Less Pain, More Gain: Implementing Evidence-Based Practice in Pain and Sedation

Andrew C. Faust, PharmD, BCPS; LSS Yellow Belt
Texas Health Presbyterian Dallas
Objectives

Define different quality improvement models and methods to incorporate evidence-based medicine in the intensive care unit

Review implementation of analgo-sedation protocol in the medical ICU to illustrate transformation of guidelines to clinical practice
Audience Survey

- Professions
- Academic vs. Community Institutions
- One intensivist group? Two? More than two?
- Medical ICU? Surgical? Mixed? Trauma?
- Have worked on implementing new practice to your ICU
- Have read a neat new RCT in a big journal that you thought you needed to implement in your ICU
What is “Evidence-Based” Practice

- Thoughtful use of current best available evidence in decision-making
  - Individual case-based
  - Broader delivery of care

- Supported by varying levels of evidence
  - R, DB, PC, multicentered huge trial
  - Retrospective, single-center studies
  - Expert/Personal opinions
  - Meta-analyses

- Straightforward, specific treatments vs. highly complex issues on some of our sickest, most vulnerable patients
  - Ex: Universal decolonization with mupirocin/CHG vs. Low-tidal volume ventilation for ARDS

Clinical Practice Guidelines

+ Accumulation of the best practices, current evidence
  + “Provide a current and transparently analyzed review of the relevant research with the aim to guide clinical practice” – 2018 PADIS Guidelines
  + “The goal of these clinical practice guidelines is to recommend best practice for managing PAD to improve clinical outcomes in adult ICU patients.” - 2013 PAD guidelines

+ Guidelines are not cookbooks
  + Ex: DKA/HHS treatment

+ 80 / 20 rule?
  + There will ALWAYS be exceptions to guidelines because patients are not uniform

Ease of Implementing EBP

+ Quality of evidence and impact on patients
  + Was this a RCT?
  + Is the outcome significant?
    + Example: Improved oxygenation vs. improved survival

+ How similar is my institution and practice to the setting in the paper?
  + Was study/trial in a MICU and you practice in CVICU?
  + Is the nursing staff and resources similar to your institution?
  + Example: “No sedation” protocol in ICU – nursing ratio was 1:1 or, if needed, an additional HCW could help watch patient

+ Implementation science
  + Field of study dedicated to understanding facilitators and barriers to adopting EBP

ARDS Example

- High quality data demonstrate that low tidal volume ventilation improves ARDS mortality
  - Given a strong recommendation by clinical practice guidelines

- Implementation of intervention has been as low at 19% in some practices

- WHY?
  - Multiple barriers to implementation
    - Under-recognition of disease state
    - Physicians not wanting to give up control of vent
    - Perception of contraindications
    - Etc.
  - Implementation science has some recommendations on framework for assessing barriers

Methods for Implementing Change

+ Should think of any change as a process / quality improvement project
  + ICU care is very interconnected – multiple disciplines and departments may be affected by change
  + What worked well in a RCT may not work well in your practice site, especially if there are multiple interventions
    + Ex: ABCDE bundles, sepsis bundles, etc.

+ Consider your implementation a small, pragmatic research study!

+ Different methods for looking at change implementation
  + Step 1 should ALWAYS be to PLAN!
  + Should involve as many of the disciplines as possible
    + Ex: Changing your sedation protocol will influence pharmacy, nursing, physicians....but also RT, PT/OT, nutrition, etc.
Give me six hours to chop down a tree and I will spend the first four sharpening the axe – Abraham Lincoln
Plan, Do, Study, Act Model

One method endorsed by AHRQ

Plan:
- What are root causes?
  - We LOVE to fix things in ICU care – resist the urge to jump to conclusions
- What is the problem?
- Who can help fix / be affected by change?
- What data are we going to collect along the way?

Do:
- Experiment by changing a root cause / condition

Study:
- What happened when we implemented change? Why?

Act:
- What do we need to change / improve on?
Lean Six Sigma Methods

△ Lean:
△ Relates to the relentless elimination of waste

△ Six Sigma:
△ Relates to elimination of defects / variations in processes that may result in undesirable outcomes
△ Many six sigma tools are applicable to implementation of new practices and evidence based medicine
△ DMAIC (define, measure, analyze, improve, and control) is one tool
△ Too often we go from “there’s a problem/opportunity, let’s implement this solution” → Avoid Cobra Effects!!
Example: Antibiotics in Sepsis

+ "Septic patients in our hospital never get their antibiotics on time"

+ Some tools to consider:
  + Define the problem and the goal
    + Example: X% of patients get antibiotics within 1 hour now. Our goal is to increase this to Y%.
  + Figure out what the process currently is and where the hang ups are
    + Value stream mapping, asking "5 why’s," Ishikawa diagrams, etc.
  + When you do implement, how are you going to measure and then sustain the gain?
Analgosedation Practice at THD
PADIS in 2018 – A very general overview!

