Implementation of Delirium Monitoring in the PACU

Elizabeth Card, MSN, RN, APRN, FNP-BC, CCRP
Vanderbilt University Medical Center

What is Delirium?

Delirium is defined as a disturbance of consciousness with inattention accompanied by a change in cognition or perceptual disturbance that develops over a short period of time (hours to days) and fluctuates over time.

Emergence Delirium is also Known As

- agitated emergence
- emergence agitation
- emergence excitement
- post-anesthetic excitement

How Do We Detect Emergence Delirium?

If delirium is not screened for by using a **validated delirium screening tool,** delirium is missed +/- 75% of the time [1-5]

Adult tools:

- **CAM**
- **CAM-ICU**
- **ICDSC**

Pediatric tools:

- **CAPD**
- **P-CAM**
- **PS-CAM**

Outcomes from ICU Delirium

- Increased morbidity
- Increased mortality
- Increased LOS
- Long term cognitive impairment

  Patient testimonial from ICUdelirium.org

  "(I) consider myself all well except that I can't remember to take my medications."

Recognizing an Opportunity

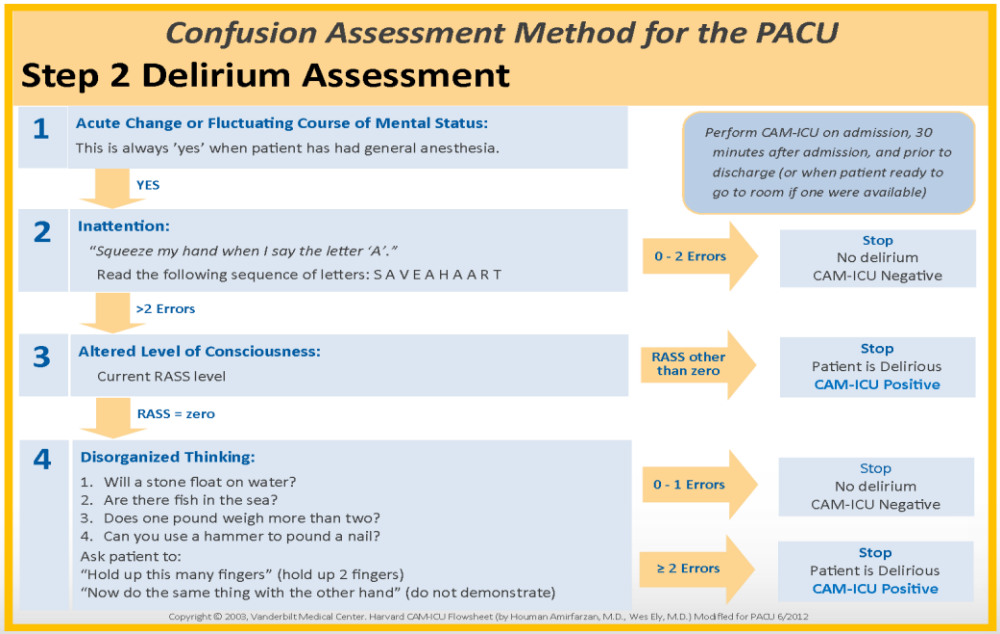
- Is emergence delirium the same as ICU delirium?
- Dearth of literature on emergence delirium
- Discussions with key stakeholders (nurse managers, charge nurses, anesthesia)
- Delirium detection tool selected

CAM-ICU Two-step Process

Step 1
Assess
consciousness

Score	Classification	(RASS)
4	Combative	Overtly combative or violent; immediate danger to staff
3	Very agitated	Pulls on or removes tube(s) or catheter(s) or has aggressive behavior toward staff
2	Agitated	Frequent nonpurposeful movement or patient–ventilator dyssynchrony
1	Restless	Anxious or apprehensive but movements not aggressive or vigorous
0	Alert and calm	
-1	Drowsy	Not fully alert, but has sustained (more than 10 seconds) awakening, with eye contact, to voice
-2	Light sedation	Briefly (less than 10 seconds) awakens with eye contact to voice
-3	Moderate sedation	Any movement (but no eye contact) to voice
-4	Deep sedation	No response to voice, but any movement to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

