POSITIONING, PULMONARY PATIENTS AND BED FRAMES

A Look At The Differences, Benefits and Challenges

LAURA ENRIGHT, RN

- Employed By Linet Hospital Beds for the past 3 years
- Registered nurse for 14 years, 12 years in the ICU
- CCRN in 2014
- Experience: Level 1 Trauma, CVICU, NTICU, MICU, CCU
- Currently Enrolled in RN to MSN, University of Arizona: Clinical Systems Leadership; Course completion December 2018
- NTI Attender

WHAT WE WILL LEARN

Why a bed is more than just a bed for a patient with respiratory issues

ADVANCES IN PRACTICE AND HOW EXACTLY BEDS CAN HELP ACHIEVE THESE GOALS

Sicker patients are moving more than ever before; ICU Mobility Initiatives and How Bed Features Can Help

- Moving vented patients (SCCM, Society of Critical Medicine ICU Liberation)
  - Determining reasons preventing mobilization and reducing or removing them (SCCM, Society of Critical Medicine ICU Liberation)
- Sit to Stand
- Micro-Shifting (NPUAP, National Pressure Ulcer Advisory Panel, 2014)
  - Turn slow and in small increments to allow for adaptation to moving
  - Benefit in beds with turn assist: consider platform versus inflation

But First Healthcare Workers Thoughts on Beds

This is What They Said…

- Placement of controls is hard for patients to reach
- Patients constantly sliding down in bed
- Bed exit alarms too sensitive
- When I slept on one (snow storm) I felt the metal bar all night
- When I was a patient and on pain medicine it took three tries to find the right button
- Tables won't go under the bed
- It is hard to care for bariatric patients
- So Uncomfortable
- We need to match the bed to the need otherwise its just a mattress on a frame….**AHHH**

A RANDOM SAMPLING (PEOPLE I KNOW) … *AN INFORMAL SURVEY OF 25 HEALTHCARE WORKERS*

NURSES, CARE TECHNICIANS AND NURSING STUDENTS

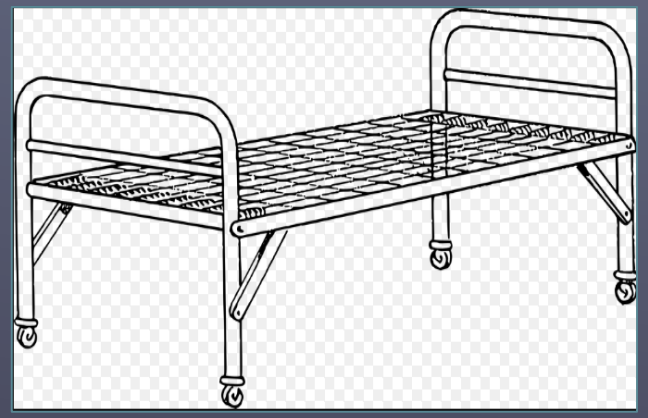
Sit and Dangle

Rotation Beds

Proning

Sit to STAnd

Chair



Kinetic Beds

Egress Position

Auto-Contour

Turn Assist

Air Beds

AND THEN THERE IS A DAY IN THE LIFE……

We Have Come A Long Way:

Beds with side-rails were first seen:

- England
- 1815-1825

In 1874 Andrew Wuest and Son

- Sought patent on hinged head section
- This allowed for elevating the head of bed HOB

Willis Dew Gatch from Indiana University School of Medicine Invented

- First 3 section bed that had head and knee elevation
- At times called the Gatch Bed - modern day knee "gatch"

(Wikipedia, n.d)

- Atelectasis: pain, sedation, positioning
    - Turn Assist – Chair - Mobilization Features
- ARDS: fluid, mucous, ventilation/perfusion problems
    - ALT/CLRT Prone
- Pneumonia: SOB * SOB * SOB
    - Chair mode - Auto-Contour
- COPD
    - What ever works!! Egress to a sitting position, bedside dangle, chair

- CHF
- Chair
- Sleep Apnea
- Lung Volume Changes; lobectomy, pneumonectomy
    - Turn Assist
- Abdominal distention impairing lung expansion
    - Bed in Chair Mode, knee gatch down to accommodate

WHEN YOU NEED A FRIEND: THE HOSPITAL BED

DAILY CLINICAL PRACTICE

- Chair
  - The vertical position of the rib cage improves ventilation
  - The end of the bed creeper
- Head of Bed at 30 degrees
  - Hiner et al 2018, found in a study of clinical workers in a hospital that only 50% of nurses estimated vented patients had HOB at 30* or higher – **How can beds help?**
    - **Indicators and one touch HOB at 30* control button: prevent aspiration in VAP protocols (Wiggerman, 2014)**
- **Micro-shifting**
  - Comfort

- Mobilization Features
  - Technology that allows nursing to properly positon patients unassisted to protect airway and reduce VAPS
  - Tools to facilitate sitting to active standing
  - **The CDC has identified Ventilator Associated Events as key factor in identifying strategies to prevent adverse vent outcomes(Klompas, 2015)**
    - Atelectasis, ARDS, Fluid Overload and Pneumonia are top contributors to VAE's
    - Prevention Strategy 3: Have a plan for early mobility (Klompas, 2015)


