Geriatric Delirium Care: Using Chart Audits to Target Improvement Strategies

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ABSTRACT

Background

Our hospital identified delirium care as a quality improvement target. Baseline characterization of our delirium care and deficits was needed to guide improvement efforts.

Methods

Two inpatient units were selected: 1) A general internal medicine unit with a focus on geriatrics, and 2) a surgical unit. Retrospective chart audits were conducted for all patients over age 50 admitted during a one-month period to compare delirium care with best practice guideline (BPG) recommendations, and to determine the incidence of missed cases of delirium and negative outcomes in patients with delirium. The aim was to gather local data to prioritize improvement efforts and mobilize stakeholders.

Results

186 charts were reviewed: 17 patients had physician-diagnosed delirium, 21 patients had missed delirium, and 148 patients had no delirium. Compliance with delirium BPGs was variable, but generally poor. There was a trend towards missed delirium and physician-diagnosed delirium being associated with greater odds of having above-median length of stay and lower odds of discharge home compared to no delirium diagnosis.

Conclusion

Overall, the chart audits confirmed delirium underrecognition and poor adherence to best practices in delirium management. Granular analysis of this data was used to mobilize stakeholders and prioritize improvement plans.

Key words: delirium, best practice guidelines, quality improvement, acute care, hospital

INTRODUCTION

Delirium is a serious, underrecognized condition affecting many hospitalized elderly patients.[1,2] Delirium is an acute disturbance in consciousness accompanied by altered attention, cognition or perception, caused by the interaction of precipitating (including drugs, illness, surgery) and predisposing factors (such as age, dementia).[3] A systematic literature review of medical inpatients (including cohorts of older adults and all adults) found that the prevalence of delirium at admission was 10–31%, and the incidence of new delirium ranged from 3–29%.[1] For post-operative patient populations, the delirium incidence rates vary widely from 10–70% depending on the type of surgery, measurements used, and patient characteristics.[4] Delirium is associated with increased mortality,[3] longer hospital stays,[5] risk of persistent cognitive deficits,[5] and increased likelihood of discharge to a higher level of care.[3,5]

Given both the ubiquity and negative sequelae of delirium, prevention and management of delirium are priorities for hospitals. Best practice guidelines (BPGs) for delirium detection and management are mainly based on consensus, due to the lack of high-level evidence for delirium management.[6] Recent Canadian BPGs for delirium emphasize structured screening processes to detect delirium and interprofessional multicomponent management strategies.[7,8] The steps in implementation of BPGs are: selecting a high-quality guideline, stakeholder engagement, environmental readiness assessment, implementation using evidence-based strategies, and evaluation.[9] A recent systematic review only found three studies outlining the implementation of delirium BPGs in a clinical setting, only two of which evaluated clinical outcomes.[6] In a before–after study in five hospitals in England, implementation of a delirium BPG occurred using feedback of baseline data, distribution of the guideline, and education sessions for nurses and doctors led to non-statistically significant improvements in the process and outcome of care.[10] Implementation of a delirium BPG on a medical ward led by a multidisciplinary team and which included environmental, process, and education strategies was

associated with fewer patients discharged with delirium and a longer length of stay compared to a control unit.[11] The final study examined nursing and physician knowledge before and after delirium education sessions as part of a delirium BPG implementation process.[12] Overall, little literature exists to guide implementation of delirium BPGs.

With delirium care identified as a quality improvement target in our hospital, chart audits were conducted to understand the 'current state' and to guide development of targeted interventions. The overall goal of the chart audits was to gather local data to prioritize quality improvement initiatives and mobilize stakeholders. As such, one aim was to compare the local approach to delirium detection and management to BPG recommendations. Additional aims were to determine the incidence of missed cases of delirium and the incidence of negative outcomes in patients with index delirium such that this data could be used to mobilize stakeholders that change within was needed. This article will describe both the findings of the chart audits and how these results were used to guide local improvement efforts. Thus, it will provide Canadian data on delirium detection and management, and contribute to the literature on real-world quality improvement stories, recognizing that implementation scholarship is critical to translating best practices that improve outcomes.

