POSTER PRESENTATION SCHEDULE

10th Annual Johns Hopkins Critical Care Rehabilitation Conference

Time	Presenter(s)	Title	Institution
Thursday, November 4, 2021 - PM Session [Facilitator - Danny Young, PT, PhD]			
12:30 PM - 1:30 PM	Maggie Chiu, PT, DPT, GCS	Lung Transplant Workup of COVID-19 ARDS Patient on Life Support	New York-Presbyterian Hospital/Columbia University Irving Medical Center, New York, NY, USA
	Iskandar Mrad, MSc	Early Mobility Intervention for COVID-19 Patients in a Tertiary Care Medical City, KFMC, Saudi Arabia	King Fahed Medical City, Riyadh, Saudi Arabia
	Neha Gupta, MD	Quality Improvement Methodology to Optimize Safe Early Mobility in a Pediatric Intensive Care Unit	University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA
	Kathleen Jarvis, BSN, RN	Early Mobilization Nursing Protocols for Critically Ill Adults: An Integrative Review	Saint John Fisher College, Rochester, NY, USA
	Albahi Malik, M.B.B.S	Perceived Barrier to Early Goal-Directed Mobility in the Intensive Care Unit: Results of a Quality Improvement Evaluation	Johns Hopkins Hospital, Baltimore, MD, USA
	Susan Piras, PhD, RN, CNE	A Multisite Study of Multidisciplinary ICU Teammember Beliefs Toward Early Mobility	Tennessee Tech University, Cookeville, TN, USA
	Lauren Reightler, OTD, MS	Occupational Therapy for Individuals with COVID-19 Requiring Ventilator Support: A Case Study	Baylor University, Waco, TX, USA
	Shanelle Middleton, PT, DPT	A Proposed Upright Mobility Pathway for Patients With Femoral Venous ECMO Cannulation Access: A Quality Improvement Project	Stanford Healthcare, Palo Alto, CA, USA

Lung Transplant Workup of COVID-19 ARDS Patients on Life Support

Maggie M Chiu, PT, DPT, GCS†; Madeline Arena, PT, DPT†; Jinna Pang, PT, DPT†

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INTRODUCTION

Lung transplantation has become the standard of care for select patients with advanced lung diseases,[1] however patients with acute lung injury due to infectious causes are generally not considered for transplantation.[2] Physical therapists (PTs) serve an important role in the care of patients with end stage lung disease requiring transplantation, including airway clearance, postural re-education, strengthening and endurance training. This patient population can require ICU level of care as the disease progresses and may need circulatory and ventilatory life support. PTs provide safe mobilization of critically ill patients to maintain physical function and slow the rate of physical deterioration.[1] At our institution, PTs are responsible for administering the 6 Minute Walk Test (6MWT), the most common functional test of exercise capacity correlated with VO2 and incorporated into the Lung Allocation Score (LAS) to determine the urgency for lung transplantation.[1,3]

The 2019 Novel coronavirus affected a wide spectrum of patients with COVID-19 related acute respiratory distress syndrome (ARDS), with many requiring prolonged mechanical ventilation and extracorporeal life support (ECLS).[2,4] As of August 2021, there are over 37.5 million afflicted with COVID-19 in the United States alone.[5] End-stage lung disease from COVID-19 is a new and growing entity that may benefit from lung transplant.[6] Currently, there are no clinical practice guidelines for rehabilitation in the lung transplant population.[1] The medical complexity of this patient population poses new challenges for PTs who are involved in the lung transplant workup process.

