Abstract Presentations

1. Development and Evaluation of a Novel e-Health Resource to Support Patients and their Families in and after Intensive Care: Pam Ramsay, PhD; Tim Walsh, MD; Eddie Donaghy, PhD; David Hope, BSc
   Affiliation: Edinburgh Napier University

2. Emotional and Cognitive Sequelae of Medical-Surgical ICU Care: Jason Schultz, MS, EdS; Kemuel Philbrick, MD; Matt Clark, PhD; Ognjen Gajic, MD; Lioudmila Karnatovskaia, MD
   Affiliation: Mayo Clinic

3. A Financial Model of Cumulative Savings through Combining Quality Initiatives: Margaret Arnold, PT, CEES/CSPHP
   Affiliation: Inspire Outcomes LLC.

4. Implementing an ICU Diary throughout all ICU’s: Cynthia K Fine, MSN, CRRN
   Affiliation: New York Presbyterian Hospital / Columbia University Medical Center

5. Patient Outcomes after Acute Respiratory Failure: A Qualitative Study of Survivors’ Experience using the PROMIS Framework: Michelle N. Eakin, Ph.D; Yashika Patel, Pedro Mendez-Tellez, MD; Victor Dinglas, MPH; Dale Needham MD, PhD; Alison Turnbull, DVM, PhD.
   Affiliation: Johns Hopkins University Division of Pulmonary and Critical Care Medicine

6. Early Rehabilitation in the Pediatric Intensive Care Unit: A Quality Improvement Project: Jodi Herbsman, PT, DPT; Yasir Al-Qaqa, MD; John Corcoran PT, DPT, MS, Cert.MDT; Jennifer Daly, Tiffany Folks, RN, BSN; Kelly Griffing, MS, OTR/L; Daniella Klein, PT, DPT, NCS; Siobhan O’Donnell, PT, DPT, PCS; Lucy Pereira-Argenziano, MD; Naomi Linder-Perlman, JD; Stacey Schneider, MA, ATR, CCLS, LCAT; Mary Ellen Sheldon, MA, RN-BC; Tina Tan, MS, CCC-SLP, BCS-S;David Wain, RT
   Affiliation: NYULMC / Rusk Rehabilitation

7. PIM III does not Predict Rehabilitation Outcome at Discharge in Neurologically Injured Children. Simon Gates, PT; Susan Bagnall, PT; Laura Kelly, OT; Rachel Keetley, PT
   Affiliation: Children’s Therapy Department, Nottingham University Hospitals NHS Trust
Poster Presentations

1. "Steps to Restoring Independence and Dignity Early", a Multidisciplinary Approach to Reducing Harm in the ICU  
   **Heather Thornton, BSN, RN**  
   Affiliation: Johns Hopkins Bayview Medical Center

2. Sensory Intervention Model for Acute Delirium  
   **Katie Walker, OTR/L**  
   Affiliation: Baylor Institute for Rehabilitation

3. The "ECMO Snorkel". ECMO Mobilization Made Safe and Easy  
   **David M. Zemmel, PT, MS, CCS**  
   Affiliation: New York Presbyterian Hospital / Columbia University Medical Center

4. Establishing a Patient-Provider Communication Program in the Pediatric Intensive Care Unit (PICU)  
   **Tami Altschuler, MA, CCC-SLP**  
   Affiliation: Rusk Rehabilitation / NYU Langone Medical Center

5. Mobilization of a Patient on Veno-arterial Extracorporeal Membrane Oxygenation as a Bridge to Lung Transplant: A Case Report  
   **Thomas M. Benson PT, MS, CCS**  
   Affiliation: New York Presbyterian Hospital/Columbia University Irving Medical Center

6. Shifting Drivers: Positive Outcomes Of Converting From System-Driven To Value-Drive Practice In an ICU  
   **Doug Benson, DPT**  
   Affiliation: University of Utah Hospital

7. Physical Therapy Management of a Critically Ill Infant After Cardiac Surgery: A Case Report and Literature Review  
   **Ana M. Jara, PT**  
   Affiliation: Johns Hopkins All Children’s Hospital

8. Combining Quality Initiatives: Opportunities for Improved Efficiency and Performance  
   **Margaret Arnold, PT, CEES**  
   Affiliation: Inspire Outcomes LLC.
Poster Presentations

9. “Running a Marathon without Training” ...Hospital Course and Outcomes of 5 Patients Admitted with ARDS Requiring ECMO
   **Michael Pechulis, PT**
   Affiliation: Lehigh Valley Health Network

10. "A Multi-Professional Approach to Optimize Outcomes in Patients Weaning from Mechanically Ventilation, a Quality Improvement Project"
    **Michael L. Davis, B.Sc**
    Affiliation: Carolinas Healthcare System

11. Rehabilitation in the Intensive Care Units at the Mount Sinai Hospital: A Quality Improvement
    **Ann H. Lichtenstein, DO**
    Affiliation: Icahn School of Medicine at Mount Sinai

12. Occupational Therapy in the Neurocritical Care: Use of Cycle Ergometry for Early Upper Extremity Rehabilitation in a Critically Ill Stroke Patient
    **Sandra Deluzio, MS, OTR/L**
    Affiliation: The Johns Hopkins Hospital

13. VITALS: A Toolkit for Developing an Occupational Therapy Program in the ICU
    **Alyssa Gartenberg, MS, OTR/L**
    Affiliation: New York University Langone Medical Center
Abstract Presentations

5th Annual Johns Hopkins Critical Care Rehabilitation Conference

Baltimore, MD
A novel e-health resource to support patients and families after ICU

Dr Pam Ramsay, PhD
Edinburgh Napier University
Edinburgh Critical Care Research Group
Royal Infirmary of Edinburgh
General ICU/HDU
18 beds (13:5)
1200 admissions/year
Why is this needed?

- 140,000 patients admitted to UK ICUs each year
- >70% of patients survive
- Short hospital stays (median 10 days at RIE)*
- >70% of patients go directly home
- High unplanned hospital readmission rates*
- Healthcare costs per patient/year ~£49,000*

(*Lone et al, 2013)
Post Intensive Care Syndrome

Physical
- Muscle wasting
- Fatigue
- Weight loss
- Joint pain/stiffness
- Impaired mobility

Psych
- Anxiety
- Depression
- PTSD

Cognitive
- Amnesia
- Delirium
- Cognitive impairment

Social
- Late return to work
- Reduced social participation
- Health & wellbeing of carers
Qualitative evidence synthesis

- **PhD** “QoL following prolonged critical illness: a mixed methods study” (20 interviews)
- **RECOVER** trial: RCT of enhanced post-ICU acute hospital rehab. (4 focus groups)
- **RELINQUISH**: Longitudinal, qualitative study of healthcare and support needs (up to 1 year post-d/c) (78 interviews)
- **PROFILE**: Mixed methods study of drivers for early unplanned hospital readmission (56 interviews)
Innovation: development

Researchers
Patients & families
Healthcare professionals
Website developers
Helping you along your Intensive Care journey
Click on one of the buttons below for more information and advice...

Intensive Care
The general wards
Getting home
Moving on

Create your own library...
Use our scrapbook to create a library of content featured on this site.

Popular Topics
amnesia, anxiety, benefits, bereavement, breathless, carer, carers assessment, community care, death, depression, diaries, dreams, driving, drugs, employment, exercise, family, family & friends, fatigue, flashbacks, health, housing, information, joint, legal, legal rights, mobility, money, muscle wasting, nightmares, Occupational Therapist, pacing, pain, pharmacist, physiotherapist, Physiotherapy, Post traumatic stress, power of attorney, psychological, social work, spiritual, strange memories, support, support groups, tiredness, visiting, ward, weakness, wheelchair, work

Suggestion Box
We'd welcome your feedback on the content and how the website works, please complete the form below...

Your name...
Your email...
Your suggestion...

Send your suggestion
Implementation 1

ICU Follow Up Team
Implementation 2
Evaluation
Findings (QUANT)

- 778 site visitors with 12,046 page views
- 97% online respondents: “extremely”/”very” useful
- 97% “” : “easy”/”ok” to use
- 69% postal respondents: “most useful” after discharge
- Most useful content
  - Other peoples’ experiences
  - Finding out more about ICU
  - Info & advice on common problems after ICU
  - Info & advice on getting help
Findings (QUAL)

• “Hearing other peoples’ stories made you realise that other people have gone through this...and been able to get on with their lives again.... That gives you hope, which is important” (patient)

• “There’s...the financial and employment issues...because you’ll be off work for months. The website is very helpful in directing you to support for these things.” (patient)

• “The great thing about the website is that it’s available 24/7, so you can access information at any time.” (patient)

• “It was just as helpful for me as it was for him...because it helped me understand what he was going through” (wife)

• “I used it to direct a family member to counselling. She told me later that it really helped her cope.” (ICU nurse)
Research Team

- Dr Pam Ramsay (nurse researcher)
- Prof. Tim Walsh (medic)
- David Hope (Project Manager)
- Dr Eddie Donaghy (Research Fellow)
- Mr Neil Francis & Shaw online (web developers)
- Thanks to patients, family members and ICU staff at Royal Infirmary of Edinburgh
Thank you

p.ramsay@napier.ac.uk
EMOTIONAL AND COGNITIVE SEQUELAE OF MEDICAL-SURGICAL ICU CARE

Schultz J, Philbrick K, Gajic O, Clark M, Karnatovskaia L
5 November 2016
Background

- Following ICU discharge, many patients suffer from long-term impairment in the domains of physical, cognitive, and psychological functioning collectively known as post intensive care syndrome (PICS)

- Over half of ICU survivors are reported to have significant psychiatric and cognitive symptoms that appear to diminish little over time


Risk factors

• Psychiatric
  • Prior psychiatric disorders
  • Use of sedating medications (benzodiazepines)
  • Memories of frightening ICU experiences
  • Presence of in-ICU psychologic distress symptoms and delusional experiences

• Cognitive
  • Delirium, Sepsis, ARDS
  • Pre-existing cognitive problems including dementia and alcoholism