METHODS

Setting

Mount Sinai Hospital in Toronto, Ontario, Canada is a 418-bed academic health sciences centre, located in a metropolitan area of 5.5 million people. The study involved patients admitted to either a General Internal Medicine (GIM) unit with a focus on providing care to adults age 65 and older, or a heterogeneous surgical unit providing post-operative care. Of note, the GIM unit also regularly admitted adults under age 65 when the hospital's other GIM units were full. The two units were selected to provide contrasting information to inform quality improvement initiatives, as one had received more geriatrics training and support than the other and cared for an older population. The GIM unit was selected as staff had completed the NICHE (Nurses Improving Care for Healthsystem Elders) Geriatric Resource Nurse e-learning modules,[13] and this unit had access to a unit-based Advanced Practice Nurse in geriatric medicine for bedside support. The NICHE modules included an overview of delirium and how to use the Confusion Assessment Method (CAM) tool, a validated screening tool with positive results indicating that delirium is likely present.[14] The surgical unit was selected given the diverse patient population and limited geriatric training provided to staff. The unit provided care to patients recovering from reconstructive orthopaedic, ENT, oral surgery, and ophthamalogy surgeries. The delirium and CAM training for the surgical nurses had occurred through didactic delivery of P.I.E.C.E.S.[15] curriculum in 2008, which the GIM nurses also attended.

Design

The chart audits used a retrospective, observational design. Research Ethics Board approval was obtained to review the health records of all patients of age 50 and over admitted to the GIM or surgical unit during a one-month period (February 2012). The sample size and time frame of the review were selected given the availability of one author to conduct the chart reviews and with the goal of informing quality improvement initiatives.

Chart Review Procedure

All chart audits were conducted by one of the authors (CL). Demographic and hospital-stay related variables were collected, including: age, unit, admitting service, and length of stay (LOS). Data were collected to assess delirium detection, documentation and interventions to evaluate BPG recommendation concordance/adherence. This data included: documentation of baseline, frequency of use and results of the CAM tool, documentation of an investigation for the cause of delirium, medication review, environmental strategies (such as orientation cues and dark room at night), and whether delirium diagnosis was noted in the patient's discharge summary.

The presence of delirium was assessed in two ways: first, by physician-diagnosis of delirium based on documentation in physician notes; and secondly, by standardized chart-based identification of delirium based on physician and/or nursing documentation of an acute confusional state, such as confusion, agitation, hallucinations, and inappropriate behaviour.[16] The entire chart was reviewed for the documentation of these symptoms.[16] Patients who had standardized chart-based identification of delirium in the absence of physician diagnosis of delirium were considered missed cases of delirium.

To assess whether index delirium was associated with negative outcomes, additional data collected included: falls, death, discharge location, and LOS. Patients were grouped according to whether they had physician-diagnosed delirium, missed delirium, or no delirium diagnosis. Analysis was conducted for the three groups.

Statistical Methods

Patients were categorized as admitted to the GIM unit or the surgical unit. Distribution of baseline characteristics of study subjects according to unit were examined using the Mann–Whitney U-test for continuous variables and the chi-square test or Fisher exact test (when the expected number was < 5) for categorical variables. Binary logistic regression analysis was used to estimate the odds ratios and 95% confidence intervals for receiving BPG delirium detection and management procedures, as well as experiencing negative outcomes, depending on delirium diagnosis. Confounders adjusted for included unit of admission (GIM versus surgery), age, and sex. A Bonferroni-adjusted p value of .008 was

determined based on a correction made for the number of statistical tests performed. All results have been compared to this criterion. All statistical analyses were conducted using SPSS 22.0 for Windows (SPSS, Inc., Chicago, IL).

RESULTS

One hundred and eighty-six patient charts were reviewed. Table 1 shows the patient characteristics by admission unit. As predicted, based on the different patient populations each serves, there were significant differences between patients on the two units.

Seventeen patients had a physician diagnosis of delirium, all of whom were also identified as delirious by the standardized chart-based identification method (Table 1). In total, 38 patients were identified as having delirium based on the standardized chart-based identification methodology, of which 21 had no physician-documented diagnosis of delirium and, thus, were considered missed cases of delirium ("missed delirium"). One hundred and forty-eight patients had neither a standardized chart-based evidence of delirium nor a documented physician-diagnosis of delirium, and were considered to have no diagnosis of delirium.

