Sleepless in the ICU: Lessons learned

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Disclosures

• No conflicts of interest to disclose
Learning Objectives

1. Recognize reasons for and consequences of adequate sleep for patients in the ICU

2. Identify interventions that can promote sleep in the ICU
ICU Doctor.......Sleep Doctor.......ICU....Sleep....
Sleep in the Hospital

• Surveys of ICU survivors have shown that sleep deprivation and the inability to sleep rank among the top 3 major sources of anxiety and stress during the ICU stay

• Persistent sleep disturbances in up to 44% of patients 3 months after discharge

Do we have our heads in the sand…..?
Evidence suggested that sleep disruption is most likely due to a combination of intrinsic and external factors which impact differently across patients according to each particular circumstance.

Increased number of arousals and N1 sleep

Severe sleep wake disorganization


Drouot et al. Sleep in the intensive care unit. Sleep Medicine Reviews (2008) 12,391e403
Circadian Rhythm?

Sleep in the Hospital: NOISE

Honkus, 2003; Drouot et al., 2008

• Noise is commonly reported by ICU patients as a significant disruptor of sleep and most often is due to staff conversations, alarms, overhead pages, telephones, and televisions

• Environmental Protection Agency recommends maximum hospital noise levels of 45 decibels (dB) during the day and 35 dB at night
Sleep in the Hospital: Nursing and medical procedures

- The lack of knowledge among nurses about the psychological and physical benefits of sleep contributed to nurses disrupting patients’ sleep at frequent and awkward hours of the night.

- Patients reported that vital sign assessments and phlebotomy were more disruptive than noise.

Sleep in the Hospital: Mechanical Ventilation

- Mechanical ventilation, masks, endotracheal tubes, suctioning, physical restraints, bite blocks and nasogastric tubes also contribute to sleep disturbance.

- Depending on the mode of ventilation, mechanical ventilation was one of the factors that negatively impacted on sleep in critically ill patients.

Sleep in the Hospital: Light

- Continuous lighting in ICU contributes to sleep disruption: nocturnal light intensities vary across ICUs but can exceed 1000 lux

- 100 lux is sufficient to impact melatonin secretion, even if brief

Consequences of Sleep Deprivation in the ICU

Prolonged failure to experience effective sleep has detrimental effects on almost all body systems. It hinders the body’s normal defense mechanisms designed to deal with insult from injury or illness as well as diminishing cognitive capacity and emotional resilience.

- Arrhythmias
- Nocturnal high BPs
- Worsening cardiac failure
- Weak upper respiratory muscles
- Delayed ventilator weaning
- Apneas and hypopneas
- Decreased hypercapnic and hypoxic respiratory drive
- Delayed healing
- Reduced ability to fight infection
- Altered tissue repair
- Agitation
- Delirium
- Post Traumatic Stress Syndrome
- Depression
- Continued sleep deprivation
- Reduced tolerance of pain
- Neurocognitive dysfunction

Sleepless in the ICU: Lessons learned.....

What can I do to improve sleep for patients in our ICU?
Sleepless in the ICU: Lessons learned
• Decrease in delirium

• Modifications in execution

• Create a sleep bundle

• Optimize sleep in the ICU

PLAN

DO

ACT

STUDY
Nursing
✓ Routine Lab Orders: after 4 am
✓ Routine nursing care: bathing etc. before 11.30 pm
✓ Scheduled Medications: minimize administration between 11:30 pm - 4am

Other ICU staff
✓ Overhead paging: minimized
✓ Routine Imaging Orders: CXR/KUB - performed after 4am
✓ Respiratory care: adjusted to protect sleep

Residents
✓ Routine Physical Exams: Perform after 4am. Try and wrap up routine mini-rounds before 11:30pm.

Family
✓ Family members to be educated about sleep/quiet sleep time also
Dear Family Member/Loved One:

Here at Memorial Hermann Hospital, we are committed to providing the best available care to our patients in the Medical Intensive Care Unit (MICU).

Part of this care includes ensuring that our patients have a good opportunity to sleep.

To help your loved one sleep between the hours of 11:30 p.m. to 4:00 a.m., we would like to request the following:

1. Please refrain from loud conversation or sounds
2. Please do not turn on the television or lights
3. Please minimize the number of visitors in the room
4. Please minimize the number of times you enter or exit the ICU

Thank you so much for your cooperation and we sincerely hope for the fast recovery of your loved one.

Best Wishes,

[Signature]

MICU MICU

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Let us help your loved ones....