• No consistent association with:
  • Severity of disease, diagnosis on admission
  • Length of stay
Rationale/Objective

• Unclear whether risk of psychocognitive pathology varies by ICU population as most studies report combined data from mixed ICUs

• Most studies report data on patients >6 months following hospital discharge
  • Does the psychocognitive picture immediately after the ICU transfer differ from what is observed at follow up?
  • If so, do in-hospital rates of anxiety, depression, or stress differ enough to argue for a more timely psychological support intervention given reported little change over time once the condition is established?
Patients & Methods

• Inclusion: >18 years old; ICU stay of >48 hours; GCS>13, CAM-ICU negative, <2 errors on the 6-item Cognitive Screener

• Exclusion: admitted to the ICU for suicide attempt; known prior cognitive impairment or dementia; prior diagnosis of PTSD; non-English speaking

Patients & Methods

• Within 96 hours of dismissal from the ICU, eligible patients completed:
  • Hospital Anxiety and Depression Scale (HADS; scores ≥8 indicating significant symptoms of anxiety or depression)
  • Impact of Events Scale-Revised (IES-R; scores ≥1.6 indicating significant PTSD symptoms)
  • Montreal Cognitive Assessment-Blind (MoCA-blind; scores <18 indicating cognitive impairment)

• Within 3 months of hospital discharge patients repeated above assessment by phone/mail

<table>
<thead>
<tr>
<th>ICU type</th>
<th>Patients Total N=265</th>
<th>HADS-D≥8 N (%)</th>
<th>HADS-A≥8 N (%)</th>
<th>IES-R≥1.6 N (%)</th>
<th>MOCA-blind&lt;18 N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heme-onc/transplant</td>
<td>38</td>
<td>15 (39%)</td>
<td>15 (39%)</td>
<td>15 (39%)</td>
<td>18 (47%)</td>
</tr>
<tr>
<td>Cardiac MICU</td>
<td>50</td>
<td>17 (34%)</td>
<td>21 (42%)</td>
<td>12 (24%)</td>
<td>27 (54%)</td>
</tr>
<tr>
<td>Cardiothoracic SICU</td>
<td>50</td>
<td>19 (38%)</td>
<td>25 (50%)</td>
<td>24 (48%)</td>
<td>27 (54%)</td>
</tr>
<tr>
<td>MICU</td>
<td>50</td>
<td>17 (34%)</td>
<td>20 (40%)</td>
<td>16 (32%)</td>
<td>30 (60%)</td>
</tr>
<tr>
<td>Trauma SICU</td>
<td>46</td>
<td>16 (35%)</td>
<td>24 (52%)</td>
<td>20 (43%)</td>
<td>26 (56%)</td>
</tr>
<tr>
<td>CV SICU</td>
<td>50</td>
<td>20 (40%)</td>
<td>20 (40%)</td>
<td>19 (38%)</td>
<td>30 (60%)</td>
</tr>
</tbody>
</table>
Results

• There was a high prevalence of symptoms of depression (range 34-40%), anxiety (range 39-52%) and PTSD (range 24-52%)

• There was also a high level of cognitive impairment across the ICUs (range 47-60%)
## Results – 3 months f/u

<table>
<thead>
<tr>
<th>ICU type</th>
<th>Patients Total N=109</th>
<th>HADS-D≥8 N (%)</th>
<th>HADS-A≥8 N (%)</th>
<th>IES-R≥1.6 N (%)</th>
<th>MOCA-blind&lt;18 N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heme-onc/transplant</td>
<td>14</td>
<td>4 (29%)</td>
<td>2 (14%)</td>
<td>3 (21%)</td>
<td>1 (7%)</td>
</tr>
<tr>
<td>Cardiac MICU</td>
<td>18</td>
<td>6 (33%)</td>
<td>3 (33%)</td>
<td>5 (28%)</td>
<td>6 (33%)</td>
</tr>
<tr>
<td>Cardiothoracic SICU</td>
<td>28</td>
<td>5 (47%)</td>
<td>6 (21%)</td>
<td>5 (19%)</td>
<td>6 of 27 (22%)</td>
</tr>
<tr>
<td>MICU</td>
<td>15</td>
<td>7 (34%)</td>
<td>5 (33%)</td>
<td>6 (40%)</td>
<td>8 of 12 (67%)</td>
</tr>
<tr>
<td>Trauma SICU</td>
<td>11</td>
<td>4 (36%)</td>
<td>3 (27%)</td>
<td>6 (55%)</td>
<td>4 of 10 (40%)</td>
</tr>
<tr>
<td>CV SICU</td>
<td>13</td>
<td>3 (23%)</td>
<td>2 (18%)</td>
<td>2 (18%)</td>
<td>4 (36%)</td>
</tr>
</tbody>
</table>
Results - 3 months f/u

• There was a high prevalence of symptoms of depression (range 33-47%) and PTSD (range 18-55%) but less so of anxiety (range 14-33%)

• Prevalence of cognitive impairment across the ICU populations was highly variable (range 7-67%)

• Preliminary data only, awaiting follow up of additional patients
Barriers to recovery 0-10 scale

Diagram showing frequency distribution for various barriers:
- Concentration
- Memory
- Relationships
- Work
- Anxiety
- Depression
Barriers to recovery 0-10 scale

- **Barrier Finances**
  - Scale: 0-9
  - Distribution:
    - 0: 10
    - 1: 20
    - 2: 30
    - 3: 40
    - 4: 50
    - 5: 60
    - 6: 70
    - 7: 80
    - 8: 90
    - 9: 100

- **Barrier Fatigue**
  - Scale: 0-9
  - Distribution:
    - 0: 10
    - 1: 20
    - 2: 30
    - 3: 40
    - 4: 50
    - 5: 60
    - 6: 70
    - 7: 80
    - 8: 90
    - 9: 100

- **Barrier Mobility**
  - Scale: 0-9
  - Distribution:
    - 0: 10
    - 1: 20
    - 2: 30
    - 3: 40
    - 4: 50
    - 5: 60
    - 6: 70
    - 7: 80
    - 8: 90
    - 9: 100
What has helped you most with recovery
Conclusions

• This is the first study to examine prevalence of psychocognitive morbidity by the ICU population type across six various ICUs at a single hospital.

• Initial symptom prevalence appears fairly consistent regardless of the ICU type/patient population.

• Data immediately following ICU discharge is similar to previously reported in literature at >6 months follow-up.

• Our 3 months follow up data is still being collected so stay tuned…
Conclusions

• May be helpful to emphasize during follow up medical visits/ICU clinics strategies aimed at communication with family and education on relaxation techniques in addition to exercise

• Tailored interventions may also need to be appropriate for individuals with cognitive impairments

• How disruption of physiological processes and altered consciousness due to disease/medications affects the brain and emotional and cognitive function requires further study
Making the business case for Quality

• Many concurrent initiatives
• Parallel priorities
• Complementary priorities
• Competing or opposing priorities
• Opportunity for staff efficiency and economic benefit through combining initiatives
Modifiable Healthcare Expenses / Costs

• Daily expenses to care for a patient (LOS)
• Added cost of care from preventable conditions
  – VAP/VAE
  – Falls
  – Pressure Ulcers
• Reductions in Reimbursement
  – Value Based Purchasing (VBP)
  – Readmission rates
  – Poor performance for Hospital Acquired Conditions (HAC)
• Staff Efficiency and meeting time
Cost of Care expenses (LOS)

- ICU Cost of care per day
  - Significantly higher on first few days, then levels off
  - Higher for mechanically ventilated patients
  - Total cost versus marginal direct-variable costs

- Hospital Cost per day
  - More stable and significantly lower than ICU
  - Again differences between Total costs and Marginal direct-variable costs (That can be saved through shortening LOS)


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Falls

• Incidence
  – 1.7-25 per 1000 patient days (AHRQ)
  – 3.56 (Bouldin et al)

• Average added cost of care per patient fall
  – $13,063.5 (average with or without an injury)


Ventilator-Associated Events / Pneumonia

- **Incidence**
  - 8.1 per 1000 ventilator days (National Healthcare Safety Network) wide range (1.8-57.6)

- **Added cost of care per event**
  - $45,609 (average from multiple sources)


Pressure Injuries

• Incidence (Stage III and IV) – 4.7-32.1
• Added cost of care per case – $43,180.00

Employee Injuries related to Patient Handling

• Incidence
  – 6.8 injuries per 100 FT workers
  – Overexertion and bodily strain 48% of all injuries

• Average direct costs
  – $15,860 (AON Risk solutions)

• Average indirect costs
  – (OSHA estimates 4-5 times direct costs in indirect costs)

• https://www.osha.gov/dsg/hospitals/
Associations and Influences

**VAP/VAE**
- Immobility
- Dec. mvt of secretions
- Inflammation
- Duration of MV
- Sedation
- Altered cough reflex
- Decreased resp muscle strength

**Falls**
- Immobility
- Cognition
- Orientation
- Incontinence
- Meds
- Lines
- Weakness/imbalance

**Pressure Ulcers**
- Sensory impairment
- (Polyneuropathies)
- Moisture
- Activity
- Mobility
- Nutrition
- Friction
- Shear
- Temperature

**Employee injuries**
- Lifting and moving dependent and weak patients
- Reaching and awkward positions for wound care and bathing patients
- “Catching” patients to prevent falls

**Length of Stay**
- Functional ability
- Cognition
- Strength
- Discharge needs
- Medications
- Social support
- Medical Status
- Risk of Readmission

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Overlapping Impact of Quality Initiatives

A CULTURE OF MOBILITY

- LOS
- Fall Prevention
- VAP/VAE Prevention
- Skin Health
- Employee Safety

A CULTURE OF PATIENT AND EMPLOYEE SAFETY
Initiatives to Reduce Costs and Improve Quality of Care

Falls
Early Mobility
SPHM
Skin
VAP/VAE
BETTER FOR PATIENTS!
BETTER FOR HOSPITALS!