Adherence to BPGs for Delirium

In looking at BPG recommendations related to detection of delirium, of the 186 patients reviewed, four (2.2%)

had baseline cognition, functioning, behaviour, and mood documented. Despite hospital requirements which required the CAM screening to be completed every shift for all medical and surgical patients over age 65, 13 patients over 65 years of age (7.0%) had no CAM screening for delirium any point during admission.

Review of the records of the 17 patients with physician-diagnosed delirium indicated that compliance with BPG recommendations was variable (see Table 2).

Delirium Symptom Assessments (CAM Screen and Nursing Notes)

The consistency between physician and nursing assessment of delirium was also notable. Of the patients with a physician diagnosis of delirium, 65% had a positive CAM screen completed by nurses and 71% had nursing documentation of delirium symptoms.

Adjusted Odds Ratios (AORs) for Outcomes (LOS and Discharge Home)

Table 3 shows the AORs for LOS and discharge home and delirium status. Due to the small numbers of patients with falls and death, the effect of delirium on these outcomes could not be analyzed. The adjusted odds ratios (AORs) showed that those with physician-diagnosed and missed delirium were more likely to have a LOS greater than the median, in

TABLE 1.
Characteristics of patients by admission unit

Characteristic	Surgical[a] n=122	GIM n=64	Total Sample N=186	p value[b]
Sociodemographic				
Age, median (IQR)	65 (58-73)	80 (71.5-85.8)	69.5 (62-80)	<.001
Female, n (%)	72 (59.0)	34 (53.1)	106 (57.0)	.533
Delirium Diagnosis				<.001
Physician-diagnosis of delirium, n (%)	1 (0.8)	16 (25.0)	17 (9.1)	
Missed diagnosis of delirium, n (%)	10 (8.2)	11 (17.2)	21 (11.3)	
Not diagnosed with delirium, n (%)	111 (91.0)	37 (57.8)	148 (79.6)	
Delirium Symptom Assessments				
Positive CAM screen, n (%)	2 (1.6)	13 (20.3)	15 (8.1)	<.001
Nursing note of delirium symptoms, n (%)	10 (8.2)	17 (26.6)	27 (14.5)	.001
Outcomes				
LOS, median (IQR)	3 (1-5)	5.5 (3-8.8)	4 (2-6)	<.001
Falls, n (%)	2 (1.6)	2 (3.1)	4 (2.2)	.609
Death, n (%)	0 (0.0)	5 (7.8)	5 (2.7)	.004
Discharge location home, n (%)	105 (86.1)	50 (78.1)	155 (83.3)	.167

[a] Admissions to the surgical unit included: reconstructive orthopedics; eye, nose & throat; otolaryngology, head & neck; gynecology; dentistry; urology; general surgery; ophthalmology and oral-maxillofacial surgery.
[b] P-values from chi-square tests or Fisher exact test (when the expected number was < 5) for categorical variables, and Mann–Whitney U-test for continuous variables.
GIM = general internal medicine unit; IQR = interquartile range; LOS = length of stay; CAM = confusion assessment method

comparison to those with no diagnosis of delirium. Based on the AORs, there was a trend for those with physician-diagnosed and missed delirium to be less likely to return home at discharge, compared to patients without delirium. Age, gender, and unit (GIM vs. surgery) were not significantly associated with LOS or discharge to home.

DISCUSSION

The chart audit results were generally consistent with the existing and concerning literature that describes poor delirium BPG adherence in hospitals. We had key questions in mind as we approached the chart audit, and the results confirmed opportunities for improvement and were used to engage frontline staff and stakeholders about the need for change in our institution.

Question 1: Was Delirium Detection Consistent with BPG Recommendations?

