Using Continuous Monitoring for Early Recognition of Patient Deterioration in the Post-op Population... *It Just Makes Sense*

January 12, 2018
**Vision:** Health technology enhances healthcare providers’ abilities to improve patient outcomes.

**Mission:** The AAMI Foundation drives reductions in preventable patient harm and improvements in outcomes with complex health technology.

Current National Patient Safety Coalitions:
A Special Thanks

National Association of Clinical Nurse Specialists
Thank you to our industry partners!

Without their financial support, we would not be able to undertake the various initiatives under the National Coalition To Promote Continuous Monitoring of Patients on Opioids. The AAMI Foundation and its co-convening organizations appreciate their generosity.
Questions?

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Or you can email your question to: mflack@aami.org
Speaker Introductions

Lynn Jansky MSN, RN-BC

Jessica Gabriele BS, MSN, CNML, NE-BC, RN-BC CNL
Using Continuous Monitoring for Early Recognition of Patient Deterioration in the Post-op Population...It Just Makes Sense

Lynn Jansky MSN, RN-BC
Jessica Gabriele BS, MSN, CNML, NE-BC, RN-BC CNL

Middlesex Hospital
Middletown, CT
Objectives:

● Describe why Middlesex Hospital decided to continuously monitor our patients using noninvasive technology

● Discuss the process involved in implementing the technology, and the lessons learned

● Review patient scenarios where the technology assisted in improving patient outcomes
Lynn Jansky MSN, RN-BC
South 6 Professional Development Specialist

Jessica Gabriele BS, MSN, CNML, NE-BC, RN-BC CNL
South 6 Manager
Middlesex Hospital
Middletown, CT
South 6 Orthopedics

- 15 bed orthopedic unit
- Specializing in the care of total joint replacement and spine surgery patients
- Accredited by the Joint Commission for Total Hip and Total Knee Replacement surgery
Describe why Middlesex Hospital decided to continuously monitor our patients using noninvasive technology.
Why we decided to use noninvasive technology?

- Initially started with MD asking for continuous O2 sat monitoring capabilities so that we could keep some of our patients on our orthopedic unit instead of transferring to the IMCU for monitoring over night.
Why we decided to use noninvasive technology?

Orthopedic Patient Population

- Opioids
- Opioid naive patients
- Diagnosed/undiagnosed sleep apnea
- CPAP non-compliant patients
- Risk of respiratory depression
Why we decided to use noninvasive technology?

- Initial thoughts – O2 sat monitoring would allow some post-op patients to stay on our unit.

- Later thoughts - what would we capture if we used continuous VS monitoring.
Top 10 Patient Safety Concerns for Healthcare Organizations 2017

This list is created to support healthcare organizations to:

- Proactively identify threats to patient safety
- Improve patient safety by addressing concerns
ECRI Top 10 Safety Concern: Unrecognized Patient Deterioration

#2 Unrecognized patient deterioration

- Stroke, heart attack, sepsis and post-surgical complications
- “proactively assess patients’ risk, plan for appropriate care and monitoring, educate at-risk patients, and supplement with technological monitoring”

https://www.ecri.org/EmailResources/PSRQ/Top10/2017_PSTop10_ExecutiveBrief.pdf
ECRI Top 10 Safety Concern: Opioid Administration & Monitoring

#7 Opioid administration and monitoring

- Multimodal pain management approach - patients are still receiving opioids
- Many concerns around opioid administration
  - Risk of respiratory depression

https://www.ecri.org/EmailResources/PSRQ/Top10/2017_PSTop10_ExecutiveBrief.pdf
Safe use of opioids in hospitals

While opioid use is generally safe for most patients, opioid analgesics may be associated with adverse effects, the most serious effect being respiratory depression, which is generally preceded by sedation. Other common adverse effects associated with opioid therapy include dizziness, nausea, vomiting, constipation, sedation, delirium, hallucinations, falls, hypotension, and aspiration pneumonia. Adverse events can occur with the use of any opioid; among these are fentanyl, hydrocodone, hydromorphone, methadone, morphine, oxycodone, and sufentanil. While there are numerous problems associated with opioid use, including under-prescribing, over-prescribing, tolerance, dependence, and drug abuse, this Alert will focus on the safe use of opioids that are prescribed and administered within the inpatient hospital setting. The Joint Commission recognizes that the emergency department presents unique challenges that should also be addressed by the hospital, but may not be directly addressed in this Alert. This Alert will provide a number of actions that can be taken to avoid the unintended consequences of opioid use among hospital inpatients.