IMPROVES
Functional Independence
Sleep Quality
Muscle strength
Likelihood of DC to home or Rehab vs ECF/SNF
Quality of Life

REDUCES
ICU LOS
Hospital LOS
Time on Ventilator
Pressure Ulcers
Ventilator associated events
Readmissions and death
Cost of Care
Hyperglycemia
Inflammation
Delirium

MOBILITY IS LIFE!

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Impact of Early Mobility on LOS


Impact of Early Mobility on Ventilator Days and Associated Events


Impact of Early Mobility on Falls

1. Fraser D, Spiva L, Forman W, & Hallen C. Original Research: Implementation of an Early Mobility Program in an ICU. AJN 2015 (Dec); 115(12): 49-58
7. See also outcomes at this website: (CSI) http://www.aacn.org/wd/publishing/content/pressroom/pressreleases/2014/feb/csi-north-carolina-hospitals.content?menu=AboutUs
Impact of Early Mobility on Pressure Injuries

• Fraser D, Spiva L, Forman W, & Hallen C. Original Research: Implementation of an Early Mobility Program in an ICU. AJN 2015 (Dec); 115(12): 49-58

• See also outcomes at this website: (CSI) http://www.aacn.org/wd/publishing/content/pressroom/pressreleases/2014/feb/csi-north-carolina-hospitals.content?menu=AboutUs
Impact of Safe Patient Handling Programs on Employee Safety


Impact of Safe Patient Handling Programs on Patient Outcomes

Associations and Influences

**VAP/VAE**
- Immobility
- Decrease mvt of secretions
- Inflammation
- Duration of MV
- Sedation
- Altered cough reflex
- Decreased resp muscle strength

**Falls**
- Immobility
- Cognition
- Orientation
- Incontinence
- Meds
- Lines
- Weakness/imbalance

**Employee injuries**
- Lifting and moving dependent and weak patients
- Reaching and awkward positions
  - “Catching patients to prevent falls

**Pressure Ulcers**
- Sensory impairment
  - (Polyneuropathies)
- Moisture
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- Mobility
- Nutrition
- Friction
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**Length of Stay**
- Functional ability
- Cognition
- Strength
- Discharge needs
- Medications
- Social support
- Medical Status
- Risk of Readmission

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Total Quality Culture

PATIENT SAFETY and IMPROVED OUTCOMES Through

EARLY AND CONTINUED MOBILITY With

STAFF SAFETY DURING PATIENT MOBILITY By Using

SAFE PATIENT HANDLING TECHNOLOGY
Staff Utilization

• EM, SPHM, Fall Prevention, Skin teams monthly meetings
• Action plans in between meetings
• Root Cause Analysis, Prevention strategies
• Staff Training
• Data collection, audits, QI projects for each

• What if we could condense and refine?
Example of Staff Efficiency Tool

<table>
<thead>
<tr>
<th></th>
<th>Number of people</th>
<th>Time per month per person (hrs)</th>
<th>Number of people</th>
<th>Time per month per person (hrs)</th>
<th>Number of people</th>
<th>Time per month per person (hrs)</th>
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<th>Number of People</th>
<th>Time per month per person (hrs)</th>
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</thead>
<tbody>
<tr>
<td>Early Mobility</td>
<td>Coordinator / Champion time</td>
<td></td>
<td>Monthly meetings</td>
<td>Fall Prevention</td>
<td>Wound Care</td>
<td>Safe Patient Handling</td>
<td>Infection Prevention</td>
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<td></td>
<td>Emails, calls, communications</td>
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<td>Developing educational materials</td>
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<td>Staff education (Trainers)</td>
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<td>Staff education (Trainees)</td>
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<td>Activities other than education*</td>
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</tr>
</tbody>
</table>

* Planning, implementing changes, addressing barriers, following up on actions, researching options and best practices, reading articles etc.
Hyperlink to Excel File
### Inspired Total Quality Solutions (ITQS) Program Costs

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added Staffing</td>
<td>$180,000.00</td>
</tr>
<tr>
<td>Additional Training</td>
<td>$15,000.00</td>
</tr>
<tr>
<td>Additional Equipment</td>
<td>$150,000.00</td>
</tr>
<tr>
<td>Additional Administration</td>
<td>$2,000.00</td>
</tr>
<tr>
<td>External Consultants</td>
<td>$100,000.00</td>
</tr>
</tbody>
</table>

**Total Cost of Program**

$447,000.00
Summary

• Many individual initiatives to improve quality of care and contain high costs
• Many areas of overlap
• Additional savings may be realized through combining initiatives
• Maximize staff Efficiency and minimize redundancy
Implementing an ICU Diary Program Throughout All the ICU’s
Cyndy K. Fine, MSN, CRRN
New York Presbyterian Hospital: Columbia Medical Center
Why Even Do an ICU Diary?
History

- Attended the Johns Hopkins Rehab in the ICU Conferences the last two years.

- Reviewed the literature.

- Met as a team and decided:
  - What were the criteria for inclusion in the program
  - Where did we want to start the Program?
  - Timetable for implementation
Inclusion Criteria

- Decided as a team that we would use the criteria that the literature suggested.
  - In the ICU for greater than 72 hours.
  - On the ventilator for 48 hours or greater.

- Decided to pilot in two of our 5 ICU’s:

- For the pilot only, the patient and their participating family were English speaking.
Timetable for Pilot

- Decided as a team that we would start in the CTICU.
- Educated staff over 2 week period.
- Implemented the pilot.
Diary was

- Very low cost, low tech and simple to use.
- Included:
  - Page to write on
  - Page titled “All About Me”
  - Place for pictures
  - Article on ICU Diary
  - Pen
Example of Picture we would take....
Results

Had no referrals to the program!
From there:

- Looked at the criteria again.
- Made changes
- Began with a patient that had been in the MICU.
From There

Added the MICU’s
At the end of the pilot, we.....

- Looked at our referrals.
- Spoke informally to the patients and families.
- Decided on making changes to inclusion criteria, making them more ICU specific.
Pilot Data: Number of patients referred versus those who participated

CTICU
- # of referrals: 9
- # of participants: 6

MICU
- # of referrals: 7
- # of participants: 2
Barriers Encountered

- Inclusion criteria.
- Staff reluctance to write in the Diary.
- Staff time to write in the Diary.
- Families reluctant to participate.
In short, this was a culture change and it would take time.
Implementation in the Other ICU’s

- Implemented the program in:
  - SAICU
  - CCU

- Have not implemented the Program in the Neuro ICU
Data: Number of patients referred versus those who participated in Phase Two

![Bar chart showing the number of participants in SAICU and CCU.](image-url)
Where do we go from here?

- Need to keep educating and re-educating our team.

- Point person is key!

- Some ICU’s may be more appropriate than others for the program. Need to look at this.

- Program needs to be encouraged by all.
Thank You!
Patient outcomes after acute respiratory failure: A qualitative study of survivors’ experience using the PROMIS framework

Michelle Eakin, Ph.D
PROMIS Framework

Physical Health
- Ability to carry out physical activities
- Self-care (activities of daily living)
- Vigorous activities that require mobility, strength, or endurance

Mental Health
- Positive and negative emotions
- Mood status
- Cognitive abilities
- Current outlook on life or adaptation to health

Social Health
- Providing and receiving quality support from family, friends, and others.
- Ability to participate in social roles and activities
Objective

Using qualitative methods describe the survivorship experience of acute respiratory failure (ARF) patients within the Patient Reported Outcomes Measurement Information System (PROMIS®) framework.
Methods

• Recruited 48 patients from two ongoing trials
  – ARDS Network Long Term Outcomes Study (ALTOS)
  – Recovery of Muscle after ARF (ROMA) study

• Oral Consent was obtained and semi-structured interview was completed by phone
## Patient Sample

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age, years</strong></td>
<td>53 (15)</td>
</tr>
<tr>
<td><strong>Women, No. (%)</strong></td>
<td>26 (54%)</td>
</tr>
<tr>
<td><strong>White, No. (%)</strong></td>
<td>48 (81%)</td>
</tr>
<tr>
<td><strong>Prior Residence, Home independently No. (%)</strong></td>
<td>42 (88%)</td>
</tr>
<tr>
<td><strong>Body mass index, kg/m²</strong></td>
<td>32 (8)</td>
</tr>
<tr>
<td><strong>Diabetes, No. (%)</strong></td>
<td>15 (31)</td>
</tr>
<tr>
<td><strong>APACHE III score</strong></td>
<td>100 (34)</td>
</tr>
<tr>
<td><strong>Duration of mechanical ventilation, days</strong></td>
<td>9.8 (10)</td>
</tr>
<tr>
<td><strong>ICU length of stay</strong></td>
<td>13 (10)</td>
</tr>
<tr>
<td><strong>Hospital length of stay</strong></td>
<td>22 (17)</td>
</tr>
</tbody>
</table>
“Mercifully I have zero memory of those 12 days when I was on the respirator. But the whole experience was just, it may sound crazy, but it was so much worse than the leukemia and the chemo and the bone marrow transplant. Up until that point I would have said that (leukemia) was the high water mark, but the whole ICU stay was just so scary.”
Results - Physical Health

Physical Health

Physical functioning
- Mobility, pain, balance, strength, ADLS

Pulmonary
- Cough, dyspnea, chest pain, supplemental O2

GI
- Nausea, appetite, vomiting, swallowing, bowel

Fatigue/Sleep
- Fatigue, stamina, sleep disturbances

Sensory
- Hearing/Vision impairments
Physical functioning

• “Being able to move and do things is the most important thing.”
• “It felt like that were two sections of chain link fence hooked to each lung and I was trying to drag them up a gravel driveway with my lungs.”
• “I feel like I have a 10-foot leash to my saturator.”
Results - Mental Health

- “My thinking is like being in a fog”
- “I'd started to take life a little bit for granted but now I am so extremely grateful to be alive”
- “I am basically a parasite ...a parasite that leaves you an emptiness inside”
Results - Social Health

• “I want to go back to work. We had to move from a 2 bedroom to a 1 bedroom because I’m out of work now. I feel like I’m being punished for being sick.”

