patients with delirium have longer hospital stays and increased likelihood of death and discharge to nursing facilities. Education about delirium risk factors, implementation of nonpharmacological nursing interventions, and hands-on training with the CAM-ICU may raise awareness of HRMs and decrease their use in MICU patients. Nurses viewed the CAM-ICU as easy to use after didactic and hands-on education. The nurses felt the tool was helpful for identifying patients at risk for delirium. CCN

Financial Disclosures

Leanne M. Boehm is receiving grant funding from NHLBI (#12HL137943-01). The funding resources had no role in the design and conduct of this study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication. The authors were not compensated to collaborate on this QI project in the hospital’s pursuit of Magnet recognition.

See also


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