GoAnimate
Go Make Your Own

ADVANCED

Rotation, CLRT/ALT and Proning

WHAT DOES THE EVIDENCE SAY:

KINETIC; ALT/CLRT: KINETIC THERAPY IS A TURN OF AT LEAST 40 DEGREES SIDE TO SIDE, CLRT/ALT IS DEFINED AS A TURN OF LESS THAN 40 DEGREES , (AHRENS ET AL, 2004)

- ARDS Patients in Prague Hospital
  - ALT: Alternating Lateral Therapy (aka CLRT) Promising Data in 3 Documented Case Studies
  - Turned left and right at 30 degrees for one hour in each turn
  - One patient in semi-prone turned 10 and 30 degrees
  - All successfully extubated and survived
- Parallel Study in an Animal Model Continues
  - Studies consistently cite that more research is needed
- The use of CLRT decreases vent days (Swadener-Culpepper, 2007)
  - Standard feature on some ICU brands
  - May be added to others
- Use of CLRT can benefit more than lungs Vollman 2012, states:
  - Training in turning patients to help with the ability to adapt to man

(Dr. Othahol, 2017)

Trauma Patient

What does the evidence say: Three year observational study in European Hospital on Kinetic Therapy in patient with thoracic trauma: Goal Of therapy was preventative

Bed used in this study is considered rental/specialty Specifications: programmable

Table 3 Observed complications (8.9 %, $n = 8/89$) that were related to CLRT

CLRT-related complications
Bed not available upon ICU admission ($n = 3$, 3.4 %)
Intracranial hypertension due to CLRT ($n = 2$, 2.2 %)
Prone positioning necessary to improve oxygenation ($n = 1$, 1.1 %)
Early termination of CLRT due to defect bed ($n = 1$, 1.1 %)
Disconnection of mechanical ventilation with CPR and ROSC within 30 s ($n = 1$, 1.1 %)

CPR cardiopulmonal resuscitation, *ROSC* return of spontaneous circulation

Table 4 Comparison of basic descriptors and outcome parameters between the CLRT study collective and data on patients with chest trauma published from the TR-DGU (Hildebrand et al. [1])

	CLRT study collective	TR-DGU	*p* value
n	76	188	–
Age (years)	43.9 (18.7)	39.1 (20.0)	0.073
Male (%)	71.1 (60.9–81.2)	76.1 (70.0–82.2)	0.490
ISS (pts.)	35.3 (12.2)	26.5 (6.8)	<0.001
AIS_{Thorax} (pts.)	3.8 (0.8)	3.6 (0.7)	0.045
Motor vehicle accident (%)	61.8 (50.9–72.8)	62.8 (55.9–69.7)	0.842
Length of stay (ICU) (days)	11.9 (10.2)	15.8 (4.7)	<0.001
Mechanical ventilation (days)	7.8 (7.1)	11.1 (7.9)	0.002
Length of stay (days)	30.1 (27.5)	36.2 (24.2)	0.076
Sepsis or MOF (%)	18.9 (9.7–27.1)	14.4 (9.3–19.4)	0.524
ARDS (%)	5.3 (0.2–10.3)	9.0 (4.9–13.1)	0.438
Hospital mortality (%)	6.6 (1.0–12.2)	11.2 (6.7–15.7)	0.365

(Wutzler et al, 2017)

WHAT DOES THE EVIDENCE SAY:

PRONING AND PRONING BEDS

- Research says prone early and for extended periods (Bos, Loeches and Schultz, 2013).
- Beds in the prone patient:
- *Consider proning on "regular" bed*
- *Rentals are available: Study by Badani et al 2017, supports improved outcomes with patients on a brand specific proning bed with no unexpected complications*
- *Rental beds: costly, challenging to use, special training required, weight limitations and delay to arrival*

WHAT DOES THE EVIDENCE SAY:

POWERED DRAW SHEETS

INNOVATIVE TECHNOLOGY THAT ASSISTS ONE NURSE TO OPTIMALLY POSITION PATIENTS IN A TIMELY MANNER TO PROTECT AIRWAY AND MAINTAIN VAP COMPLIANCE

In the article the sliding patient, the question of the migrating patient was posed as not yet studied:

- Current research in powered draw sheets shows that improved boosting in a timely manner does decrease skin sheering and improve posture (Hermans & Call, 2015)
  - Better airway management (Wiggerman, 2014)

- Reduces risk of injury to caregiver
  Maintains patient dignity

WHAT DOES THE EVIDENCE SAY: BARIATRIC:

- A bed that is too small makes patients uncomfortable, reduces the ability to mobilize patients and increases likelihood of injury to healthcare workers
- Beds are the equipment that are usually used the most by patients and caregivers
- There are no set standards on when to use special sized beds

(Wiggerman, Smith & Kumpar, 2017)

- Consider the use of beds with turn assist features and powered draw sheets

STANDARD ICU BED

Features: Chair Position, Frame Based Turn, Mobilization Features

WHAT DOES THE EVIDENCE SAY:

BEDSIDE SITTING

- Gravity improves drainage
- Expands lung fields
- Decreases Atlectasis
- Improves Oxygenation (Umei et al, 2014)

Bed Considerations:

- One touch buttons to assist in position changes
  - Assists caregiver with tube/line management
  - Ergonomic features to maintain position

What exactly is Auto-Contour?

