Welcome to our presentation! We will be using Poll Everywhere during our presentation. Please use the prompts to answer the following question. Did you enjoy lunch?

Yes, but I am ready to get this afternoon started

No
The Down and Dirty of Prone Therapy for ARDS Patients

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Kaiser Permanente Roseville
Disclosure

The presenters have nothing to disclose
Kaiser Roseville Intensive Care Unit

- Our ICU is a predominately medical ICU with 20 bed in a 300+ bed hospital
- We have 114 staff nurses covering 3 shifts
- We are an AACN silver beacon award recipient
Learning Objectives

By the completion of this lecture, participants will be able to:

- Summarize the benefits of manual prone therapy.
- Describe the three levels of severity of acute respiratory distress syndrome.
- Distinguish the appropriate method of placing a patient in the prone position.
- Discuss three ways to sustain practice of manual prone therapy.
Do you use Manual Prone Therapy at your facility?

Yes, We do use manual Prone therapy

No, We use a form of automatic prone therapy (ie roto prone bed)

No, We do not use prone therapy at my facility
Journey to Manual Prone Therapy

Time for a change in practice

- Advocate for a change in current proning practice for ARDS patients.
- Does research support the change in practice?
- How can we sustain the change in practice?
Definition of Acute Respiratory Distress Syndrome

To prone or not to prone, think timing, what does the chest x-ray look like, and what was the initial cause of the injury?

Berlin Criteria

- There are 3 levels of Acute Respiratory Distress Syndrome
  - Mild
    - The P/F ratio is less than 300mm Hg to 200mm Hg with a PEEP >5
  - Moderate
    - The P/F ratio is less than 200mm Hg to 100mm Hg with a PEEP >5
  - Severe
    - The P/F ratio is less than 100mm Hg with a PEEP >5

Drahnak & Custer, 2015
How to calculate your PaO2/FiO2 ratio

- Obtain a recent ABG from your patient
  - Divide the paO2 by the FiO2 to give you the PaO2/FiO2 ratio

- Example
  - ABG results are pH 7.21, pCO2 78, paO2 85, HCO3 26
  - Your patient is on 100 % FIO2 and their PEEP is 10
  - 85/1.00 = a P/F ratio of 85
  - What category does this patient qualify for?
Mr. Smith is a ventilated patient with ARDS. His PaO2 is 60 and his FiO2 is 100%. What is Mr. Smith's P/F ratio?
Literature Review

Guerin et. al, (2013)

Proseva study

- Considered the gold standard study for prone position.
- 466 total patients in the study.
- 229 patients in the supine group.
- 237 patients in the prone group.

Mortality at day 28

16% in the prone group
32.8% in the supine group.

Guerin et. al, (2018)

Apronet Study Group

- This was a one day observational study, conducted four times
- Researches looked at how other often prone position was used for ARDS patients
- Researchers screened more than 6,000 patients for ARDS in over 20 countries. 101 patients met criteria for manual prone therapy.
Literature Review

Drahnak and Custer (2015)

The use of prone position for ARDS has been in practice since 1970.

To achieve the best results for patients with ARDS, the use of manual prone position should be implemented within 72 hours of diagnosis for up to 20 hours.

Scholten, Beitler, Prisk, and Malhotra (2017)

Prone position is considered a lung protective strategy and is not considered a salvage therapy anymore.

Prone position helps to improve alveoli recruitment by decreasing the resistance placed on the lungs when in the supine position.
Implementing Change
Getting Buy In from Our Staff

- ICU Manager approval
- Intensivist Approval
- Upper Management approval
  - Contract with Automatic proning bed
- KP Roseville ARDS committee trip to South Sacramento Kaiser
  - Already had a checklist and policy in place
  - Had been manually proning patients
  - Had Supportive ICU Educator
  - We were able to learn from their wins and their areas for opportunity
Hands On Learning

We gave our staff the “why”

Multiple staff meetings with RNs providing hands on exposure to preparing and proning the “patient”

Multidisciplinary approach to hands on education (RTs & MDs at staff meetings)