Opioid analgesics rank among the drugs most frequently associated with adverse drug events. The literature provides numerous studies of the adverse events associated with opioids. One study found that most adverse drug events were due to drug-drug interactions, most commonly involving opioids, benzodiazepines, or cardiac medications. In addition, a British study of 3,655 inpatient adverse drug reactions found that 16 percent were attributable to opioids, making opioids one of the most frequently implicated drugs in adverse reactions. The incidence of respiratory depression among post-operative patients is reported to average about 0.5 percent. Some of the causes for adverse events associated with opioid use are:

- Lack of knowledge about potency differences among opioids.
- Improper prescribing and administration of multiple opioids and modalities of opioid administration (i.e., oral, parenteral and transdermal patches).
- Inadequate monitoring of patients on opioids.
AAMI Foundation

**Mission:** The AAMI Foundation drives reductions in preventable patient harm and improvements in outcomes with complex health technology.
Discuss the process involved in implementing the technology, and the lessons learned
Process of Implementing Technology

- MD champion pushing for pulse oximetry monitoring
- Nurse manager (former) reached out to biomed to see what was available
- Multiple discussions (nurse manager, nurse educator, biomed, MD) around what device would meet our needs
- Biomed had seen EarlySense device at a conference
- Trialed 2 devices in late 2016 - didn’t have staff/manager buy in
- New manager January 2017 - revitalized the trial
- Full on use of 9 EarlySense monitors in March 2017
What is EarlySense?

- Noninvasive monitoring device that allows for continuous and contact-free monitoring of patient's Heart Rate & Respiratory Rate

- Features:
  - HR, RR monitoring
  - O2 saturation monitoring
  - Turn reminder
  - Fall alarm
Preparing the Unit

● Worked closely with Biomedical Engineering Department
● Our unit had to be prepped for these devices (additional wiring etc…)
● Location of central monitoring devices on the unit
● Location of in room monitors (mobile vs. mounted)
● How would the devices alert the nurses
  ○ Pagers vs phones vs audible alert only
Staff Education

- Company rep provided staff education on the use of the device
- Educator created education powerpoint program which is readily available and housed on Education Website
- Manager and Educator strong supporters and reinforced use
Staff Education

- Currently have 9 devices - awaiting additional devices to have for each bed
- Who do we use the devices on?
  - Use on all new post-op patients
- Patients that may benefit from use are:
  - patients with sleep apnea
  - opioid naive patients
  - any patient requiring large doses of opioids
  - fresh post-op
Staff buy in

- Staff initially disliked the technology
- Viewed it as an additional burden, increased workload
- Didn’t trust technology
- Didn’t want to use it
- Manager/Educator encouraging use
- Manager → “not optional”
- Once we started seeing outcomes of using the technology staff did turn around
- Now staff want it on all their patients
Lessons Learned

- It takes time to get staff buy in and get everyone on board
- Glitches with interference
  - Vibration from SCD pumps
- False alarms
- Benefit of use outweighs any potential false alarm or glitch
Review patient scenarios where the technology assisted in improving patient outcomes
Patient Scenario Scenario #1 : SVT

S: 86 y/o male admitted for left quadriceps repair, EarlySense fired on post-op day one to alert nursing staff of a high heart rate. RRT (Rapid Response Team) was called patient was found to be in a new SVT.

B: No significant medical history

A: EarlySense fired an alert to nursing staff that patient had an abnormal heart rate. Upon RN assessment EarlySense findings were validated, RN initiated a RRT.

R: Patient transferred to higher level of care for further evaluation and treatment. This may have gone undetected for an extended period of time-related to the patient not reporting any symptoms before EarlySense firing.
Patient Scenario Scenario #2: Afib

S: 87 y/o male admitted for a left total knee replacement. EarlySense fired post-op day zero alerting nursing staff of an elevated heart rate; RRT called

B: Patient history of paroxysmal afib with no need for medical treatment in place.

A: EarlySense fired alerting nurse to assess the patient for change in heart rate. Upon assessment, the patient was found to have a heart rate in the upper 130's and asymptomatic. RN initiated an RRT; the patient was seen to be in an afib requiring medical intervention.

R: Patient was able to remain on the unit to continue his recovery process, with the assistance of early intervention.
Patient Scenario #3: Fluid Overload

S: 71 y/o Female admitted for Lumbar fusion. EarlySense fired post-op day two alerting nursing staff of increased respiratory rate.

B: Patient history of Hyperlipidemia, NIDDM, Hypertension, and Osteoporosis.

