Monitoring Guidelines for Prevention of Opioid Induced Ventilatory Impairment

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Sentara RMH Medical Center

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Background

- An estimated 12% of cases where patients receive parenteral opioids will result in respiratory depression. This condition is known as opioid induced ventilator impairment (OIVI).
- Unrecognized decompensation of patients continues to be an issue on hospital floors.
- Early detection allows for non-invasive interventions

Problem Identification

- There are currently no standardized monitoring guidelines for patients receiving intravenous opioids at Sentara RMH.
- This project aims to incorporate evidence-based practice guidelines on OIVI monitoring and create a standard practice at Sentara RMH Medical Center.
- Implementation of a standardized monitoring program for patients receiving intravenous opioids aligns with RMH's mission to always keep our patients safe by ensuring we first do no harm.
- This project was approved by the Sentara RMH Institutional Review Board.

Literature Review

- One third of code blue alarms are related to OIVI (Stites et al., 2017).
- According to 2 systematic reviews completed by Khanna et al. (2018) and Carlise (2014), while patients are at risk for respiratory depression, it is preventable through adequate continuous monitoring of respiratory status.
- According to a systematic review by Carlise (2014), capnography can be lifesaving for patients who are at risk for OIVI, including postoperative patients, opioid naïve patients, and those on PCA or continuous infusions.
- Capnography can quickly monitor trends or developing issues, detecting signs of respiratory distress earlier than visual assessments and pulse oximetry.
- Continuous capnography use significantly decreases the incidence of OIVI in patients requiring supplemental oxygen while receiving opioids (Stites, Surprise, McNiel, Northrop, & De Ruyter, 2017).
- OIVI decreased by 50% over a two-year period after implementation of continuous capnography (Stites, Surprise, McNiel, Northrop, & De Ruyter, 2017).
- Milligan, Zhang, & Graver (2018) found a 33% decrease in OIVI events after continuous capnography implementation with patients receiving opioids.
- Meisenburg, Ness, Rao, Rhule, & Ley (2017) found that with the implementation of a standardized bundle to assess for OIVI supports a five fold reduction in OIVI events.
- In addition to the cost of an OIVI event, there is a 55% increase in hospital LOS, 36% increase readmission rate, 3.4 times chance of patient mortality (Stites et al., 2017).
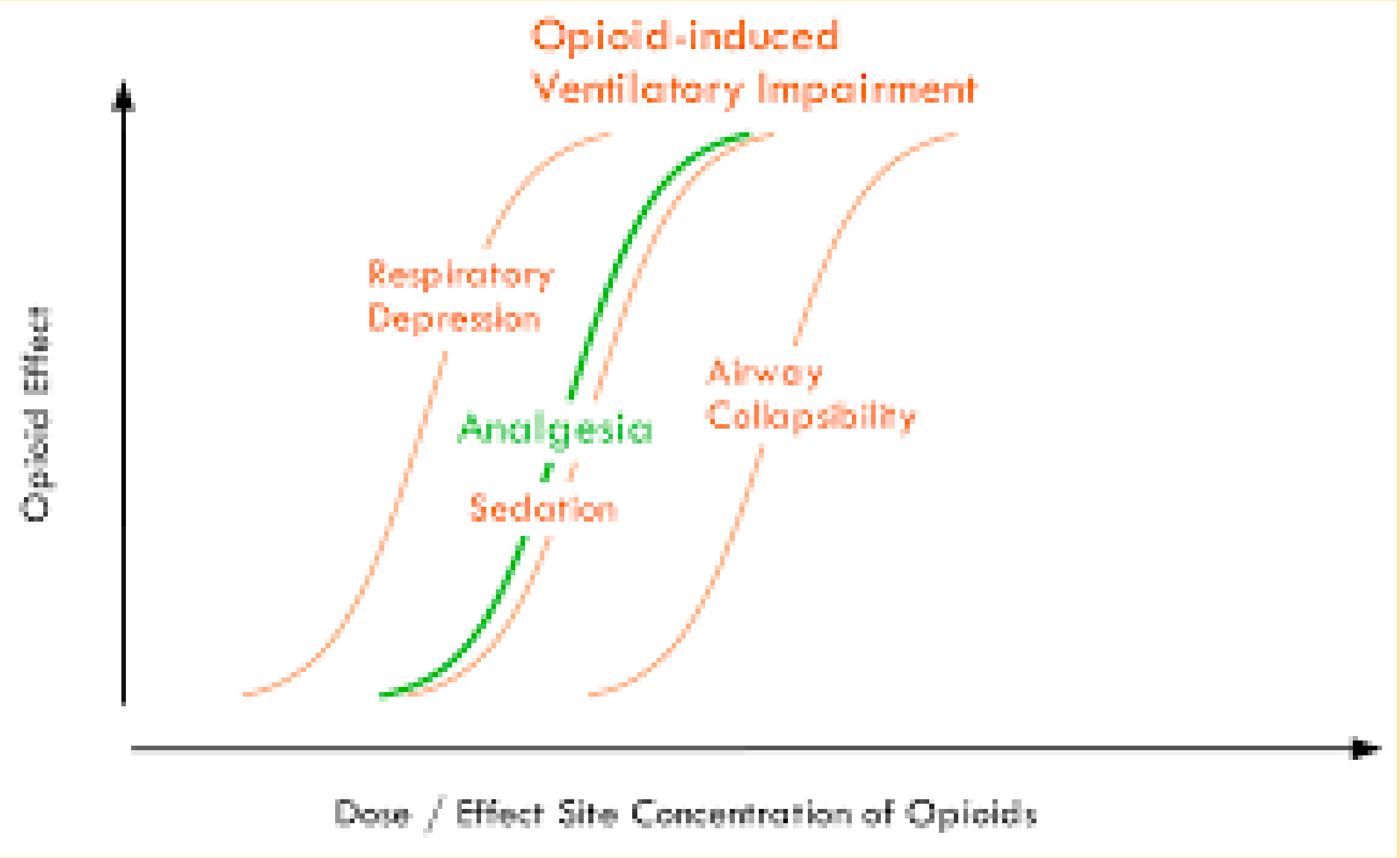
Conclusion

- Pulse oximetry has a significantly delayed response compared to any other ventilatory monitoring measure such as capnography or blood gas (Stites et al., 2017).
- Capnography measures ETCO2 which measures ventilation and quickly identifies OIVI.
- Continuous monitoring on all floors is best solution to prevent OIVI (Khanna et al., 2018).
- The average daily cost for capnography monitoring is approximately $9.50. Compare to the average cost of an OIVI event, which is $6,721 (Stites et al., 2017).
- A bundled approach with risk stratification, sedation monitoring and OIVI monitoring tools is the most effective method for preventing opioid related complications.

Implications

- A risk prediction screening tool is recommended.
    - Factors: age >60, BMI >30kg, OSA, Smoker, Use of other sedatives, opioid naive, comorbidities of lungs and kidneys
- More specific sedation scale: Pasero Opioid-induced Sedation Scale (POSS)

Monitoring

- *Low risk for OIVI*
    - Continuous bedside monitoring of pulse oximetry for first 24 hours receiving opioids
- *Moderate/High risk for OIVI*
    - Strongly recommend continuous EtCO2 monitoring and continuous pulse oximetry monitoring with remote and centralized visibility

Barriers

- Monitoring equipment availability
- Centralized audibility/limited availability of remote telemetry boxes
- Education
- Standardizing process across system
- Cost