Making it as “real” as possible

”Buy In” achieved with real life patient and showing that it works
Inclusion Criteria

- Diagnosis of severe ARDS
  - Within 36 hours of intubation
  - P/F ratio < 150
  - Peep > 5
  - FiO2 > 60%

- Bilateral infiltrates on CXR
Exclusion Criteria

- Elevated intracranial pressures (ie ICP > 20)
- Massive hemoptysis
- Tracheal surgery or sternotomy within 15 days
- DVT treated for < 2 days
- Fresh pacemaker within last 2 days
- Unstable spine, femur, or pelvic fractures
- Underlying disease with life expectancy < 1 year
- MAP < 65mmHg on maximum vasopressors
- Pregnancy
- Anterior chest tube with air leaks
- Burns > 20%
- Abdominal Compartment Syndrome
- Eye trauma or injury; serious facial trauma or facial surgery
- Exclusionary post-operative state (not cleared by surgery)
True or False; You can use manual prone therapy on a patient who was diagnosed with a DVT 4 days ago.
Staff Education

- Bi-annual staff meetings
  - ARDS committee
  - YouTube video (making our own)
- Hands-on approach
- Reference Binder
- Links on intranet
Developing the Order Set

- There was a need for a compilation of what orders are needed when implementing manual prone therapy
- A Roseville Multidisciplinary Team was created
  - This orders “compilation” has been used by our nurses and physicians over the last 2-3 years.
- Includes suggested therapy and medications
  - Enables quicker/more accurate order entry
  - Quicker initiation of prone therapy
  - Better patient care
- Complete/updated order set went live July 2019
What does the order set include?

- Patient activity/positioning
- Medications
  - Sedation
  - Paralytics
- Ventilator/Respiratory
  - ETT care
  - Ventilator Orders/Lung Protective Ventilation Protocol
  - Permissive Hypercapnia
- Other Orders
  - ABG, OGT, Dobhoff/feeding, oral and eye care, foot drop
Time to Prone
Get Ready

FENTANYL 50 mcg/mL

Date_____ Time_____ Init._____

CISTRACURIUM
Neuro Muscular Blocking (NMB) / Paralytic (NMBEX)
200 mg/300 mL. NF
Can mix in DSW

Common Dose

Bag dose: 0.05 mg/kg
Initial infusion Rate: 1 mcg/kg/min

Maximum Rate of Induction: 5 mcg/kg/min

Titrated Information
Titrated dose by 2 mcg/kg/min every 10 minutes to achieve a Train-of-Four (TOF)
of 1-2 out of 4.

Richmond Agitation and Sedation Scale (RASS)

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>Combative</td>
</tr>
<tr>
<td>+3</td>
<td>Very Agitated</td>
</tr>
<tr>
<td>+2</td>
<td>Agitated</td>
</tr>
<tr>
<td>+1</td>
<td>Restless</td>
</tr>
<tr>
<td>0</td>
<td>Alert &amp; calm</td>
</tr>
<tr>
<td>-1</td>
<td>Drowsy</td>
</tr>
<tr>
<td>-2</td>
<td>Light sedation</td>
</tr>
<tr>
<td>-3</td>
<td>Moderate sedation</td>
</tr>
<tr>
<td>-4</td>
<td>Deep sedation</td>
</tr>
<tr>
<td>-5</td>
<td>Unarousable</td>
</tr>
</tbody>
</table>
What do you think is the minimum number of healthcare workers needed to manually prone a patient?
Making the Patient “Sandwich”

Staff needed:
- MD present
- 2 Respiratory Therapists
- At least 4 RN’s

Equipment:
- EKG electrodes
- 2-4 pillows
- 1-3 bath blankets
- 2 lift sheets
- Anesthesia face pillow
- Extension tubing
- Chux
- Mepilex
Get Ready

FENTANYL 50 mcg/mL
Date_____ Time_____ Init _____

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</table>
Get Set
Get Set
Roll
Roll
Roll
Roll
Q2H