• “He told me if I would live, he would never stop taking care of me …so he has gone out of his way to do all that”
Conclusions

• ARDS survivors reports significant impairments in all domains of PROMIS
• Different coping responses to critical illness with some seeing it as a benefit and others were very distressed.
• Important to consider outcome measures that assess meaningful patient outcomes across all domains
Rusk Rehabilitation/
Sala Institute for Patient and Family
Centered Care

Early Rehabilitation in the
Pediatric Intensive Care
Unit: A Quality Improvement Project

11/5/2016

Jodi Herbsman, PT, DPT
Presentation Objectives

• Demonstrate how a pediatric early mobilization can be safe and effective
• Identify potential challenges and successes to implementing an early mobilization project in the pediatric intensive care unit (PICU)
Background

Literature has shown that adult patients who are immobilized, mechanically ventilated and/or sedated for a prolonged period of time, experience:

• Decreased quality of life
• Muscle atrophy
• Impaired cardiopulmonary endurance
• Overall decrease in mobility at discharge and follow up

Research in the pediatric population is limited
Barriers to Mobilization
Identified on Survey

- Knowledge of the importance of early mobilization
- Skills to move critically ill patients
- Comfort level in moving critically ill patients
- Ability to identify patients eligible for early mobilization
- Lack of resources
**SMART Aim**

We will increase percent of PICU patients who are mobilized within recommended* time frame from 60% to 80% by June 2016.

*Recommended time frame: 18 hours from PICU admission for non-vented patients, 48 hours from PICU admission for vented patients

Population: PICU patients 18 months and older

**Global Aim**

Improve patient experience and outcomes, generate cost savings

---

**Key Drivers**

- Consistent identification of patients ready to be mobilized and formulation of mobilization plan
- Accurate and timely orders for patients who need to be mobilized
- Consistent use of evidence based weaning and sedation protocols
- Adequate resources available to safely and consistently mobilize patients
- Staff comfortable to safely mobilize patients
- Parent/Family/Patient comfortable mobility process
- Staff understanding benefits of early mobilization

---

**Interventions**

- Create, test, an implement use of an algorithm to identify patients eligible for mobilization
- Train staff in use of algorithm
- Update order sets
- Make LIPs aware of change (via e-mail)
- Review and update weaning, sedation/choice of medication protocols based on current evidence. Ensure consistent use of updated protocol by LIPs, Nurses and RT
- Assess current resources (time/space/staff)
- Implement patient schedule to maximize use of staff time
- Create a procedure to ensure that all RNs, PCTs, therapists are trained on how to safely mobilize critically ill patients
- Incorporate patient/family concerns re: mobilization in the ICU during rounds and treatment
- Work with FAC and YAC to identify patient/family barriers to mobilization
- Involve CAT, CL, IH for mobilization and prep
- Change culture of early mobility for all team members
Interventions Summary

• Mobilized interdisciplinary team
• PICU admission order set updated
• Algorithm created
• Patient scheduling trialed
• Therapy/Nursing education and training provided (PDSA)
• Family advisor interviews conducted with patients and caregivers
• Family faculty/nursing discussions conducted
Pediatric Mobilization Algorithm

- Contraindications and precautions
- Process to determine eligibility for mobility
- Includes roles of all team members
- Signs of intolerance
Family Interviews
(interviews done by family advisors)

• Do you understand the roles of PT, OT, SLP?

• Did a staff member ask you if your child wanted to “move” today?

• Did you “move” today? If not, why?

• Is there anything we could have done to make it easier/more comfortable for your child to move?

• Did the staff member explain the benefits of remaining mobile?
  • Were the benefits clear? If not, how can we make it better?

• Do you know when PT/OT/SLP will be returning to see you?
Outcomes- Orders

% of patients

Activity Orders 89%
PT Orders 82%
OT Orders 76%
SLP Orders 52%
% Patients Mobilized within recommended time frame 60%

85%
Early Rehabilitation in the Pediatric Intensive Care Unit

- Scheduling of patients for therapies initiated (PDSA) 4/11/16
- Family advisor discussions with families initiating including feedback back to staff (PDSA) 6/2/16
- Individualized mobilization training initiated for nursing staff (PDSA) 6/6/16
- PICU Admission Order Set Updated to include activity orders in addition to PT/OT 11/19/15
- Email sent to LIPs asking for therapy orders POD#0 5/16/16

Week Ending Date

% of PICU Patients Mobilized 18 Hours+ within Established Time Frame

- % of Patients Mobilized within Established Time Frame
- % of Patients Who Met the Desired Clinical Outcome
- Median
- Goal
Time From PICU Admission to First Mobilization

Date

09/23/15 10/08/15 10/22/15 11/05/15 11/19/15 12/10/15 12/24/15 01/07/16 01/21/16 01/28/16 02/11/16 02/18/16 03/03/16 03/04/16 03/11/16 03/18/16 04/04/16 04/11/16 04/18/16 05/05/16 05/12/16 05/19/16 05/26/16 06/09/16 06/16/16 06/23/16 06/30/16 07/07/16 07/14/16 07/21/16 07/28/16 08/04/16 08/11/16 08/18/16 08/25/16 09/01/16 09/08/16 09/15/16 09/22/16 09/29/16 10/06/16 10/13/16

Weekly Average (in Hours)

0 5 10 15 20 25 30 35 40 45 50 55 60

Name of plotted data  Centerline  Control Limits

PICU Admission Order Set
Updated to include activity orders in addition to PT/OT 11/19/15

Algorithm Finalized (PDSA) 2/25/16

Email sent to LIPs asking for therapy orders POD #0 5/16/16

Individualized mobilization training initiated for nursing staff (PDSA) 6/6/16

Scheduling of patients for therapies initiated (PDSA) 4/11/16

Family advisor discussions with families initiating including feedback back to staff (PDSA) 6/2/16

Early Rehabilitation in the Pediatric Intensive Care Unit

11
Challenges

- Coordination of the mobilization team in real-time
- Coordination of training
- Changing culture is gradual
- Time and resources
- Documentation consistency
Successes/Wins

• Strong team collaboration (including family advisors)

• Positive feedback from patients and families

• Utilization of improvement science methodology helped team navigate through complex project

• No adverse events
Lessons Learned

Early mobilization in the PICU at is

- Feasible and safe
- Rewarding for all members of the interdisciplinary team
- Benefits of utilizing PDSA cycles (small tests of change)
- Clinical and financial outcomes pending
Acknowledgements

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• Lauren Selikoff, BSN, RN
• Mary Ellen Sheldon, MA, RN-BC
• Lauren Simon, PT, DPT, NCS
• Tina Tan, MS, CCC-SLP, BCS-S
• David Wain, RT
PIM III Score Does Not Predict Rehabilitation Outcome At Hospital Discharge

Susan Bagnall – Senior Physiotherapist
(On behalf of the Children’s Therapies team)
Background

Who we are?

Aim

Method

Results

Conclusion
Where are we based?
Brain Injury Living Life (BRILL)

Established 2014

Multidisciplinary rehab for children with acute neurological injury

Contributors to UK ROC
Aim

Can we use PIM 3 to predict how much support patients will need to return home?

OBJECTIVE
To explore the relationship between initial presentation and outcome for patients admitted to PICU with a neurological diagnosis, who received rehabilitation from the BRILL team.
Method

Inclusion:

patients who were admitted to PICU and required neuro-rehabilitation provided by the BRILL Team over an 18month period

Data collected:

• admission date
• date of first contact
• Rehabilitation Complexity Scale: Extended (Version 13) scores at discharge
• PIM III score was obtained using the national PICANET database.

Statistical analysis was performed using Statibot.
Inclusion flow diagram

- RCS completed on initial assessment and discharge
- BRILL Patients n = 125
  - Admitted to PICU n = 44
  - Admitted to ward n = 81
- PIM III Score developed where complete data available
  - Final inclusion n = 24
  - Incomplete data n = 20
<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pupils fixed to light</td>
</tr>
<tr>
<td>Elective admission</td>
</tr>
<tr>
<td>Mechanical ventilation (in the 1\text{st} hour)</td>
</tr>
<tr>
<td>Absolute value of base excess (mmol/L)</td>
</tr>
<tr>
<td>Systolic Blood Pressure at admission (mmHg)</td>
</tr>
<tr>
<td>Systolic Blood Pressure^{2}/1,000</td>
</tr>
<tr>
<td>100 x FiO_{2} / PaO_{2} (mmHg)</td>
</tr>
<tr>
<td>Recovery post procedure?</td>
</tr>
<tr>
<td>Yes, recovery from a bypass cardiac procedure</td>
</tr>
<tr>
<td>Yes, recovery from a non-bypass cardiac procedure</td>
</tr>
<tr>
<td>Yes, recovery from a noncardiac procedure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Very high-risk diagnosis</th>
<th>High-risk diagnosis</th>
<th>Low-risk diagnosis</th>
</tr>
</thead>
</table>

\textit{Straney et al. (2013)}
Rehab Complexity Score – Extended (Version 13)

Aims to provide basic banding of patient complexity.

The outcome is scored out of 22, with individual domains scored from 0-4.

Turner-Stokes et al. (2007)
Results

Twenty four eligible patients were identified, (male = 10, median age = 11).

Eleven had trauma related diagnoses, 6 were encephalopathic, 3 had bleeds as a result of AVM and the remainder were of varying diagnosis.

Spearman Rank Correlation analysis of PIM III score and RCS-E (V.13) at discharge demonstrated non-significant positive correlation (n=24, r=0.297, p=0.16.)
Conclusion

Severity of initial presentation measured using PIM III score did not predict outcome of rehabilitation at hospital discharge for patients with a neurological diagnosis.
Discussion

Only two patients had a >10% chance of mortality.

Narrowed population

Small single centre cohort

Extrinsic variables

PIM 3 score should not influence rehab intensity
What next?