- Pain is first – it should be treated first
  - Opioids remain treatment of choice
  - **Management of pain for adult ICU patients should be guided by routine pain assessment and pain should be treated before a sedative agent is considered** (THD paper included in references)
    - Ask the patient (awake and interactive patients are, generally, a good thing!)
    - Use objective scores when patients cannot report

- When indicated, use a sedative agent
  - Keep sedation light (when possible) and be objective
  - **Minimize** benzos (don’t completely eliminate)
    - Especially continuous infusion benzodiazepines, which have been shown to increase ventilator duration, delirium, etc.
    - Benzos are still acceptable for acute agitation and effect of intermittent use isn’t well known
  - Propofol or dexmedetomidine preferred
PADIS in 2018 – A very general overview!

Delirium
- Is bad – we think
  - Lots of conflicting evidence about both short and long term effects
- No “magic bullets” for treatment or prevention
  - Multicomponent, nonpharmacological management might be helpful

Immobility
- Get patients moving – either walking on the vent or at least range of motion / PT / OT exercises

Sleep
- The ICU is not a great place to get good sleep
  - Implement a sleep-promotion protocol?
- Likely expanding area of research for sleep hygiene / sleep maintenance

THD’s Analgosedation Practice

- Practice changed in 2012
  - ICU ACM group
    - ACM = accountable clinical management
    - Financial incentives to physician group
  - One of the group’s metrics was to implement a new sedation protocol
  - Anticipation of the “soon to be released” SCCM guidelines

- Increasing interest in using analgesia-first practice
  - Analgesia was mentioned in the prior guidelines (2002)
  - Lots of talk amongst critical care groups and review papers
  - Increasing recognition that our propofol-first attitude was NOT treating pain....which is exceedingly common
  - And growing tired of the “which sedative is best?” debates when pain management may have been the key!

Planning

- Multidisciplinary team
  - Lead by clinical pharmacists
  - Included physicians and nursing

- Reviewed other hospitals protocols, guidelines, review papers, and primary literature
  - How much of this would apply to a 24 bed MICU at a community teaching hospital with one group of intensivists?

- Assessed what current practices already were
  - Already using RASS and CPOT
  - Not great about treating pain (few patients getting continuous infusion analgesics)

- Knew we wanted to study this as a process improvement project
  - Used pharmacy resident resources
THD Intensive Care Unit Sedation and Analgesia Protocol (Expected Duration of Intubation > 24 hours)

ONLY FOR USE IN PATIENTS ON MECHANICAL VENTILATION – See Order Set in EPIC

Exclusions to protocol include: Therapeutic Hypothermia, Prone Positioning, Neuromuscular Blockade, Pressure Control Ventilation

Routine patient assessment and documentation of pain and sedation assessment (CPOT and RASS at least q 2 hours)

Is patient comfortable and at RASS goal? GOAL RASS = 0 to -2 unless specified by MD

Have reversible causes of discomfort/agitation been addressed and corrected? [Ex: ET tube misplacement, ventilator dyssynchrony, environmental factors (lights, TV, family, etc.)]

PROVIDE ANALGESIA
- Patient displays dangerous behavior (ex: attempting self-extubation) – Give 1 dose fentanyl or morphine before proceeding to sedation
  - Fentanyl 50-100mcg IV per dose (Preferred agent)
  - Morphine 2-5mg IV per dose (Alternative agent if MAP > 70 and CrCl > 30)
- If no dangerous behavior, give fentanyl or morphine q 10 min up to 3 doses until at RASS goal

MAINTENANCE OF RASS
- Fentanyl or morphine q 2 hrs as needed for RASS above goal
- If giving more often than 3 doses within 2 hour span, begin continuous infusion fentanyl or morphine
  - RASS +1 to +4 (or above MD specified goal) despite analgesia

PROVIDE SEDATION
- If already receiving propofol infusion: Propofol 0.5 mg/kg (max 50mg) IV bolus (unless MAP < 70, then give midazolam) and increase propofol infusion by 5 mcg/kg/min until at goal RASS
- Midazolam 2-5mg q 5 min (up to 3 doses) until at RASS goal
- If delirious (per CAM-ICU), give haloperidol 1-5mg IV (avoid if QTc > 450 msec)

MAINTENANCE OF RASS
- Midazolam 2-5mg q 5 minutes (up to 3 doses) as needed after first addressing analgesia
- If using midazolam more often than 3 doses within a 2 hour span, start continuous infusion
  - Preferred: Propofol: Start at 10 mcg/kg/min and increase 5 mcg/kg/min every 5 mins to achieve RASS goal. Max 80 mcg/kg/min.