A: EarlySense fired alerting nurse to assess patients respiratory status. Upon assessment patient was found to have increased respiratory rate, and crackles at the bases. Chest x-ray showed signs of Congestive heart failure/volume overload.

R: Patient received appropriate medical intervention and was able to remain on the unit to continue her recovery process, with the assistance of early intervention.
**Patient Scenario #4: Faulty AICD**

**S:** 79 y/o male admitted for a left total knee replacement. EarlySense fired post-op day zero alerting nursing staff of a decreased HR.

**B:** Patient history of TIA, Afib, and AICD.

**A:** EarlySense fired alerting nurse to assess patient for a low heart rate. RN findings upon assessment noted patient to be in no distress yet, with a heart rate in the 30’s. EKG noted that patient was bradycardic and no evidence of pacer spikes.

**R:** Patient was transferred to telemetry unit for further monitoring and follow up with cardiology. Once stable from cardiology standpoint returned to orthopedics to continue recovery process.
Other Findings

- High RR alarm, patient found hypoventilating → undiagnosed broken ribs

- Low HR alarm, RN placed on cardiac monitor → new heart rhythm detected Wenckebach

- Low RR alarm, → PCA induced Respiratory Depression

- Early detection of opioid naive patients
Goal - Improve Patient Outcomes

Did we meet our goal of improving patient outcomes through the use of this technology?

We looked at:

- Number of RRTs (rapid response team) called
- Number of patients transferred off of S6 to a higher level of care
- Narcan usage
- Each individual patient case scenario
Rapid Response Team (RRT) Calls

RRT calls on South 6 Orthopedics

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of RRT calls</th>
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</thead>
<tbody>
<tr>
<td>2016</td>
<td>74</td>
</tr>
<tr>
<td>2017</td>
<td>83</td>
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EarlySense went live March 2017 with 9 monitors - not full bed capacity of 15
Patients Transferring to Higher Level of Care

Number of patients transferring off of South 6 to a higher level of care

<table>
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<tr>
<th>Year</th>
<th>RRT calls</th>
<th>Transfer to higher level of care</th>
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</thead>
<tbody>
<tr>
<td>2016</td>
<td>74</td>
<td>23 patients</td>
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<tr>
<td>2017</td>
<td>83</td>
<td>24 patients</td>
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</tbody>
</table>

EarlySense went live March 2017 with 9 monitors - not full bed capacity of 15
Narcan Administration

Our goal: through early intervention and detection decrease use of Narcan.

<table>
<thead>
<tr>
<th>Year</th>
<th>Narcan Administration</th>
</tr>
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<tbody>
<tr>
<td>2017</td>
<td>4</td>
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</table>
Future Opportunities

- Preliminary findings
- Opportunity to look at data further and really study patient outcome measures
- Looking forward to having all 15 monitors in use
Individual Patient Case Scenarios

With each patient case scenario, we learn the importance of early detection. We believe that our early interventions have truly made a difference in each of our patients' lives.
Conclusion

- Through the use of continuous monitoring for early recognition of patient deterioration, we have:
  - Proactively identified threats to patient safety
  - Improved patient safety by addressing concerns
South 6 RN Quote

“I love knowing that my patients are safe at a quick glance of the monitor. I can’t always be with my patients as much as I would like, so being able to see their HR and RR on the EarlySense central monitors brings me comfort.”

~ Tammy H (South 6 RN)
Polling Questions

Select your answer in the “Polling Section” on your webinar dashboard
Future/Ongoing Initiatives
Mark your Calendars!
February 23, 2018: 12pm to 1pm EST

Smart Pump Interoperability: 
A Multi-System Safety Journey
Presented by
Deb Bonnes RN, MS,
Nursing Informatics Specialist, UC Health, Aurora, CO
Sondra May, PharmD
UC Health, Aurora, CO
&
Jennifer Biltoft, PharmD, BCPS,
System Clinical Pharmacy Manager, SCL Health

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http://www.aami.org/PatientSafety/content.aspx?ItemNumber=3694&navItemNumber=3089
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We hope that you will support this important mission

Why Support? Adverse events continue to be a troubling issue in healthcare and technology is a contributing factor. With complex technology being introduced at the point of care at a rapid rate there is a need to identify solutions to help care givers navigate this environment and mitigate the risks that are present. Your support will create essential tools to help reduce the risk of technology related incidents.

How to Support? It is easy! you make a tax deductible donation two ways:

http://my.aami.org/store/donation.aspx

or

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Thank you for attending the AAMI Foundation Opioid Safety Seminar Series!

This concludes the presentation