Expand the study
Look at alternative measures:
  - FIM+FAM
  - PRISM
  - Wider population

Clinical experience
References


Thank you
Poster Presentations

5th Annual Johns Hopkins Critical Care Rehabilitation Conference

Baltimore, MD
Background

"Early mobility for critically ill patients has evolved to become a new standard of care for the intensive care unit (ICU)" (Kleinpell, 2011). Early mobility in the ICU is expected to reduce the patients length of stay and lower the number of readmissions to the hospital. Overall benefits include decreased duration of mechanical ventilation, decreased ICU Delirium, and decreased costs.

Objective

- To identify common ICU safety risks and intervene early
- To provide patient-centered care aligned with patient goals and prevent the loss of respect and dignity to ICU patients
- To reduce ICU Delirium, ICU-Acquired Weakness, Ventilator Associated Events (VAE), Central Line Associated Bloodstream Infections (CLABSI), Venous Thromboembolism (VTE)

Method

The Medical Intensive Care Unit (MICU) at Johns Hopkins Bayview Medical Center (JHBC) developed a program to optimize patient care and increase the medical intensive care unit (ICU) safety. Steps To Restoring Independence and Dignity Early (STRIDE) uses a multidisciplinary approach. The STRIDE Coordinator is a registered nurse that works together with the nursing staff, a dedicated Physical Therapist and Occupational Therapist, to provide care to the patients on the unit. Other disciplines, such as Speech Language Pathology and Respiratory Therapy, are key to optimizing the care of each patient.

Results

Over the two years before the start of the program, patients had a 16% chance of not surviving their stay in the ICU. After initiation of the program, mortality has decreased to 12%. Prior to the start of this program, 17% of MICU patients went to a rehabilitation facility before going home; that is down to 5%. Over 6,000 patient’s charts were reviewed to obtain this data.

Effect of MICU Early Mobility on Survival and Discharge Destination

![Graph showing % Discharged Alive from Hospital](image)

Significance

The idea of early mobility in the intensive care unit will reduce the patient’s length of stay, lower the amount of readmissions to the hospital and decrease the duration of mechanical ventilation on the intubated patients.

**Reference:**

Abstract
The pathogenesis of delirium is poorly understood despite being one of the most common complications experienced by hospitalized clients, with negative effects and costly outcomes being widely researched and documented. The mainstay of the prevention and treatment of delirium is the cessation or minimization of risk factors, in addition to non-pharmacological interventions. With the complexity of biochemical derangement, potential causes, and cognitive/behavioral changes, it has proven challenging to provide effective education to staff and family members regarding the care of their loved ones with acute delirium.

In response, a learning model based upon each of the senses has been conceptualized. Clients in acute delirium experience an altered perception of sensory and environmental input, with special needs for sensory modulation. This model has potential to meet the need for quick and effective training, pending further QI development.

Objectives
1. Anticipate the effects of delirium and sedation practices on therapy interventions
2. Learn to identify symptoms of delirium
3. Design specific rehab treatment plans tailored to a patient dealing with delirium by utilizing the 5 senses.

Background
Delirium is defined as a transient, usually reversible, cause of cerebral dysfunction and manifests clinically with a wide range of neuropsychiatric abnormalities. The clinical hallmarks of delirium are decreased attention span and a waxing and waning type of confusion. Delirium can occur at any age, but it occurs more in patients who are elderly and have compromised mental status. More specifically, it affects 2.3 ICU patients, and 1.6 general hospital ward patients. Risk factors include age, history of hypertension, mechanical ventilation, higher APACHE score, benzodiazepines and opiates, and vitamin deficiency.

Patients with delirium are more likely to be hospitalized 10 days longer, have longer days requiring mechanical ventilation, have a higher six month mortality rate, and have short and long term cognitive deficits up to 2 years post. Costs in excess of $164 billion per year are a result of this preventable syndrome.

Assessments
Mini-Cog: identifies patients at high risk for in-hospital delirium.
CAM-ICU: nonverbal assessments to evaluate the important features of delirium in critical care patients, especially those on mechanical ventilation.
CAM-S: measures the severity of delirium in hospitalized patients (short form).
FAM-CAM: screening tool that interviews caregivers.
The Sour Seven Questionnaire: screening tool for untrained informal caregivers.

Treatment Suggestions
- Familiar faces/objects
- Family photos
- Don’t avoid eye contact
- Natural, indirect light
- Glasses
- Salivation triggers parasympathetic system
- Cleaning mouth
- Moisturizing lips
- Ice water
- Tepid water
- Lemon water
- Correct dehydration
- Hearing aids (check batteries)
- Disimpaction of ear wax
- Minimize unnecessary noise
- Talk to the patient, use their name
- Avoid abstract concepts/watch phrasing
- Limit auditory stimuli to one source at a time
- Address pain using a scheduled protocol
- Timely removal of catheters/restraints
- Early mobilization and engagement in activity
- Physical contact/massage
- Joint compression
- Weighted blankets
- Promote smells such as: lemon, familiar smells (e.g. pet’s blanket)
- Repress smells such as: bowel movements, body odor, infection, trash

Other Suggestions Include:
- Providing cognitively stimulating activities multiple times/day
- Repeated reorientation
- Nonpharmacological sleep protocol (warm tea, blankets, etc)
- Engaging in typically normal tasks
- Don’t shy away from listening or letting them tell you about their experience. Encourage processing.

Clinical Relevance
• The acute care length of stay is brief and evidence shows that 1 in 10 clients with acute delirium is discharged home with delirium.
• Delirium is preventable in 30-40% of cases.
• The majority of individuals affected demonstrate a mix of symptoms that are both hyperactive and hypoactive.

Contact:
Katie Walker, OTR/L
Katie.Walker@BSWHealth.org
Baylor Scott & White All Saints Medical Center – Fort Worth
Abstract

As early mobility programs across the nation and world continue to push the boundaries of what is possible, safety remains paramount. To that end, the ECMO "Snorkel" was developed to enhance the safety and feasibility of mobilizing some of our most challenging patients including the so called "ambulatory" ECMO patient.

In patients with large bore cervical cannulas it is extremely important to provide adequate stabilization to prevent inadvertent dislodgement or kinking. The ECMO "Snorkel", a novel device created from heat moldable thermoplastic, is worn by the ECMO patient during mobilization. It can stabilize the cannula to such a degree that no other external support is required, thereby freeing up the hands of the clinician.

At our institution we have had a great deal of success safely mobilizing pediatric and adult patients with the ECMO "Snorkel" without adverse events.
Establishing a Patient-Provider Communication Program in the Pediatric Intensive Care Unit (PICU)

Tami Altschuler, MA, CCC-SLP, Tina Tan, MS, CCC-SLP, BCS-S, Mary Ellen Sheldon, MA, RN-BC, Tiffany Folks, RN, BSN

**Communication Challenges**

- Children in pediatric intensive care units (PICUs) may experience difficulty with verbal communication due to:
  - intubation/tracheotomy
  - neurological conditions
  - pre-existing communication deficits
  - language barriers

- Being unable to communicate:
  - is emotionally frightening
  - leads to an increase in sentinel events
  - may result in medical errors
  - can extend lengths of stay

- The Joint Commission set a new standard for patient-provider communication effective 2012.

**Perceptions**

Survey distributed to all providers with direct patient contact in the PICU prior to program initiation. Notable results below:

The communication needs of patients who are non-verbal are being met:

- Percentage of staff who have received AAC training:
  - 72%
  - 28%

Quality of care declines when staff cannot understand a patient:

- 35%
- 19%
- 33%
- 9%

**Interventions**

- Grant funding was awarded to establish a PICU Communication Toolkit with range of low-technology to high-technology augmentative and alternative communication (AAC) supports.

- All PICU staff trained on communication supports and strategies by SLP.

- Use of Toolkit prompts referrals to receive AAC intervention with SLP.

- Coordination of services with PT/OT/SLP to promote communication intervention with early mobility.

**Progress to Date**

- PICU staff are actively utilizing the Toolkit.

- Monthly referral rate for AAC evaluations has doubled.

- Children are being referred earlier, i.e. while they are still intubated and emerging from sedation.

- Culture change: PICU staff are advocating for patients to receive communication supports.

**Next Steps**

- Expand upon Communication Toolkit to include additional items to better address motor and sensory limitations.

- Extend program to the adult population to target critically ill patients in the ICUs.

- Post survey for one year follow-up.

- Explore options for ongoing nursing education during new employee orientation.

Reference: Costello, Patak, Pritchard (2010)

**Established a high-technology AAC system with switch access for a patient pre-operatively (tracheotomy placement) with voice/message banking**

Contact: Tami.Altschuler@nyumc.org
Mobilization of a Patient on Venoarterial Extracorporeal Membrane Oxygenation As a Bridge to Lung Transplant: A Case Report

Thomas Benson PT, MS, CCS
thb9004@nyp.org
Advanced Clinician for Medical & Surgical Intensive Care Units
New York Presbyterian Hospital/Columbia University Irving Medical Center

Introduction: Extracorporeal membrane oxygenation (ECMO) is an intervention that can provide cardiac and pulmonary support to the patient whose heart and lungs are not functioning adequately to meet the metabolic needs of the body. The circuit draws blood from a central vein along a membrane where the blood is oxygenated & carbon dioxide is removed. The blood is then returned to the patient via a central vein (VV ECMO) or artery (VA ECMO).

ECMO was initially used with the pediatric population. In 1971 it was first used to successfully support an adult victim of a motor vehicle accident who had sustained multiple fractures and developed ARDS. The patient was supported for 3 days on ECMO.

The past decade has seen an increasing number of institutions which have used ECMO to extend the life expectancy of patients with end stage lung disease, thus increasing their chance of surviving to transplant (bridge to transplant). The use of ECMO in this population permits a patient who might otherwise be tethered to a ventilator and confined to bed, to sit at the side of the bed, stand, get out of bed to a chair and ambulate with considerably less symptoms. This promotes a sense of well-being, allows the patient to maintain their functional mobility and prevents the deleterious effects of bedrest while they await lung transplant.

Objective: The purpose of this case report is to demonstrate the feasibility of mobilizing a patient on VA ECMO over a period of four months.