Step 2
Assess
cognition

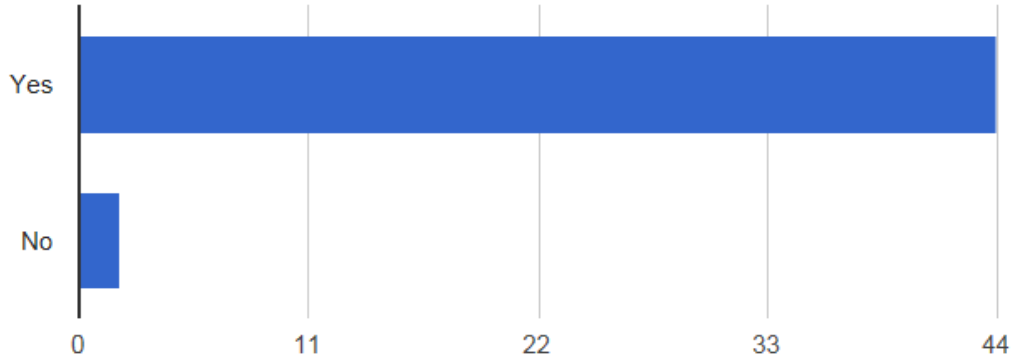


Where was the Baseline Nurses' Knowledge?

Have you ever taken care of a patient in the PACU with emergence delirium or confusion? Refresh Plot | View as Bar Chart

Total Count (N)	Missing	Unique
46	0 (0.0%)	2

Counts/frequency: Yes (44, 95.7%), No (2, 4.3%)

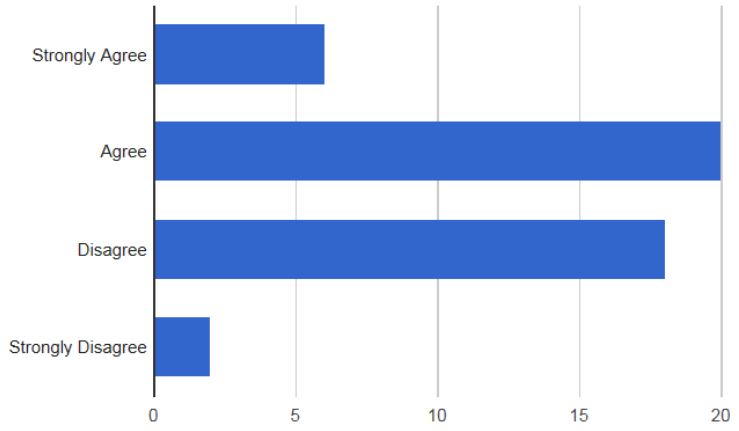


Nurses' Perception of Presentation

I think most delirious patients are hyperactive. Refresh Plot | View as Bar Chart

Total Count (N)	Missing	Unique
46	0 (0.0%)	4

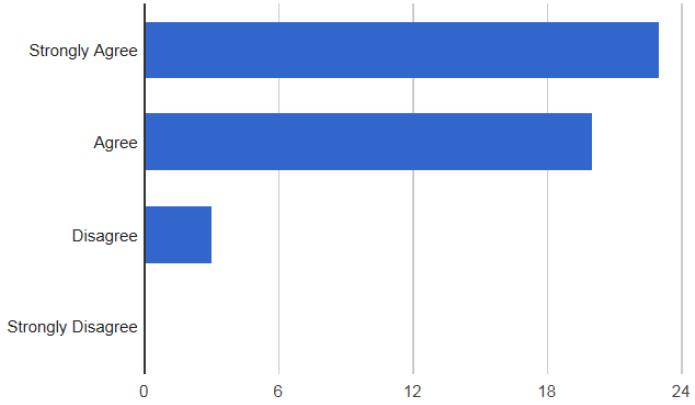
Counts/frequency: Strongly Agree (6, 13.0%), Agree (20, 43.5%), Disagree (18, 39.1%), Strongly Disagree (2, 4.3%)



