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Safe opioid use – Strategies for reducing adverse events and related harm

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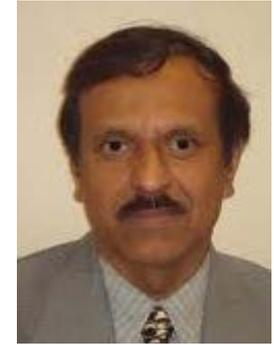
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Our Experience in Successfully using ETCO₂ Monitoring During the Usage of PCA Pain Management

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St. Joseph's/Candler Health System Savannah, GA

- 2 hospital system, tertiary care, community, referral centers
 - Two of the oldest continuously operating hospitals in the nation
 - Largest healthcare system in SE Georgia; 675 beds
 - Approximately 25,000 annual discharges



BALANCING EFFECTIVE ANALGESIA WITH SAFETY



What caused a change in PCA delivery at SJCHS?

- We experienced three opioid-related events with serious outcomes in the 2 years preceding our embarking on a multiyear process of implementing an advanced IV medication safety system.

PCA Team Developed

- The team recognized that safe use of PCA required both correct pump programming and monitoring of patients' individual respiratory response to opioids.

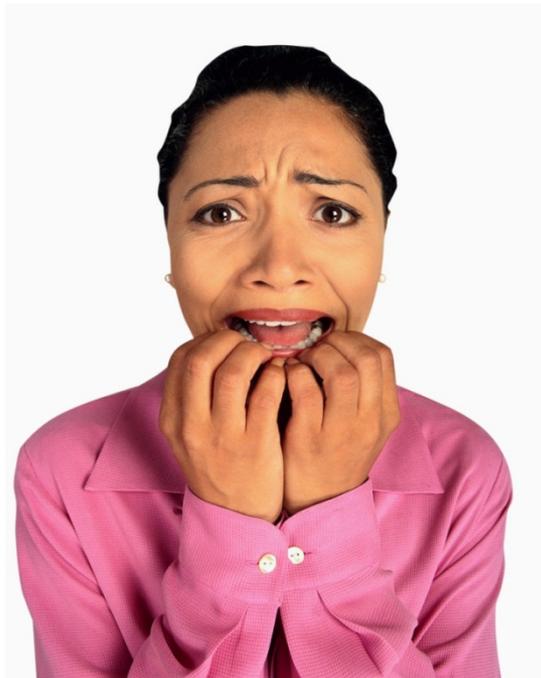
1st STEPS in our progression to becoming involved in the monitoring of post-operative patients receiving pain management

The pharmacy and nursing staffs were attempting to address safety concerns with regards to PCA pain medication delivery. Respiratory Care was called in to address monitoring options early on in the decision making process.

Beta Testing

- Beta testing revealed the difficulty of predicting which patients actually were high-risk. We did note that capnography, not pulse oximetry, provided the first indication of opioid-related respiratory depression. As a result, the decision was made to require a capnography module for each PCA infusion and to use a pulse oximeter module for selected patients receiving PCA analgesics who have preexisting co-morbidities.

Are we sure that this is an area that we want to take on? What about staffing? I don't know anything about PCA pumps and pain scales?



Why should Respiratory Care be involved in Pain Management?

- RTs have keen clinical assessment skills
- RTs understand EtCO₂ and it's limitations
- RTs have the ability to use good clinical judgment and to guide the care of patients suffering from Respiratory Depression.



Development of a Functional EtCO₂ Tool

- Early on in the evaluation process a problem was identified, in that the staff noticed that the EtCO₂ Monitor would alarm indicating High Respiratory Rate. The patient's resp. rate would be 20 bpm however the device would read 40 bpm.
- The solution was to be achieved by working with the manufacturer to decrease the EtCO₂ threshold, so that only true breaths and not fluctuations in the respiratory pattern would be counted as breaths. This was done and the problem was resolved.