Hospital Course: 55 year old female with a history of nonspecific interstitial pneumonia and secondary pulmonary hypertension who presented to our ED with disease progression, worsening right heart failure and a pericardial effusion. She was transferred to the medical intensive care unit where she was placed on high flow nasal cannula and managed initially with diuretics & inotropes. She continued to deteriorate clinically despite the addition of inhaled nitric oxide, iloprost and a continuous furosemide drip. On day 22 she deteriorated further requiring cannulation with VA ECMO with an upper body configuration: right internal jugular vein to innominate artery.

She participated in daily or twice daily physical therapy sessions (6 days/week) while on VA ECMO, with the focus being either walking in the hallway or on a treadmill (longest distance in hall was 1,000 feet; longest distance on treadmill approximately 1,500 feet). She was maintained on VA ECMO for 126 days. On day 148 she underwent bilateral lung transplant and was weaned off of ECMO 4 days later (day 152). On day 167 she was transferred to inpatient rehabilitation. She was discharged home on day 186.

Conclusion: Select patients on VA ECMO can participate in daily physical therapy, including ambulation, with the assistance of an experienced, multidisciplinary team. This is a resource intense undertaking. Access to a bedside treadmill may allow a medically complex patient to continue to ambulate when it is no longer feasible to ambulate in the hallway.

References
1. Hill et al. NEJM 1972; 286: 629-634
Shifting Drivers: Positive Outcomes of Converting from System-Driven to Value-Driven Practice in an ICU

Purpose

The Surgical Intensive Care Unit (SICU) at the University of Utah Hospital (UUh) was once considered a lower-priority area as related to acute physical therapy’s allocation of time and resources. This led to nominal physical therapy services and devalued opinions of the therapy role played as a member of the critical care team and the need for change was apparent.

Methods

RECOGNITION: An honest assessment of the interdisciplinary relationships and therapy practice patterns within the existing SICU culture

“I have been disappointed by how little it has been emphasized here…”
Anonymous MD; >5 yrs in SICU at UUh
“…” occasional team member.”
Anonymous RN; >5 yrs in SICU at UUh

- How does the current system drive daily decisions?
- Could converting to a new model positively influence these devolved opinions and ultimately lead to physical therapy becoming a more integral member of the critical care team?
- What would that new model look like?

LEARNING: Acknowledging specific points of evidence and support that encouraged and inspired a need for change:

Influence from National Vision

- National conference attendance and publications
- Position statement on Value vs. Productivity Measurement in Acute Care Physical Therapy from the Academy of Acute Care Physical Therapy Value/Productivity Task Force

Influence from University of Utah Health Care Vision

- Publications and recognition citing UUh, specifically Vivian S. Lee, MD, PhD, MBA and Senior Vice President for Health Sciences
- Introduction to an idea of an Integrated Practice Unit (IPU) model as put forth by UUh
- System = Emphasis on department and volume
- Value = Emphasis on patient and quality

ELEMENTS OF AN IPU

Integrated Practice Units (IPUs), are a concept first introduced by Bernard Sloman’s School Professor Michael Porter. The idea is to create value in delivering healthcare that is measurable and trackable. The following is an example of how the IPU model can be applied to a therapy team within a specific ICU area.

The “Shift”

IMPLEMENTATION: Fully immersing in an IPU model of care with daily decisions being driven by patient-centered outcomes rather than engrained provider-focused practice patterns

“The idea is to move away from organizing health care around specialties and departments to organizing around the patient’s health needs.”

Table 1 - Survey Demographics

<table>
<thead>
<tr>
<th>Group</th>
<th>S.A.</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>S.D.</th>
<th>% A or S.A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better under-</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>PT in the ICU</td>
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<td>15</td>
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</tr>
<tr>
<td>There are bet-</td>
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<tr>
<td>ter patient</td>
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<tr>
<td>outcomes with</td>
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<tr>
<td>PT</td>
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<td>7</td>
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</tr>
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<td>has inc- reased</td>
<td>16</td>
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<td>than anticipated</td>
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</tr>
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<tr>
<td>the therapist’s</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>skills that</td>
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<td>4</td>
<td>4</td>
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<td>0</td>
<td>84%</td>
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</table>

Table 2 - Survey results (N=256). (S.A.)=Strongly Agree, (A)=Agree, (N)=Neither Agree nor Disagree, (D)=Disagree, (S.D.)=Strongly Disagree

“The idea is to move away from organizing health care around specialties and departments to organizing around the patient’s health needs.”

S.A. = Strongly Agree
A = Agree
N = Neither Agree nor Disagree
D = Disagree
S.D. = Strongly Disagree

Revised 5/14/15

References

5. http://healthsciences.utah.edu/innovation/

Ana M. Jara1, PT, DPT, Jeffrey P. Jacobs1,2,3, M.D., FACS, FACC, FCCP, Margaret Reilly1, PT, MBA

1Johns Hopkins All Children’s Hospital, St. Petersburg, FL, USA;
2 Chief of the Division of Cardiovascular Surgery and Director of the Andrews/Daicoff Cardiovascular Program at Johns Hopkins All Children’s Heart Institute.
3 Surgical Director of Heart Transplantation and Extracorporeal Life Support Programs at Johns Hopkins All Children’s Heart Institute

Introduction

This case report describes the physical therapy management of an infant with a congenital heart defect (CHD) through the first palliative surgery until her discharge. A review of the literature identifies treatment interventions and early mobility after cardiac surgery for children and adults but no specific guide that can manage the treatment in the infants. Medical interventions have advanced the treatment of infants with congenital heart disease (CHD) and increased the survival rate.

The stress generated by surgery and surrounding interventions can contribute to prolonged ventilation, increased morbidity, and a prolonged hospital stay which can lead to new challenges for families and the multidisciplinary team. Physical therapy can assist and help with diminishing the use of sedation and assisting in parent education for these patients.

Objectives

The primary aim:
- To present the management and delineation of appropriate physical therapy intervention in an infant needing cardiac surgery and complex medical management throughout the hospitalization until her discharge home.

The secondary aim:
- To validate the importance of collaborative work with nursing on parental involvement and education for quality maternal-infant interactions that are critical factors in the development of infant regulatory function.

The tertiary aim:
- To outline the active involvement of physical therapy assisting in safe early mobility to enhance postural lung drainage, decrease the influence of primitive reflexes, and diminish motor imbalances that have been identified in infants in the intensive care unit, decreasing potential risk for developmental delay.

Case description

A female born at 38 weeks with hypoplastic left heart syndrome (HLHS).
- She underwent a Norwood procedure at five days of life with delayed sternal closure on a failed Oral-Pharyngeal Motility Study complicated her progress.
- Her postoperative course was complicated by wound dehiscence ten days after chest closure, treated with a wound vac.
- A failed Oral-Pharyngeal Motility Study complicated her progress.

Assessment

The TIMP (Test of Infant Motor Performance) is the test of choice for this population. It gives measurements to identify postural control-stability and infant’s reactions to visual and auditory stimuli. The TIMP was performed at two days and again at nine weeks of age.

Evaluation of the Tonic Labyrinthine and Symmetrical tonic neck reflex were based on the primitive reflex profiles (PRP), as clinically these two primitive reflexes have been considered the most sensitive indicators of early motor abnormality.

Education of the parents was evaluated through the ability to provide repeat demonstration of developmental activities, range of motion, and handling of their baby during daily care.

- Parent education to identify better positioning provided through a chart with seven pointers.
- Parent education to wean off postural support.
- The primary aim: to validate the importance of each component of therapy to the outcome of the infant, for communication with the multidisciplinary team to clearly associate the need for decreased morbidity with early mobility and improved sensorimotor development in this population make it imperative that the physical therapist collaborates with the multidisciplinary team.

The parental education and involvement appears to enhanced the level of confidence of the parents at the time to take their baby home.

The secondary aim: to validate the importance of collaborative work with nursing on parental involvement and education for quality maternal-infant interactions that are critical factors in the development of infant regulatory function.

The tertiary aim: to outline the active involvement of physical therapy assisting in safe early mobility to enhance postural lung drainage, decrease the influence of primitive reflexes, and diminish motor imbalances that have been identified in infants in the intensive care unit, decreasing potential risk for developmental delay.

Interventions

Physical therapy management was divided in three stages with different targeted goals. The treatment was based on the patient’s needs at the moment of intervention and according to the stage during the hospitalization.

<table>
<thead>
<tr>
<th>Stages</th>
<th>Period</th>
<th>Goals</th>
<th>Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Assessment day, until surgery</td>
<td>Maintain the infant in a stable physiological state</td>
<td>Parent education: recognize the baby’s behavioral cues, needs for baby to sleep, facilitated tucking as an effective strategy in attenuating their infants’ physiologic and behavioral responses to minor pain and the multidisciplinary team.</td>
</tr>
<tr>
<td>II</td>
<td>After surgery until patient was weaned off the ventilator support</td>
<td>Weaning from ventilator support while maintaining a stable physiological state</td>
<td>Post op: Assisting nurse positioning the infant to facilitate posterior chest expansion with supporting rolls on the side and obtaining a shoulder position in 30-degree flexion and 20-degree support as possible. The head was positioned in the midline of the body, and the pelvis in slight retroversion, close to a tucked in position (Picture 2). After chest closure, it became necessary to focus on positioning to facilitate diaphragmatic breathing with a bed inclination of 30-degree angle and boundaries to promote relaxation (Picture 3). Facilitation of supported upright position for postural drainage in preparation for weaning respiratory support (Picture 4). A positioning pillow was used to bring patient to a 45-degree angle after extubation. In this supported position, the muscles of shoulder elevation and scapular retraction were gently lengthened as the caregiver passively lowered and adducted the shoulders as well as protracted the scapulae. With the use of these accessory respiratory muscles limited, the infant experienced upper extremity movement toward the midline while performing diaphragmatic breathing.</td>
</tr>
<tr>
<td>III</td>
<td>After patient no longer required respiratory support.</td>
<td>Manage problems related to feeding, positioning, and irritability</td>
<td>Assisting with positioning to manage gastroesophageal reflux disease and feeding problems, relaxation to decrease irritability, and parent education to incorporate developmental positioning handling and play at care time.</td>
</tr>
</tbody>
</table>

Results

Table 1: TIMP (Test of Infant Motor Performance) Results

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Adjusted age</th>
<th>Raw</th>
<th>Z</th>
<th>Percentile</th>
<th>Age Equivalent</th>
<th>Per Standard</th>
<th>Tester</th>
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<tbody>
<tr>
<td>01/18/2015</td>
<td>40-41 weeks PCA</td>
<td>53</td>
<td>-0.75</td>
<td>24th percentile</td>
<td>36-37 weeks PCA</td>
<td>Low average</td>
<td>AMJ</td>
</tr>
<tr>
<td>03/18/2015</td>
<td>9 weeks Post term</td>
<td>101</td>
<td>+0.44</td>
<td>74th percentile</td>
<td>8-9 weeks Post term</td>
<td>Average</td>
<td>AMJ</td>
</tr>
</tbody>
</table>

Conclusions

The physical therapy intervention program provided to this infant with HLHS exemplifies strategies that may apply to infants with complex CHD. The need for decreased morbidity with early mobility and improved sensorimotor development in this population make it imperative that the physical therapist collaborates with the multidisciplinary team.