- Eye Care, Oral Care
- Reposition
  - Requires 2 RT’s or RT and RN to hold ETT and head,
  - 2 RN’s on each side of patient to utilize lift and monitor lines
  - Swimmers position
  - May use reverse Trendelenburg up to 11 degrees
After 16-18 Hours

- Repeat the process for proning → supine
- Once supine:
  - Change ETT securing tape and place Hollister securing device
  - Obtain CXR
  - POTUS boots
- After an hour
  - Obtain ABG
- Start discussing the possibility to prone again
Sustainment and Results

“We are what we repeatedly do. Excellence then is not an act but a habit.”

– Aristotle
Sustainment: How can we sustain the change in practice?

<table>
<thead>
<tr>
<th>Education</th>
<th>Teamwork</th>
<th>Accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Staff Education</td>
<td>Multidisciplinary Collaboration</td>
<td>Easily Accessible Resources</td>
</tr>
</tbody>
</table>
Sustainment

Education: Staff Education

- Bi-Annual Staff Meetings dedicated to ARDS/Prone Therapy Education
  - Staff Nurse Lead / Peer-Peer Education
- Active simulation with “real” patients.
- Non-Mandatory, encourage attendance by offering contact hours
Sustainment

Education: Staff Education
Sustainment

Teamwork: Multidisciplinary Collaboration

- Ongoing Multidisciplinary review (physicians, nurses, respiratory therapists, mobility technicians)
- Adjusting to changing resources
  - Hovermat to RepoSheets
  - Liko overhead ceiling track lifts
- Physician and Leadership Support
Sustainment

Accessibility: Easily Accessible Resources

- Unit Resource Binder
- Utilizing Technology: ICU Website on the hospital Intranet
  - Accessible from all computers in the hospital and at the bedside
  - Easily print checklists and orders compilation
Results: What were the results of this Project?

<table>
<thead>
<tr>
<th>Speed</th>
<th>Empowered</th>
<th>Accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Order to Initiation Times</td>
<td>Trained and Experienced Staff</td>
<td>Regional Order Set Creation</td>
</tr>
</tbody>
</table>
Results

Speed: Improved Order to Initiation Times

- The old way: Automatic Prone Bed delivery takes “4-6 hours depending on availability, traffic or time of day”. (RotoProne/Arjo Customer Service)
- Three (3) randomly reviewed cases from 2018 and 2019 in ICU.
  - Average time from order/note to prone position: 71 minutes
  - Switching to Manual Prone Therapy allowed for quicker therapy initiation times.
- Result: Faster Evidence-Based Treatment!
Results

Empowered: Trained and Experienced Staff

- Current percentage of trained staff with hands-on practice: 73% (83/114)
- Number of staff trained over the last 3 years: 171 (including 19 Respiratory Therapists)
- How comfortable are our nurses with Manual Prone Therapy?

Let’s see…
Survey to Current Staff:

- Survey given to Nursing staff in July 2019
- 104 currently available nursing staff
- 74 staff responses: 71% response rate

**Question: What shift do you work?**

<table>
<thead>
<tr>
<th>Shift</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>41.89%</td>
</tr>
<tr>
<td>Evening</td>
<td>25.58%</td>
</tr>
<tr>
<td>Night</td>
<td>32.43%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>74</strong></td>
</tr>
</tbody>
</table>
Survey to Current Staff:

Question: Have you participated/assisted in manual prone therapy on an actual patient?

<table>
<thead>
<tr>
<th>ANSWER CHOICES</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>89.19%</td>
</tr>
<tr>
<td>No</td>
<td>10.81%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
</tbody>
</table>
Survey to Current Staff:

Question:
Which turns have you done?
- Initial Prone
- Every 2 Hours
- N/A
Survey to Current Staff:

Question:
Have you participated/assisted in manual prone therapy on a simulated patient? (Staff Meeting)

<table>
<thead>
<tr>
<th>ANSWER CHOICES</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>75.68%</td>
</tr>
<tr>
<td>No</td>
<td>24.32%</td>
</tr>
</tbody>
</table>

TOTAL 74
Survey to Current Staff:

Question:
How comfortable are you *advocating* for manual prone therapy for your patient?