Development of an efficient EtCO₂ tool



- Another process development was the creation of a new EtCO₂ cannula design.
- In the PACU unit it was noted that the no breath alarm would be sounding, even with the patient seemingly breathing effectively.
- The new cannula was designed to provide increased surface area for CO₂ sampling and hence improved accuracy. This action resolve the clinical issues that occurred in the PACU.

What do the RTs do?

- Q shift monitoring of each patient on PCA therapy.
- RTs assess patient's history and adjust monitoring to meet patient's status.
- Reviews trended information (EtCO₂, SpO₂, Respiratory Rate, & PCA medication rates)
- Provide bedside education regarding EtCO₂ monitoring





Changes from Baseline – Action Steps for Nursing Staff

Remember the ABC's (airway, breathing, circulation)

Assess the patient

Follow your normal protocol, which may include:

- Stimulate patient if necessary
 - Ensure open airway
 - Check the cannula positioning
 - Notify Respiratory Therapy
- Consider decreasing or stopping PCA and starting alternative drug delivery
 - Inform M.D.
 - Administer reversal agents as prescribed

Typical Monitoring of Patients on PCA

- Intermittent assessments of cognition, vital signs, pulse oximetry and pain scores.
- Dangers of overmedication may not be detected.



PCA Monitoring Trend Data: Opioid Induced Respiratory Depression

= alarm

A Morphine 1mg/mL 09:00			
2003-06-06 TIME	TOTAL DOSE (mg)	SPO2 AVG	PULSE AVG
09:00	2.5	95	90
09:30	3	97	92
10:00	2.5	97	88
10:30	4.5	94	80
11:00	5.5	93	84
11:30	5.5	88 ⚠	90

ZOOM: 120 60 **30** 5 1 minutes

>Press UP/DOWN Keys to Move Cursor.

ZOOM SPO2 MAIN PAGE DOWN

A Morphine 1mg/mL 09:00			
2003-06-06 TIME	TOTAL DOSE (mg)	ETCO2 AVG	RR AVG
09:00	2.5	44	18
09:30	3	42	22
10:00	2.5	43	20
10:30	4.5	50 ⚠	14
11:00	5.5	54 ⚠	9 ⚠
11:30	5.5	57 ⚠	7 ⚠

ZOOM: 120 60 **30** 5 1 minutes

>Press UP/DOWN Keys to Move Cursor.

ZOOM ETCO2 MAIN PAGE DOWN

Change in the Culture of Care for Our PCA Patients



Improved Pain Management

Clinicians often times use extreme caution during narcotic administration.

Problem:

Under medication to prevent respiratory depression resulting in poor pain control.

Solution:

Add continuous monitoring to provide clinicians with assessment tools that assist in the detection of respiratory depression and allow adequate administration of analgesics.