The parental education and involvement appears to enhanced the level of confidence of the parents at the time to take their baby home. Limitations of this case report are related to the objective determination of the optimal frequency and duration of intervention for infants with complex CHD. Challenges related to the implementation of a physical therapy program in an infant with complex CHD include the need for strong lines of communication with the multidisciplinary team to clearly associate the importance of each component of therapy to the outcome of the infant, for clustering care and fostering sleep.

**Picture 1**
- Tucked positioning
- Picture 1: holding her baby in a tucked position

**Picture 2**
- Upright position for postural drainage in preparation to wean respiratory support.
- Picture 2: supported tilted 30 degree angle with close to body boundaries.

**Picture 3**
- Supported inclined 30 degree angle with close to body boundaries.

**Picture 4**
- Upright position for postural drainage in preparation to wean respiratory support.
- Picture 4: Upright position for postural drainage in preparation to wean respiratory support.
Combining Quality Initiatives: Increase Efficiency and Effectiveness
Margaret Arnold, PT, CEES, CSPHP Inspire Outcomes LLC, and Jennifer McIlvaine, PT, MSPT, CSPHA, Duke Health

Background
- Multiple patient and staff safety initiatives aim to improve quality outcomes, and reduce cost of care
- Heavy economic burden on healthcare facilities with competing initiatives
- This poster presents a model of a collaborative approach to improve efficiency and effectiveness to achieve the goals

Opportunities
- Consistent terminology to enhance communication
- Identify complementary activities and potential for collaboration
- Better understanding of inter-disciplinary roles and objectives of each initiative
- Prioritize actions and risk by viewing the WHOLE patient from a systems perspective
- One team with both joint and initiative-specific activities with opportunity for focus teams
- Reduce committees from 5 to 1 with one set of meetings, agendas, action items, interventions , and training
- Each discipline has increased awareness of the impact of actions in one initiative on other initiatives
- Improved team cohesiveness for the patient: “Everyone is on TEAM PATIENT”

Duke Health Initiative: Duke MOVES
(Move Often, Very Early, and Safely)
- Combined SPHM, EM, and Fall prevention safety initiatives
- Created inter-disciplinary oversight committee
- Clarified role descriptions and policies
- Adopted use of Bedside Mobility Assessment Tool to identify appropriate equipment for each patient to meet care goals
- Updated equipment inventory with consideration for EM
- Enhanced website for committee updates and training materials
- Annual workshop and quarterly meetings

OUTCOMES
- Decreased total and injurious falls
- Decreased staff injuries related to patient handling
- Decreased pressure ulcers in ICU with ceiling lifts
- Improved time management by reducing 3 committees to 2
- Plans to combine other safety initiatives

References:
8. Johns Hopkins Critical Care Rehabilitation Conference
“Running a Marathon Without Training”...Hospital Course and Outcomes of 5 Patients Admitted With ARDS Requiring ECMO

Michael Pechulis PT, DPT; Kenneth Miller MEd, MSRT, FAARC; Rita Pechulis MD, FCCP
Lehigh Valley Health Network, Allentown, Pennsylvania

OBJECTIVES
This case examines 5 patients admitted to Lehigh Valley Hospital with ARDS requiring ECMO. The purpose of this case study is to describe the functional milestones, the outcomes and the adaptations required to rehabilitate these patients.

METHODS
This retrospective case study describes 5 patients (all female, average age 44 +/- 13 years old) admitted with ARDS (2 Influenza A, 2 Influenza A/H1N1, 1 pneumonia). All patients required ECMO support (average 28 +/- 25 days), experienced prolonged mechanical ventilation (average 51 +/- 46 days) and ICU stay (average stay 62 +/- 52 days). Post ECMO, patients demonstrated severely impaired lung function with compliance 16 +/- 5 cm and Pa/FiO2 ratio of 139 +/- 28. Rehabilitation included average of 27 +/- 17 physical therapy (PT) visits.

RESULTS
Patients recovering from ARDS have difficulty achieving textbook weaning values due to the stiffness of the lung and respiratory muscle weakness. In this report, patients had lung compliance about 5% of normal. Delirium/impaired arousal, vital signs outside of traditional accepted ranges and increased work of breathing make initiation of weaning and/or mobility difficult. Interdisciplinary communication set clinical endpoints that allowed progression in weaning as well as initiation of reconditioning through progressive mobility. Individual prolonged weaning plans (see Table 3) were created for each patient and the ICU team agreed that heart rates of up to 150 bpm, oxygen saturation of 85% and respiratory rates of 45 would be acceptable during strenuous activity (see Table 4). In conclusion, knowledge of underlying lung pathology, interdisciplinary communication and early initiation of mobility was crucial to enabling these critically ill patients to progress through their hospital stay and return home.

CONCLUSIONS

OBJECTIVES

See Table 1

<table>
<thead>
<tr>
<th>Pt #</th>
<th>Age</th>
<th>Gender</th>
<th>Admit Dx</th>
<th>ECMO Days</th>
<th>Compliance Post ECMO</th>
<th>P/F Post ECMO</th>
<th>Vent Days</th>
<th>ICU Days</th>
<th>Hospital Days</th>
<th>Trach?</th>
<th>Rt Visits</th>
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<th>1st OOB Hospital Day</th>
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<td>147</td>
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<td>F</td>
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<td>107</td>
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See Table 2

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<th>Post ECMO</th>
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<th>Last ICU</th>
<th>Hospital Day</th>
<th>Discharge Destination</th>
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See Table 3

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<td>2 hrs AM</td>
<td>1 hr AM</td>
</tr>
<tr>
<td>2</td>
<td>4 hrs AM &amp; 2 hrs PM</td>
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<td>1.5 hr AM &amp; 1 hr PM</td>
</tr>
<tr>
<td>3</td>
<td>6 hrs AM &amp; 6 hrs PM</td>
<td>4 hrs AM &amp; 2 hrs PM</td>
<td>1.5 hr AM &amp; 1.5 hr PM</td>
</tr>
<tr>
<td>4</td>
<td>8 hrs AM &amp; 6 hrs PM</td>
<td>4 hrs AM &amp; 4 hrs PM</td>
<td>Over tolerating continue weaning following Option B</td>
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Table 2. Outcomes

<table>
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<tr>
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<th>FSS-ICU Post ECMO</th>
<th>Hospital Day</th>
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<th>Hospital Day</th>
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Table 4. Acceptable Vital Signs During Strenuous Activity

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<tr>
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<th>HR less than 150</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>S2O, greater than 85</td>
</tr>
<tr>
<td></td>
<td>Respiratory Rate less than 45</td>
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A Multi-Professional Approach to Optimize Outcomes in Patients Weaning from Mechanical Ventilation: Quality Improvement Project

Michael Davis BSc., Michelle Anderson DPT, Colleen Karvetski PhD, and Justin Swartz MD

Purpose
In 2010, review of administrative data suggested excessive hospital length of stay (LOS) for patients who required placement of a tracheostomy to help facilitate weaning from mechanical ventilation. As a quality improvement project, we set out to build a multi-professional team to focus on mobility efforts and ventilator weaning. A literature review revealed early mobility in the critically ill patient population is feasible, safe, cost-effective, and improves patient outcomes. (1-3) This was utilized as the foundation for this project. With high level administrative support, in October 2011 the Respiratory Specialized Care Unit (RESCU) team was created to assist clinical case management by focusing on this patient group that generally had limited community resources.

Methods
• The Plan-Do-Study-Act Model was utilized as part of continuous quality improvement methodology to facilitate process improvement.

• We utilized Premier’s Quality Advisor database to build baseline data on patients who had been transferred to our Progressive Care Unit (PCU) where the excessive LOS was thought to reside. All patients had undergone tracheostomy during the ICU stay but still required mechanical ventilation.

• Afterwards, the database was utilized to guide quality improvement.

• The Team that focused on mobility and ventilator weaning included:
  • Respiratory Therapy
  • Physical Therapy
  • Occupational Therapy
  • Speech Therapy
  • Nutrition
  • Pulmonologist
  • Nurse Manager
  • Clinical Supervisors
  • Staff Nurses
  • Clinical Case Management

• Each discipline reported on rounds facilitating daily discussion of barriers.

• Monthly team meetings were established to review the process and discuss outcomes gleaned from the Redcap database.

• Processes were created or modified to optimize patient care and team workflow.

Results
• Average hospital LOS was reduced (5.9 days)
• Average ICU LOS was reduced (2.1 days)
• Average PCU LOS was reduced (17.1 to 11.3 days)
• 30-day readmission rate was reduced (14.6% to 9.3%)
• Hospital mortality rate was reduced (10.3% to 4.2%)
• In the years 2014-2015, more than 75% of patients left PCU completely weaned from mechanical ventilation.
• Disease severity was similar between the 2 groups.