Continue current management using minimum drug therapy. Continue assessment for discomfort, pain, and agitation. Sedation vacation should be performed unless otherwise specified by MD or contraindicated

No – at goal RASS and comfortable

Correct reversible causes and reassure patient. Is patient still agitated and above RASS goal?

PROVIDE ANALGESIA

Continue current management, assessing patient for RASS and causes of pain/discomfort at least q 2 hours

Consider provision of analgesia prior to painful procedures (ex: suctioning, chest tubes, etc.)

If patient OVERSEDATED (RASS -3 to -5) or no adjustment to continuous sedation for 12 hours – see RASS Adjustment Table

Hold sedation/analgesia sedation vacation and assessment for weaning unless contraindicated – see Sedation Vacation Guidelines

BP low-normal (MAP < 100): Add ketamine infusion 5-40 mcg/kg/min. Patient must be on benzodiazepine or propofol concomitantly

BP high: Add scheduled lorazepam 2-4 mg q4
Planning

+ LOTS of nursing education
  + Planned inservices
  + On-the-fly huddles
  + Newletters (bathrooms work great!)

+ LOTS of physician education

+ Tried to anticipate barriers
  + “Isn’t it bad that patients are more awake?! That seems mean!”

+ Access to medication
  + Went to pre-mixed, outsourced fentanyl bags to load in PYXIS
  + Toyed with the idea of narcotic boxes in the rooms

+ IT / EHR support
Do

+ Implemented in late 2012

+ Emphasized early, aggressive treatment of pain with intermittent and, if needed, continuous fentanyl

+ Minimized sedation
  + Preferred drug was intermittent benzodiazepine followed by continuous propofol

+ RASS goal, daily awakenings/sedation vacation, and ventilator weaning guidelines unchanged
Study / Act

- During implementation period, held weekly meetings
  - Looking at accidental extubations, complications, success stories, barriers, etc.
  - Continually looking to improve process

- Nursing questionnaire sent to address knowledge deficits but also concerns

- Quickly learned that bedside RTs were a vital part of our group that we’d omitted from planning
  - Ventilator and tubing positioning were changed to prevent inadvertent ventilator disconnection
  - Practices of taping ETT were addressed

- Physical restraints were addressed
  - More use of mittens

- LOTS of early wins
  - Patients communicating needs with iPads, computers, message boards, etc.
Results

- Retrospective, pragmatic study in MICU
  - Applicability to SICU, CVICU, etc.??

- 65 patients in propofol-based protocol (2011 group) vs. 79 patients in fentanyl-based protocol (2013 group)
  - More male patients in 2011 group

- Duration of MV reduced with fentanyl-based protocol
  - $138.3 \pm 132.6$ vs. $92.9 \pm 73.3$ hours
  - Difference of 26.6 hours (95% CI, 44.98 to 8.26) in linear regression

- Lighter sedation and better pain control with fentanyl-based protocol

Medication Use in Study

- Fentanyl use went up
  - Per patient: 1436.2 mcg fent equivalents vs. 7516.8 mcg (p < 0.001)

- Sedative use
  - Propofol: Per patient: 14,192.3 mg vs. 1503.2 mg (p < 0.001)
  - Other sedatives stayed about the same
  - Use of continuous infusion of any sedative: 92.3% vs. 38.0% (p<0.001)

- Drug costs decreased ~ $225 per patient
Application of EBP / Guidelines

- Nowhere in the guidelines does it say exactly how to manage your ICU patients
  - Realize that you cannot treat every inevitability with a protocol or order set
    - Zebras DO exist

- Work as a group to come up with your own best practice based on available evidence
  - If you are not cohesive in your approach, even the best evidence and best practices WILL LIKELY FAIL!

- Look at implementation of EBP and clinical guidelines as QI/PI projects
  - Texas SCCM is a great place to share your successes and lessons learned

- Anticipate problems and try to mitigate unintended consequences
THANK YOU!!

Andrewfaust@texashealth.org