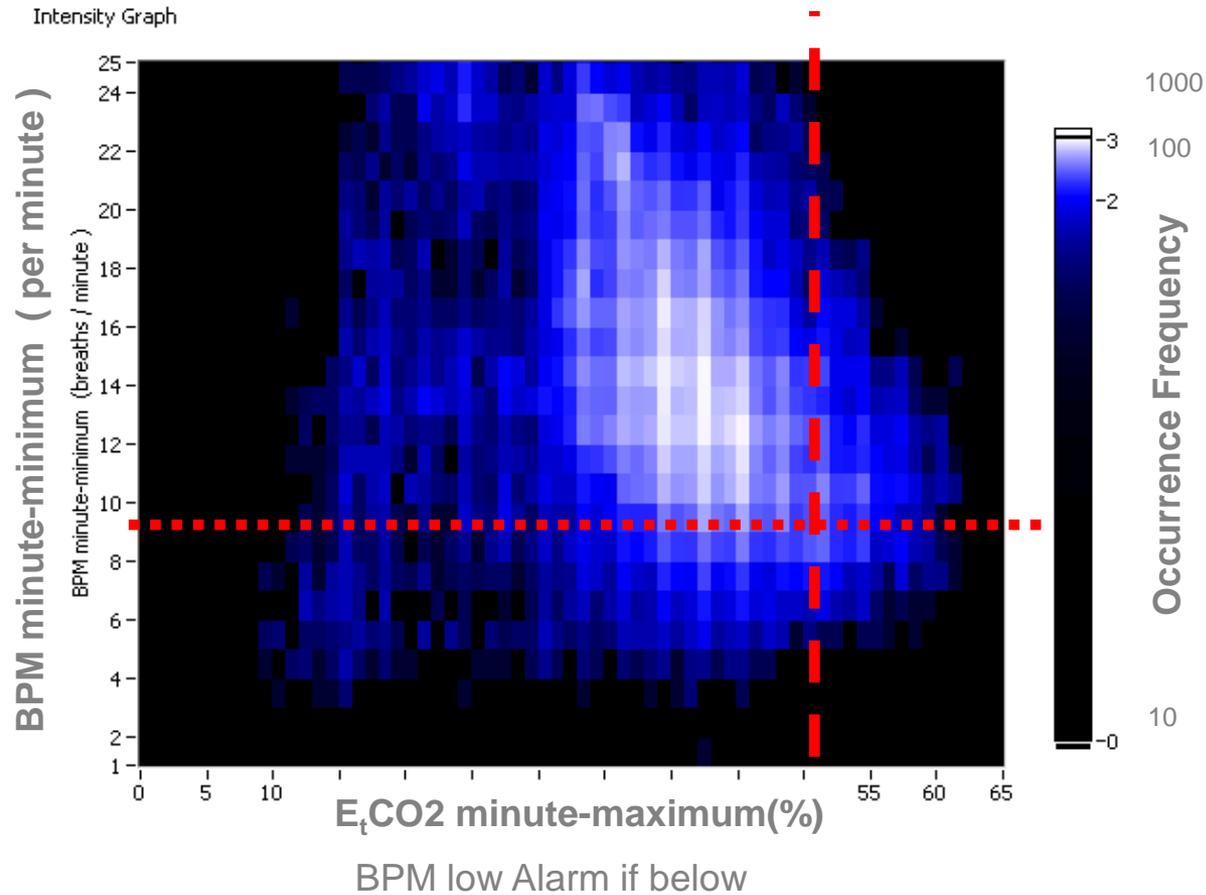
Findings Using Continuous Etco2 and Spo2 Monitoring With PCA Therapy

- Multiple “high risk” situations identified including:
 - Narcotic overdose leading to respiratory depression.
 - Apnea alarms.
 - Undiagnosed sleep apnea.
 - Post op pneumonia and Atelectasis.
 - Congestive heart failure.

BPM low <8 7504
EtCO2 high >60 71
Both 9

Aggregated
50 patients SJC

low BPM versus high EtCO2 in same minute



RESULT

- Increased likelihood of better sustained pain control, faster recovery and discharge.
- A better patient experience.
- 8 YEARS of event free usage of PCA therapy



SUMMARY OF OUR EXPERIENCE

- EtCO₂ provides earliest alert of decline in respiratory function.
- Undiagnosed Sleep Apnea more prevalent than expected.
- Post op respiratory depression unrelated to PCA detected.
- Pain is more effectively controlled in patients with both high and low opioid tolerance.

CONCLUSION

- Changes in respiratory status is a leading indicator of adverse patient response to opioid infusion or other types of clinical deterioration.
- Current respiratory monitoring technology can aid in patient assessments and prevent serious adverse events.

THANK YOU



Panel Discussion



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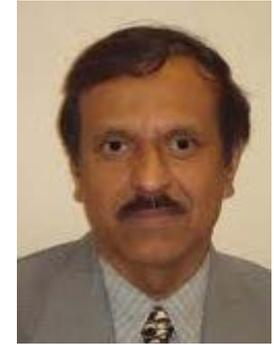
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