I think patients who experience delirium have longer stays in the PACU than those patients who wake up less confused. Refresh Plot | View as Bar Chart

Total Count (N)	Missing	Unique
46	0 (0.0%)	3

Counts/frequency: Strongly Agree (23, 50.0%), Agree (20, 43.5%), Disagree (3, 6.5%), Strongly Disagree (0, 0.0%)

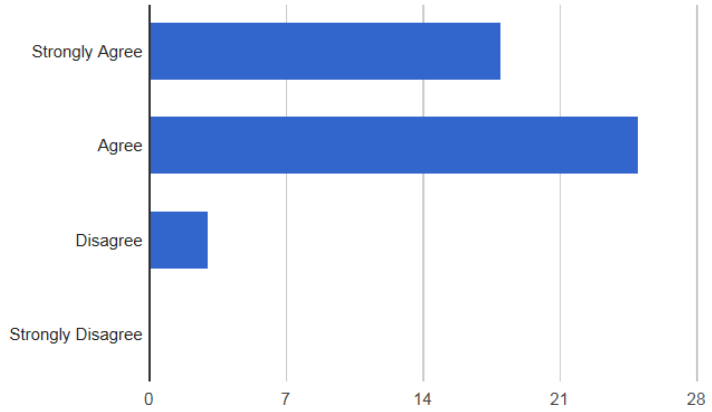


Nurses' Interest in Delirium Monitoring

I think having the ability as a bedside caregiver to diagnose delirium would be useful. Refresh Plot | View as Bar Chart

Total Count (N)	Missing	Unique
46	0 (0.0%)	3

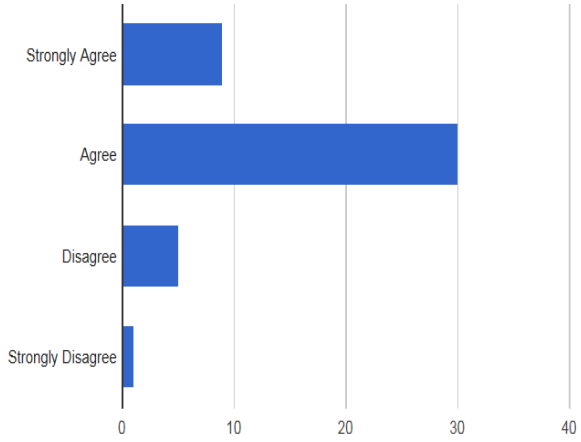
Counts/frequency: Strongly Agree (18, 39.1%), Agree (25, 54.3%), Disagree (3, 6.5%), Strongly Disagree (0, 0.0%)



I think the CAM-ICU provides the patient's health care team with useful information. Refresh Plot | View as Bar Chart

Total Count (N)	Missing	Unique
45	1 (2.2%)	4

Counts/frequency: Strongly Agree (9, 20.0%), Agree (30, 66.7%), Disagree (5, 11.1%), Strongly Disagree (1, 2.2%)



A HUGE Undertaking

- Research protocol developed
- Recruited staff nurses as nurse research investigators
- CITI training and Good Clinical Practice completed
- Training on CAM-ICU with inter-rater reliability agreement 100%

Interesting Ideas Generate Excitement

- Generated multidisciplinary discussions
- Electronic charting added CAM-ICU
- Nurse champions volunteered; more nurses wanted to assess for delirium!

BIG Question Needed Answering First

IF to d/c home, then what??