Try not to disturb

11:30 p.m. - 4 a.m.
Intervention = SLEEP BUNDLE

- Consolidate sleep time **11.30 pm to 4 am** mandatory lights off
- “Bundled” nursing/respiratory care
- House staff/physicians patient interactions
- Melatonin 6mg at 8pm
- White noise machines installed in patient rooms
- Eye masks/ear plugs (when appropriate)
- Family education/visitation
- Activity/interaction/orientation/lights on during the day
SLEEP BUNDLE: Intervention

- Intervention on “SHORT SIDE” ONLY (beds 11-17)
- “Long side” (beds 1-10) serving as controls (usual care)

✓ This will entail practices that promote sleep and minimize disturbance at night

✓ Also to maintain activity during the day, light on and blinds open
Outcome Measurement Tool

Confusion Assessment Method for the ICU (CAM-ICU) Flowsheet

1. Acute Change or Fluctuating Course of Mental Status:
   - Is there an acute change from mental status baseline? OR
   - Has the patient's mental status fluctuated during the past 24 hours?
   - **NO** → CAM-ICU negative NO DELIRIUM
   - **YES**

2. Inattention:
   - "Squeeze my hand when I say the letter 'A'." Read the following sequence of letters: SAVEAHART or CASABLANCA or ABABBAADAY
   - ERRORS: No squeeze with 'A' & Squeeze on letter other than 'A'
   - If unable to complete Letters → Pictures
   - 0 - 2 Errors → CAM-ICU negative NO DELIRIUM
   - > 2 Errors

3. Altered Level of Consciousness
   - Current RASS level
   - RASS = zero

4. Disorganized Thinking:
   1. Will a stone float on water?
   2. Are there fish in the sea?
   3. Does one pound weigh more than two?
   4. Can you use a hammer to pound a nail?
   - Command: "Hold up this many fingers" (Hold up 2 fingers)
   - "Now do the same thing with the other hand" (Do not demonstrate)
   - **OR** “Add one more finger” (If patient unable to move both arms)
   - > 1 Error → CAM-ICU positive DELIRIUM Present
   - 0 - 1 Error → CAM-ICU negative NO DELIRIUM

CAM-ICU + POSITIVE
CAM-ICU - NEGATIVE
Why Delirium?


Number of days of ICU delirium was associated with higher 1-year mortality after adjustment for relevant covariates in an older ICU population.
Exclusion criteria

- ETOH intoxication
- Substance abuse/withdrawal
- Hepatic encephalopathy
- Anoxic brain injury
- Hypothermia protocol
- Known dementia

Documentation

- Age
- Diagnoses
- Mechanical ventilation
- Medications

Compared rates of delirium in the 2 groups

Grp 1    WITH SLEEP BUNDLE
Grp 2    WITHOUT SLEEP BUNDLE
Then we turned the lights out..................
Follow up........
Sleepless in the ICU: obstacles...

- Resistance to a change in culture - nursing and house staff
- Inability to finish nursing tasks
- Disturbances in the surrounding patient care area
- Over head pages
- Resident examinations (at night)
- Breathing trials (at night)
- White noise machines “torn” from the wall
- Data collection lapses
- Failure to order melatonin
1. Daily data collection sheet
2. Modification of the sleep times to 12.30 am - 5 am
3. Resident and nursing reeducation
4. Addition of faculty advocates and nursing champions
Then we turned the lights out.....again..
Sleepless in the ICU: Lessons learned

RESULTS
RESULTS

• First round of data collected: December 2017-March 2018

• Total of 155 patients included in the study
  
  GROUP 1 (WITHOUT BUNDLE) : 83 patients
  
  GROUP 2 (WITH BUNDLE) : 72 patients
### RESULTS: Demographics

<table>
<thead>
<tr>
<th></th>
<th>WITH BUNDLE (n=72)</th>
<th>WITHOUT BUNDLE (n=83)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>58 +/- 23</td>
<td>60 +/- 20</td>
<td>0.52</td>
</tr>
<tr>
<td>Gender (%male)</td>
<td>56%</td>
<td>45%</td>
<td>0.75</td>
</tr>
<tr>
<td>Number Comorbidities</td>
<td>3.2 +/- 4</td>
<td>4.5 +/- 3</td>
<td>0.34</td>
</tr>
<tr>
<td>% Ventilated</td>
<td>48%</td>
<td>52%</td>
<td>0.64</td>
</tr>
<tr>
<td>% Sedation</td>
<td>55%</td>
<td>50%</td>
<td>0.89</td>
</tr>
</tbody>
</table>
Results: Delirium in the ICU

Effect of adding a sleep bundle on the rate of delirium in the MICU

- Without bundle: 24.1%
- With bundle: 13.9%

p < 0.05
Lessons learned........

• Change the perception that “not sleeping well” in the hospital is okay
• Involvement of hospital leadership and healthcare staff in pursuit of a healthcare model that prioritizes restorative sleep
• Change practices = “change habits” and “build momentum”
• Challenges will be unique to each unit: one size may not fit all?
• Many factors that are not “modifiable” and “intrinsic” to the illness
Lessons learned

Designing such protocols may seem straightforward, but it requires dedicated ICU champions, a multidisciplinary stakeholder team, effective implementation methods to achieve staff buy-in and alter practice, with mechanisms for regular auditing.
Acknowledgments.....”Team ICU SLEEP”
A consequence of sleep deprivation and disturbance in the ICU include:

A. Delirium
B. Lower pain tolerance
C. Delayed ventilator weaning
D. All of the above
Sleep disturbances in the ICU can persist in almost half of patients after being discharged from the hospital?

A. True
B. False
QUESTIONS?

Sleepless in the ICU: Lessons learned

"These machines sure are life-savers, doc. The noise annoyed me right out of my coma."