A major gap in detection was the lack of baseline cognitive and functional assessment and documentation; this was present in

TABLE 2.
Adherence to best practice guideline recommendations for N = 17 patients with physician-diagnosed delirium

Best Practice Guideline Recommendation	Patients with physician-diagnosed delirium who received this care, n (%)
Chart evidence of investigation/ review of cause for delirium	14 (82.4)
Documented environmental strategies to manage delirium symptoms	5 (29.4)
Documented review of medications	9 (52.9)
Delirium diagnosis noted in patient's discharge summary	6 (35.3)

only 2.2% of patients. A previous study found that baseline cognitive status was not recorded for patients in 24.6% of nursing and 49.8% of medical notes.[10] When baseline was recorded, physicians were more likely to make a diagnosis of delirium,[10] which likely occurs as accurate determination of baseline cognitive state allows the key delirium symptom of acute change in mental status to be detected. Delirium is often missed in patients with dementia,[3] most likely because the cognitive changes that the patient displays are attributed to dementia rather than delirium being considered.

Similar to literature reports,[14,17] accurate and complete CAM screening by nurses was a barrier to BPG care. CAM completion rates were disappointing, with 7% of patients over age 65 never receiving any CAM screening during their entire hospital stay. More importantly, the chart audit results highlighted issues with the accuracy of the CAM: although positive CAM results were associated with delirium diagnosis, about 1/3 of patients with physician-diagnosed delirium had negative CAM results throughout their stay and no nursing notes describing delirium symptoms. Together, the negative CAM results and lack of nursing documentation of delirium symptoms indicate a failure of the nursing staff to observe delirium symptoms in patients with physician-diagnosed delirium and a gap in communication as the nurses were unaware of when a physician had diagnosed delirium. A key local contributor to this gap is our hospital's hybrid medical record in which physicians and nurses document in separate charting sections.

Question 2: Was Delirium Missed?

The rate of physician-diagnosed delirium was 9.1%, which is slightly below the lowest rates reported in the literature of 11% for medical inpatients.[1] However, the study population included patients of age 50 and up, and a mixed surgical population for which rates would differ. Adding in the missed cases of delirium brings the rate of delirium to 20.4%, which is consistent with typical rates of 20–30% seen for medical inpatients.[1] As discussed previously, the chart audit results

TABLE 3.
Adjusted odds ratios for delirium symptom assessments and outcomes

Variable	Age, 1-year Increment	Male	Surgical Unit	Physician-diagnosis of Delirium	Missed Diagnosis of Delirium
			Adjusted Odds Ratio (95% CI)		
LOS	1.00	1.46	0.48	4.77	6.87
(above/below median = 4) (n=186)	(0.97-1.03)	(0.76-2.82)	(0.22-1.08)	(1.32-17.21)	(2.20-21.47)
Discharge Home (n=155)	0.99	1.75	1.18	0.51	0.16
	(0.95-1.04)	(0.73-4.16)	(0.42-3.29)	(0.12-2.10)	(0.05-0.48)

CAM = confusion assessment method; LOS = length of stay

also demonstrated that delirium was frequently missed by nurses, with about 1/3 of physician-diagnosed cases of delirium having no nursing documentation of delirium symptoms (positive CAM and/or documentation of delirium symptoms). This is consistent with literature findings of health-care professionals missing delirium up to 69% of the time.[18] Similar to other studies, factors that contribute to non-recognition include the tendency of staff to attribute delirium symptoms to dementia, the fluctuating nature of delirium, and challenges using the CAM.[19] When these results were shared with nursing staff, they highlighted challenges in communicating with physicians, who did not know what the CAM screen was or the significance of a positive CAM and, thus, nurses felt that reporting CAM results was of little benefit.

Question 3: Was Delirium Management Consistent with BPG Recommendations?

Delirium management was also not consistent with BPG recommendations for a large number of patients. Other researchers have found similar results, for example, on an orthopedic surgical unit pre-implementation of BPGs, 17.3.% of patients received formal preoperative cognitive assessment; 0% were cared for in a good sensory environment and 0% received CAM screening to detect delirium.[17] Lastly, a key practice gap revealed by the chart audits was a failure to include the delirium diagnosis in the discharge summary, which occurred for only 35.3% of patients with delirium. This impedes post-discharge follow-up of delirium symptom resolution and delirium detection on future visits.

Question 4: Did Patients with Delirium Have Poor Outcomes?