Chart 1. The 'modified' Aldrete Scale

RESPIRATION	2	1	0
	Able to take deep breath and cough	Dyspnea/Shallow Breathing	Apnea
O2 SATURATION	2	1	0
	Maintains > 92% on room air	Needs O2 inhalation to maintain O2 saturation > 90%	Saturation < 90% even with supplemental O2
CONSCIOUSNESS	2	1	0
	Fully awake	Arousable on calling	Not responding
CIRCULATION	2	1	0
	BP ± 20mmHg pre op	BP ± 20-50mmHg pre op	BP ± 50mmHg pre op
ACTIVITY	2	1	0
	Able to move 4 extremities voluntarily or on command	Able to move 2 extremities voluntarily or on command	Able to move 0 extremities voluntarily or on command

What if the Patient has Delirium??

DELIRIUM (S) (remember: delirium usually has more than one cause)

- **D** Drugs, Drugs, Drugs
- **E** Eyes, ears *
- **L** Low 02 states (MI, ARDS, PE, CHF, COPD) **
- **I** Infection
- **R** Retention (of urine or stool), Restraints
- **I** Ictal
- **U** Underhydration/Undernutrition
- **M** Metabolic
- **(S)** Subdural, Sleep deprivation

* Poor vision and hearing are considered more risk factors than true causes, but should be "fixed" or improved if possible. Cerumen is common cause of hearing impairment.

** "Low 02 states" does NOT necessarily mean hypoxia, rather it is a reminder that patients with a hypoxic insult (e.g. Ml, stroke, PE) may present with mental status changes with or without other typical symptoms/signs of these diagnoses.