- When the head and knee rise together to prevent patients sliding down in bed
  - Standard on some bed configurations
  - Bed design impacts patient movement down in bed, more so than the Auto-Contour feature (Wiggerman, 2014)

WHAT DOES THE EVIDENCE SAY:

AUTO-CONTOUR (SLIDING - PATIENT) CARDIAC CHAIR MOBILITY FEATURES, BEDSIDE SITTING

A CALL TO ACTION: PRACTICE CHANGE

"Evidence based medicine should not kill the medical reasoning"
How many patient's died waiting for the evidence"

Dr. Lucianno Gattinoni 2013 ESICM Lives 26th Annual Congress

- Engage in decision making on bed purchasing and rentals
- Learn about the beds you currently use
- Is it possible to implement protocols that include the what your beds are capable or
- Gather data and examine what you collect

THANK YOU …..

SEE YOU AT NTI

References

Asher, A. (2013). Equipment used for safe mobilization of the ICU patient. *Critical Care Nursing Quarterly*, *36*(1), 101-108. doi:10.1097/CNQ.0b013e318275357e

Ahrens, T., Kollef, M., Stewart, J., & Shannon, W. (2004). Effect of kinetic therapy on pulmonary complications. *American Journal Of Critical Care*, *13*(5), 376-383

Badani, A., Awan, O., Zakhary, B., & Mukherjee, V. (2017). Changes in hemodynamic and gas exchange parameters with the use of the rotoprone bed in patients with severe ARDS. *Chest*, *152*A233. doi:10.1016/j.chest.2017.08.260

Bos LD, Martin-Loeches I & Schultz MJ. (2013). ARDS: challenges in patient care and frontiers in research. *Eur Respir Rev* 2018; 27: 170107 [https://doi.org/10.1183/16000617.0107-2017]

Halpern, N. A., Goldman, D. A., Kay See, T., Pastores, S. M., & Tan, K. S. (2016). Trends in Critical Care Beds and Use Among Population Groups and Medicare and Medicaid Beneficiaries in the United States: 2000-2010. *Critical Care Medicine*, *44*(8), 1490-1499. doi:10.1097/CCM.0000000000001722

Hermans, M.H.E., Call, E. (2015). Sliding down in bed impacts pressure ulcer development and the importance of frequent repositioning. *Wounds*, 27(7). Retrieved from, http://morelcompany.com/media/White-Paper-Benefits-of-Timely-and-Frequent-Repositioning-Weber-State-Study.pdf

ICU Liberation (n.d) Early mobility and exercise retrieved from http://www.iculiberation.org/Bundles/Pages/early-mobility.aspx

Klompas, M. (2015). Potential Strategies to Prevent Ventilator-associated Events. *American Journal Of Respiratory & Critical Care Medicine*, *192*(12), 1420-1430. doi:10.1164/rccm.201506-1161CI
https://en.wikipedia.org/wiki/Hospital_bed

References

National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Critically Ill Individuals – an extract from the Clinical Practice Guideline. Emily Haesler (Ed.). Cambridge Media: Osborne Park, Western Australia; 2014

Swadener-Culpepper, L. (2007). Continuous lateral rotation therapy (CLRT): development and implementation of an effective protocol for the ICU. Retrieved from http://www.steomedical.com/criticalcare/pdf/135579.pdf

Vollman, K. M. (2012, February). Hemodynamic instability: is it really a barrier to turning critically ill patients. *Critical Care Nurse*, *32(1)*, 70-75. Retrieved from http://ccn.aacnjournals.org/

Nao, U., Kazuaki, A., Hideo, O., Seino, U., Yasuhiro, O., Atsushi, U., & Hideki, S. (2016). Impact of mobilisation therapy on the haemodynamic and respiratory status of elderly intubated patients in an intensive care unit: A retrospective analysis. *Intensive & Critical Care Nursing*, *35*16-21. doi:10.1016/j.iccn.2016.02.001

Wiggermann, N. (2014). The sliding patient: How to respond to and prevent migration in bed. *American Nurse Today*, 17-19.

Wiggerman, N., Smith, K & Kumpar, D. (2017). What bed size does a patient need? the relationship between body mass index and space required to turn in bed. *Nursing Research*. 66(6). DOI: 10.1097/NNR.0000000000000242

Wutzler, S., Sturm, K., Lustenberger, T., Wyen, H., Zacharowksi, K., Marzi, I., & Bingold, T. (2017). Kinetic therapy in multiple trauma patients with severe thoracic trauma: a treatment option to reduce ventilator time and improve outcome. *European Journal Of Trauma & Emergency Surgery*, *43*(2), 155-161. doi:10.1007/s00068-016-0692-3

http://www.arjohuntleigh.net/ch/Product.asp?pagenumber=4667&Product_Id=651&ProductCategory_Id=240