<table>
<thead>
<tr>
<th>ANSWER CHOICES</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Uncomfortable</td>
<td>8.11%</td>
</tr>
<tr>
<td>Uncomfortable</td>
<td>5.41%</td>
</tr>
<tr>
<td>Neither</td>
<td>5.41%</td>
</tr>
<tr>
<td>Comfortable</td>
<td>60.81%</td>
</tr>
<tr>
<td>Very Comfortable</td>
<td>20.27%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>74</strong></td>
</tr>
</tbody>
</table>
Survey to Current Staff:

Question: How comfortable are you when assisting to manually prone a patient?

<table>
<thead>
<tr>
<th>ANSWER CHOICES</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Uncomfortable</td>
<td>12.16%</td>
</tr>
<tr>
<td>Uncomfortable</td>
<td>5.41%</td>
</tr>
<tr>
<td>Neither</td>
<td>6.76%</td>
</tr>
<tr>
<td>Comfortable</td>
<td>51.35%</td>
</tr>
<tr>
<td>Very Comfortable</td>
<td>24.32%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
</tr>
</tbody>
</table>
Survey to Current Staff:

Question:
Do you know where to find your Manual Prone Resources?

Answer Choices

<table>
<thead>
<tr>
<th>ANSWER CHOICES</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>81.08%</td>
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<tr>
<td>No</td>
<td>18.92%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>74</td>
</tr>
</tbody>
</table>
Results

Accessibility: Regional Order Set Creation

- A Roseville Multidisciplinary Team met to compile all orders that a patient receiving Manual Prone Therapy would need.
  - This orders “compilation” what been used by our nurses and physician over the last 2-3 years.
- Roseville Chief Intensivist brought this information to the Regional ICU Team for potential orders creation into KP HealthConnect

Regional Manual Prone Order Set went live July 2019!!
Regional Prone Therapy Order Set

PRONING ORDERS
Method of Proning - MANUAL or

PRONING BED (Single Response)

Prone Positioning in ARDS [12401]

NOTE

Criteria for Prone Positioning Therapy NOTE: Exclusion Criteria Present
Use with intubation, Sedation and Ventilation ED/ICU Orderset, Neuromuscular Blockade Orderset and Standard ICU Admission Orderset.

INCLUSION CRITERIA FOR PRONE POSITIONING
- Patient endotracheally intubated on mechanical ventilation for ARDS for less than 36 hours
- PaO2/FIO2 ratio less than or equal to 150 mmHg with FIO2 greater than or equal to 0.6 and PEEP greater than or equal to 5 cm H2O

EXCLUSION CRITERIA FOR PRONE POSITIONING
- MAP less than 65 on maximum vasopressors
- Elevated intracranial pressure (e.g. ICP > 20)
- Intra-abdominal hypertension/abdominal compartment syndrome
- Pregnancy
- Anterior chest tube with air leak
- Massive hemothysis
- DVT treated for less than 2 days
- Eye trauma or injury
- Exclusionary post-operative state: Open abdomen or recent abdominal surgery (not cleared by surgeon); implanted pacemaker within prior 48 hours; recent flap or graft with potential for vascular compromise; serious facial trauma or facial surgery during the previous 15 days; tracheal surgery or sternotomy during the previous 15 days
- Unstable fracture/ligamentous injury: cervical traction without jacketed halo traction; unstable cervical ligament injuries; unstable pelvic or long bone fractures
- Underlying disease with life expectancy of less than 1 year

ADDITIONAL Management Recommendations
- Lung protective ventilation, 6 ml/kg IBW
- Consider pharmacologic paralysis during first 48 hours

Manual proning for 15 hours has been shown to improve mortality in patients with severe ARDS.

The Rotational Proning Bed is available for proning. However, no prospective randomized control trials have been conducted on this device that have demonstrated benefit for severe ARDS over manual proning.
References