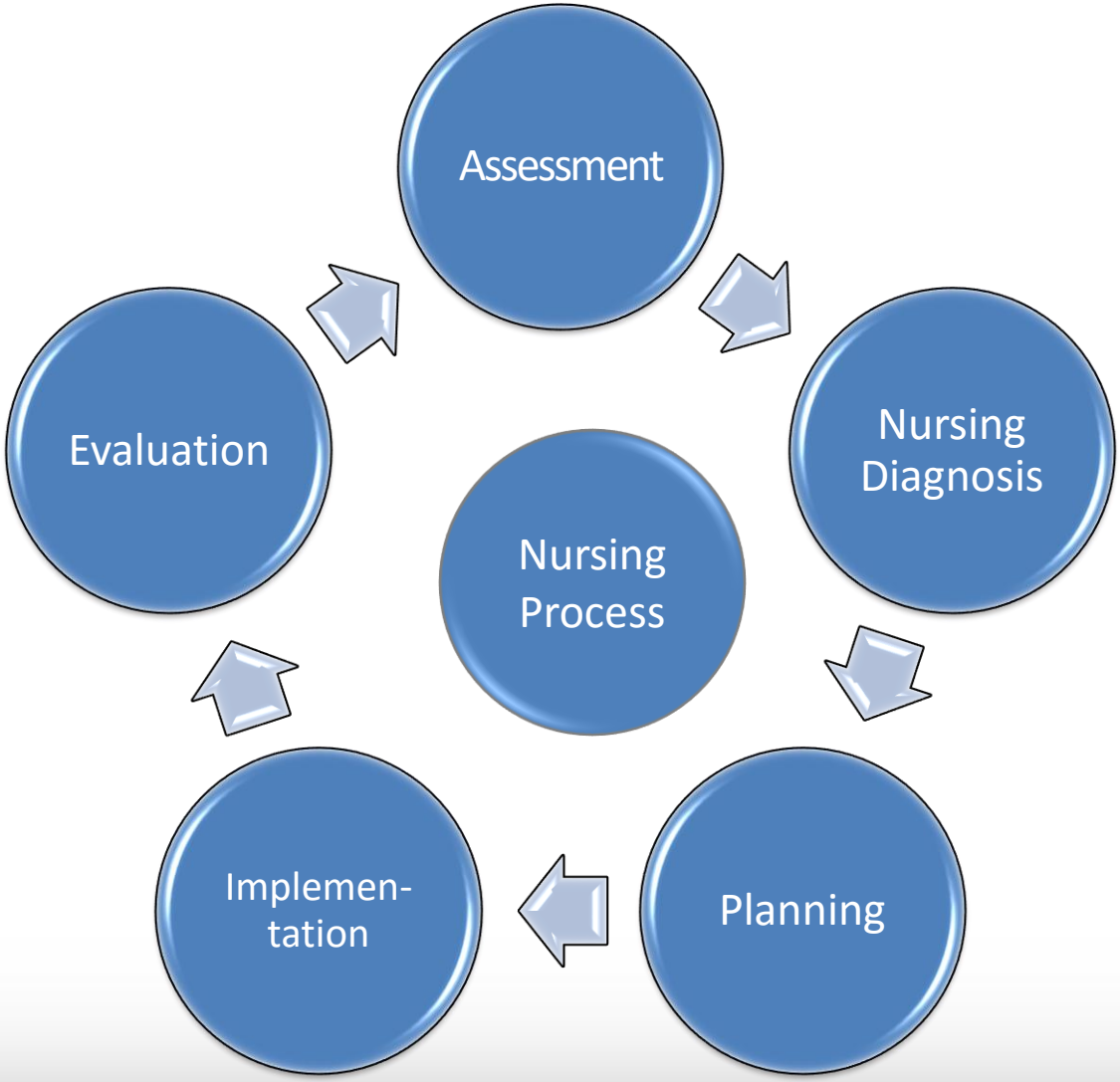
Education on Treatments for Delirium

- No FDA-approved therapies YET
- Identify etiologies
- Risk factors you can modify? (decrease benzodiazepine usage, increase O2 if hypoxemia, re-orient)
- Haldol (2-5 mg IV q6h), atypical antipsychotics
- Dexmedetomidine
- Treat pain
- Early mobilization and/or ROM

Roll Out to All Staff Began

- Unit Board presentations
- EMR addition
- Learning Exchange Module
- Training book created with vignettes for nurses to score
- Incorporated into orientation for new staff
- Added to PACU nurses' competencies

Feedback from Staff



Study Completion

- Enrollment and assessment of 400 general anesthesia patient
- 9 months to enroll
- Published: *E. Card, E; Pandharipande, P; Tomes, C: Lee, J. Wood, D. Nelson1, A. Graves, A. Shintani E. W. Ely and C. Hughes Emergence from general anaesthesia and evolution of delirium signs in the post-anaesthesia care unit British Journal of Anaesthesia. (2015) 115 (3): 411-417. doi: 10.1093/bja/aeu442*

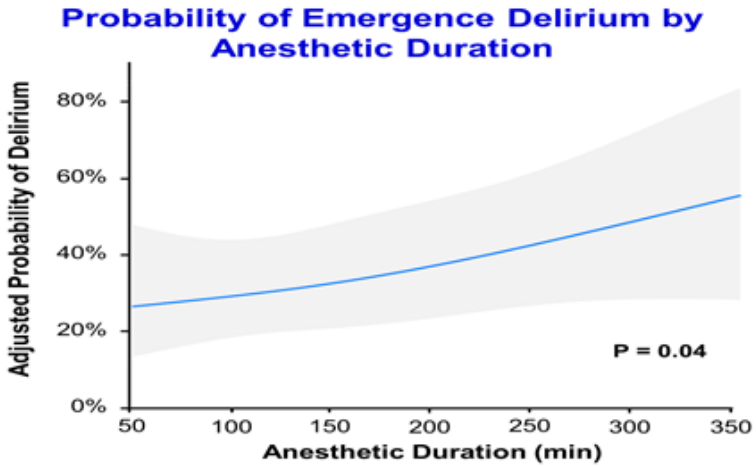
Emergence Delirium Study Patient Demographics