• Cost avoidance was estimated to be $1.73 million dollars.

• Disease severity: The notable decrease in RT costs while PT/OT/SLP therapy costs increased (felt to be due to increased demand for therapy presence in the ICU) is attributed to synergy produced between therapies and the improvement in respiratory status as patients mobilize.

• The care coordination through a multi-professional rounding approach has been sustained since inception in October 2011 due to our ongoing hospital administration’s support and the perception by clinical staff that coordinated care is more efficient and improves teamwork satisfaction.

• Foremost in our lessons learned is that coordinated workflow, perpetual communication, and unrelenting commitment to removing the barriers that prevent a patient from walking out the front door of the hospital are paramount.

Discussion
• The success of the project shows that providing a focused, multi-professional team approach in coordinating therapeutic interventions for mechanically ventilated patients reduces hospital length of stay and contributes to improved patient outcomes.

• This is highlighted by the reduction in length of stay while also decreasing readmission rate and mortality.

• We feel the reduction in ICU LOS, PCU LOS and variable cost per encounter is evidence that the multi-professional approach decreases burden on the limited ICU and hospital resources despite being a labor intensive process.

• The unexpected finding of a reduction in hospital mortality warrants further investigation.

• The notable decrease in RT costs while PT/OT/SLP therapy costs increased (felt to be due to increased demand for therapy presence in the ICU) is attributed to synergy produced between therapies and the improvement in respiratory status as patients mobilize.

Conclusion
In creating a sustainable, multi-professional team to coordinate rehabilitation and mobilization efforts with ventilator weaning, we successfully reduced the hospital length of stay for patients who required tracheostomy during their ICU stay. Most of the patients had limited community resources, and, thus, their recovery and ventilator liberation was to happen because of the teams efforts. Without administrative support, this project would not have been possible.

We feel confident there are other patient groups who can also benefit from this care delivery model.

References

A special thank you to Dr. Colleen Karvetski for her expertise, work, and diligence in the data processing and graphic displays included within this project.*
Rehabilitation in the Intensive Care Units at Mount Sinai: A Quality Improvement Project

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INTRODUCTION

Immobilization may lead to long lasting impairments in physical, cognitive, and psychological functioning. It has been shown that early mobilization within 48 hours of admission to a medical ICU decreases length of stay and mortality while improving outcomes, functionality, and self care at discharge. Benefits of early mobilization for mechanically ventilated patients also include decreased readmissions, increased strength, increased independence in activities of daily living, and significant cost savings.

Previous early mobilization programs in the ICU have been successfully instilled in the MICU and Cardiovascular ICU. There are exceedingly few projects and studies on early mobilization outside of a MICU population. Our project shows that early mobilization is feasible and safe across all types of intensive care units.

MOBILITY PROTOCOLS

Mobilization Protocol (Respiratory Recovery Pathway) Cross-Functional diagram based on patient progression

OUTCOMES

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Billed Tx</th>
<th>Dangle</th>
<th>Stand</th>
<th>Transfer to Chair</th>
<th>Ambulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>266</td>
<td>176</td>
<td>88</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>2014</td>
<td>309</td>
<td>198</td>
<td>92</td>
<td>37</td>
<td>37</td>
</tr>
</tbody>
</table>

Comparison of functional milestones of DRG 3 and 4 patients at MSH and those functional milestones of recent, landmark projects on early mobilization in the ICUs.

FUNCTIONAL MILESTONES

- Comparison of functional milestones of DRG 3 and 4 patients at MSH and those functional milestones of recent, landmark projects on early mobilization in the ICUs.
- MSH Total Rx refers to all mobility levels of DRG 3 and 4 treatments and MSH Medium and High Level ICU patients refers to those DRG 3 and 4 patients at mobility levels 3 and 4.
- Fall of 2014, there was a hospital-wide initiative created to focus on improved care for critically ill and mechanically ventilated patients.
- Outcomes, quality of care, and early mobilization initiated
- Multidisciplinary committee formed
- Patients targeted: Diagnostic related group (DRG) code levels 3 and 4: tracheostomy due to prolonged mechanical ventilation
- 5 ICUs targeted, 63% of those patients in DRG codes 3 and 4 had excess length of stay totaling 5,995 days in 2014

CONSCLUSION

- Our project shows that early mobilization is feasible and safe across all types of intensive care units.
- Nursing buy-in is important to success of the unit
- Decreased LOS for DRG 3 & 4 diagnoses significantly reduced hospital costs
- Functional outcomes data is similar to other previous studies
- By delivering a higher quality of care, reducing overall average length of stay, and cutting excess days in half, we were able to deliver higher quality of care to a larger number of patients in need.

REFERENCES

Background and Purpose:

- Early upper extremity (UE) rehabilitation after stroke is often overlooked in critical care settings.
- UE cycle ergometry is inexpensive, simple and is proven to improve force production and function of the shoulder, elbow and hand in patients with chronic stroke.
- Purpose of this case report is to determine the feasibility and safety of the use of UE cycle ergometry in a critically ill patient with stroke.

Methods:

- Case report of an 82 year old male admitted to the Neuro Critical Care Unit (NCCU) with right cerebellar hemorrhage with difficulty weaning off the ventilator.
- Bedside UE Cycle Ergometer (MOTOMed Letto 2, RECK-Technik GmbH & Co) was performed.
- Passive and active motor settings was used for bilateral UE cycling.
- Pre- and post-intervention, the following parameters were measured:
  - Hemodynamic monitoring
  - Ability to follow verbal/visual commands
  - Arousal (JFK-CRS Subtest)

Results:

- Patient underwent four trials of UE cycling during the NCCU stay.
- UE cycle ergometry was initiated on Day 28 of NCCU stay.
- No change observed in the hemodynamic status pre- and post-intervention.
- Arousal level and command following pre and post intervention remained unchanged during all trials.

Discussion and Conclusion:

- Initial findings suggest UE cycle ergometry is a feasible intervention for early UE rehabilitation in a critically ill patient with stroke.
- This technology may serve as a viable treatment modality as we attempt to initiate restorative therapies earlier in the stroke recovery period.
- Future studies should collect a larger sample size with randomization to study the efficacy of this intervention using sensitive outcome measures that are relevant to OT practice.

Table 1: Hemodynamic and cycling parameters

<table>
<thead>
<tr>
<th>Trial</th>
<th>Active Cycling (minutes)</th>
<th>Passive Cycling (minutes)</th>
<th>Pre-Intervention Vitals</th>
<th>Post-Intervention Vitals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>BP (mmHg)</td>
<td>HR (beats/min)</td>
</tr>
<tr>
<td>1</td>
<td>0:00</td>
<td>9:04</td>
<td>105/51</td>
<td>65</td>
</tr>
<tr>
<td>2</td>
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<td>0:18</td>
<td>135/72</td>
<td>66</td>
</tr>
<tr>
<td>3</td>
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<td>0:11</td>
<td>127/56</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>4:53</td>
<td>7:33</td>
<td>109/64</td>
<td>60</td>
</tr>
</tbody>
</table>

BP = Blood Pressure; HR = Heart Rate, Ventilator settings: Trial 1, 3, & 4- Mode: Pressure Support (PS), PEEP: 5, PS: 10, Fraction of Inspired Oxygen Concentration (FiO2): 40%; Trial 2- Mode: Assist Control, Respiratory Rate: 12, PEEP: 5, FiO2: 40%.

References:


Acknowledgement:

The authors would like to acknowledge the enthusiastic Johns Hopkins Hospital NCCU staff for their participation in the early mobility project.
VITALS: A Toolkit for Developing an Occupational Therapy Program in the ICU
Megan Evangelist, MS, OTR/L & Alyssa Gartenberg, MS, OTR/L

Objectives
1. Increase awareness of the evolving occupational therapy role in the ICU setting through current research and clinical practice.
2. Facilitate staff orientation and education through the use of a mentoring process.
3. Illustrate the feasibility of implementing traditional occupation-based interventions in the ICU setting.

Occupational-based Interventions
- Seated self-care for patient with femoral arterial line.
- Out of bed → chair transfer for patient with swan-ganz catheter.
- Occupational profile assessment for patient while receiving CRRT.
- Standing grooming at sink-side for patient with multiple chest tubes and pacing wires.
- Pre-LVAD assessment (near visual acuity, grip/pinch strength, cognitive assessment, hands-on practice) for patient with IABP.
- Cognitive screening for ICU-acquired delirium using the CAM/CAM-ICU.
- Early mobility for patients on mechanical ventilation (including collaboration with Respiratory Therapy).

Method: Multi-Phase Mentorship
- The competency process begins with a two-part lecture reviewing current literature, lab values and implications, medication, oxygen delivery, lines/tubes/drains, precautions, delirium, and ICU-specific equipment.
- The trainee completes a pre-competency ICU survey to assess comfort level with various ICU-required skills.
- There are three different phases to the clinical mentoring aspect of the competency. In Phase 1, the trainee observes patient sessions with a mentor. In Phase 2, the trainee co-treats with the mentor. In Phase 3, the trainee evaluates patients with the mentor in close proximity for safety considerations. The mentor is responsible for providing the trainee with direct and timely feedback after each training session.
- Concluding the competency, the trainee takes an interactive oral examination and completes the post-competency ICU survey to assess for changes in comfort level and knowledge.

Results
- We have found it feasible to train 7 of 11 therapists in a one-year time frame.
- With familiarity in specialized medical equipment, medication, and the ability to recognize changes in medical status, occupational therapists can implement their skill set to the critical care setting.

Conclusions
- Using an organized, systematic approach, occupational therapists can become competent to treat in the ICU.
- With the appropriate education and training, occupational therapists can continue to overcome perceived barriers (e.g. mechanical ventilation) to early occupational therapy intervention.
- Occupational therapist competency can lead to increased referrals, reduction of hospital costs, increased interdisciplinary involvement (e.g. rounds), and increased transdisciplinary research opportunities (e.g. delirium).

References

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