Patients with missed and physician-diagnosed delirium had a trend towards longer LOS in comparison to patients without delirium. Patients with physician-diagnosed and missed delirium were also less likely to return home after hospitalization, than patients without delirium. Failure to recognize delirium contributes to poor outcomes, as patients do not receive appropriate treatment.[18]

Local Improvement Initiatives

The chart audit data outlining gaps in detection and management of delirium was used for constructive performance feedback, and to engage nurses and health informatics in collaborative problem-solving. Having institution- and unit-specific data increased staff agreement that change was required. Multimodal strategies were used to improve the nursing CAM screening on the GIM unit and have been outlined previously.[20] Similar to strategies used by colleagues,[21] nursing and allied health documentation tools were modified to include baseline assessment findings and education to these groups reinforced the importance of this

data. When the chart audit results were shared with nursing staff, a key barrier to CAM completion was their perception that a positive CAM result did not trigger interventions. This is concordant with the sense of screening futility reported in the literature.[18] In response, a standardized nursing care plan focusing on the non-pharmacologic and environmental strategies for delirium management was developed and implemented. Extensive education was provided to nursing staff on accurate completion of the CAM, including face-to-face and an e-learning with interactive case components. Nursing staff are now regularly provided performance feedback about the frequency of CAM completion on admission and every shift for patients on their unit.

Physician and surgeon delirium practice improvements have proven more challenging to achieve. Physicians were included in the stakeholder groups, but those that participated were volunteers with significant experience managing delirium. Long-term plans include order set and care map development to guide assessment of potential causes and management of delirium. Additionally, the hospital plans to implement electronic physician documentation. The finding that the failure of physicians to diagnose and manage delirium is associated with increased LOS and an inability to return home will be a key finding that will be communicated to the physicians and surgeons during implementation.

Limitations

A major limitation of this study was that the presence of delirium was based on retrospective chart review rather than patient assessment. Thus, cases of delirium, especially the hypoactive form, may have been missed, and the delirium rate found in this study is most likely an overestimate. Alternatively, other conditions (dementia, psychosis) may have been mislabeled as delirium by either physicians or the chart-based method. The chart-based method was selected as it fit with the resources available and because the purpose of the chart review was to generate institution-specific data to guide quality improvement initiatives.

Another limitation is that the small sample size precluded analysis using adjusted odds ratios for some adverse events, specifically falls and death, as the frequency of these events was low. Again, the sample size was limited due to the resources available and the purpose of the chart audits.

CONCLUSION

Many hospitals are tasked with improving delirium care, either as a matter of clinical imperative or broader BPG adoption. Notably, this delirium improvement project and audit took place in a hospital that had already been engaging in a variety of hospital and regional senior-friendly initiatives that included delirium education, CAM adoption, and BPG education. The audit nonetheless highlighted the gaps between improvement goals and frontline impact and

adherence. This audit-focused lens offers additional insight into the challenges of adopting delirium BPGs and of ensuring such practices are reliably executed and contributed to intended outcome improvement. Within our organization, targeted improvements have been made, with ongoing plans in place for additional improvements.

Available evidence has highlighted the utility of bedside tools in delirium diagnosis, noting the CAM as the most evidence-based tool.[22] However, the literature is less prescriptive regarding how to effectively implement CAM screening to enable its most effective utilization in real-world practice. This audit-based research highlights that delirium detection through CAM implementation interventions is best appreciated as more than a stand-alone tool, but rather as a tool which must be embedded in standardized patient baseline determination on admission and interprofessional collaboration regarding CAM-positive algorithms, so that the CAM is an enabler of improved practice rather than a tool completed in isolation.

Future priorities for research should focus on evaluating BPG implementation strategies. These may include evaluating the value of bundling CAM screening with decision-support algorithms, comparing nursing-focused interventions with interprofessional interventions, and evaluating how to optimize the accuracy of baseline determination on admission as a critical enabler of delirium detection accuracy. As many hospitals aspire towards improvements in the care of this underrecognized clinical problem, further research into translating BPGs into standardized frontline care will be critical to realizing the benefits for patients and families.

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CONFLICT OF INTEREST DISCLOSURES

The authors have no conflicts of interest to report.

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