Variable*	N = 400
Age (yr)	57 (44 – 67)
Preop + Intraop Midazolam (mg) • 0 mg • 0.5 – 2 mg • > 2 mg	2 (0 – 2) 31% 65% 4%
Preop + Intraop + Postop Midazolam (mg) • 0 mg • 0.5 – 2 mg • > 2 mg	2 (0 – 2) 31% 63% 6%
Preop + Intraop Fentanyl Equivalents (mcg)	250 (150 – 383)
Preop + Intraop + Postop Fentanyl Equivalents (mcg)	383 (200 – 554)
Anesthetic Duration (min)	140 (87 – 207)
Inhalation Agent (N) • Sevoflurane • Desflurane • Isoflurane	398 (97%) 53% 35% 12%
ASA Classification • 1 • 2 • 3 • 4	3 (2 – 3) 4% 44% 49% 3%
Emergent Delirium n (%) • Agitated emergence per OR staff • Positive CAM-ICU on PACU admission	154 (38%) 75 (19%) 124 (33%)
PACU Delirium n (%) • Positive CAM-ICU at 30 min • Positive CAM-ICU at 60 min • Positive CAM-ICU at Discharge	67 (17%) 59 (15%) 32 (8%) 15 (5%)

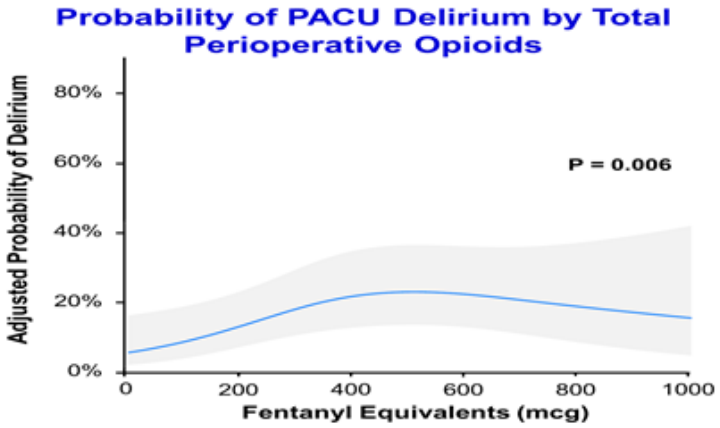
Risk Factors

Emergence Delirium

Variable, N = 154	*P*
Age	0.34
Preop + Intraop Benzo	0.60
Preop + Intraop Opioid	0.32
Anesthetic Duration	0.04
Inhalation Agent	0.95
ASA Classification	0.81



PACU Delirium



Variable, N = 67	*P*
Age	0.07
Preop + Intraop + Postop Benzo	0.21
Preop + Intraop + Postop Opioid*	0.006
ASA Classification	0.21

*Nonlinear

Without Excitement Difficult to Sustain 100%

- Research study completion
- Nurse investigators promoted and/or transferred to other departments
- Delirium monitoring continues, but not by all the nurses all of the time

"The world hates change, yet it is the only thing that has brought progress." – Charles Kettering

Lessons

- Continued interest to sustain 100% compliance
- Education and chart audits

"There are no mistakes or failures, only lessons."

– Denis Waitley

References

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3. Spronk PE *Intensive Care Med.* 2009; 35:1276-1280.
4. Van Eijk MM *Crit Care Med.* 2009:37:1881-1885
5. Card E *BJA (2015) 115 (3):411-417*
6. *http://www.icudelirium.org/medicalprofessionals.html*

Elizabeth Card, MSN, APRN, FNP-BC, CPAN, CCRP

Nursing Research Consultant

Vanderbilt University Medical Center

Department of Nursing Research

1161 Medical Center Drive S-2411 MCN

Nashville, TN 37232-2424 USA

Office: 615- 875-4611

elizabeth.b.card@vanderbilt.edu