METHODS

This poster aims to report on the role of PTs in the lung transplant workup process, management of lung transplant candidates on life support prior to COVID-19, and explore the challenges and adaptations made necessary due to the COVID-19 pandemic via:

- A systematic review of the current literature on lung transplantation and COVID-19.
- Retrospective chart review of patient cases undergoing lung transplantation workup during COVID-19 pandemic between 2020-2021
- Review clinical challenges and practice adaptations to lung transplant workup

RESULTS

Image 1-4 depicts equipment used to adapt to challenges in lung transplant work up during COVID; (from left to right): 1. AliMed Eva platform walker; 2. Laerdal portable suction unit; 3. Mini-Shuttle Leg press; 4. Litegait GaitKeeper portable treadmill

		Lines	PT Course	Limits/ Adaptations
1	45 yo M, COVID+, I, c/b RF, R Cereb H. CVA, L HTx, B PTXs, VAP, CMV viremia, RV thrombus, severe epistaxis.	• Trached to vent or HFNC • VV RIJ-RFV ECMO • LFV CRRT • Chest tubes x 2 PTX • NGT	PT consulted with goals to strengthen and work towards BTT (lung + kidney) • Marching (mod A x 2)	Limits: • Hemodynamic instability = high pressors • Repeat positive test, MOF, sepsis - Delisted Adaptations: • Portable treadmill attempt • Fluid prior/diurese post session • Pressors during session
2	48 yo F COVID+ prior meningioma resection c/b LLE weakness, PTXs. >3 months bedrest at OSH.	• HFNC 25/75 -> Max HFNC • CT - PTX → 3 CT-suction	Consulted for LTx workup 6MWT: • Transfers Mod A, LLE Buckling • Ambulation with platform walker	Limits: • Frailty from COVID and bedrest, LE weakness • Portable treadmill not safe Adaptations: • Shuttle press leg press LLE CC- extensions • Platform walker +portable suction
3	62 yo M, COVID+, ILD, HP, CMV+, PTX s/p pigtail, VV ECMO for BTT → VAV ECMO	• VAV ECMO • 60L/100% HFNC + 25L NRB +iNO • antihypertensives + pressors	Consulted for LTx workup 6MWT • Portable treadmill (6MWT), pricing seated breaks	Limits: • Frailty, significant desats (failed 1st attempt 6MWT), persistent tachycardia 160s • Hemodynamic instability with orthostasis Adaptations: • Portable treadmill • Antihypertensives + pressors
4	68 yo F COVID, HTN, HLD, PE, pHTN, fibrotic lung disease	• HFNC 60LPM/ 100% +NRB +iNO	Consulted for LTX workup • Portable treadmill (6MWT) with significant desat (50%) • Transfers and bed level	Limits: • Not EMCO candidate • Insurance lapsed due to prolonged hospitalization previous year → delayed listing • Poor health literacy Adaptations: • Portable Treadmill

Table 1. Review of lung transplant workup during COVID: limitations and adaptations

DISCUSSION

End-stage lung disease from COVID-19 is a new and growing entity that may benefit from lung transplantation; however, there is limited data on patient selection, perioperative management and expected outcomes.[6] Medical complexity in this population pose many challenges in the lung transplant workup process. Complications commonly seen in patients with COVID ARDS, such as pneumo- and hemothoraces, interstitial fibrosis, traction and cystic bronchiectasis severely limits their ability to tolerate strenuous endurance training.[2] Other concerns, including the severe deconditioning associated with prolonged mechanical ventilation, sedation and neuromuscular blockade, may limit the use of lung transplantation as a therapy for patients with COVID ARDS. These might complicate recovery after transplant and the potential for SARS-CoV-2 or super-infecting pathogens associated with viral pneumonias in the native lung to recur in the allograft.[2] Additionally, social distancing requirements, airborne isolation and scarcity of respiratory therapists required PTs to adapt to utilizing bedside portable treadmills and other creative interventions. Furthermore, the transplant process itself poses a significant risk of transmission from the procurement team.[7] The lack of resources-effective surveillance strategies for donor transmission, absence of proven treatments for COVID-19 and potential for turning the recipient into a vector for viral transmission remains concerning.[7]

CONCLUSIONS

As of August 2021, there have been greater than 212 million cases of COVID-19 globally.[5] There is potential that many people will require lung transplantation due to COVID-19 in the future. Findings from the current literature review and these case studies will improve the efficiency of the lung transplant workup process and begin to provide useful guidelines for rehabilitation professionals caring for this growing population.

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Early Mobility Intervention for COVID19 patients in a tertiary care Medical City, KFMC, Saudi Arabia

Iskandar C. Mrad PT MSc. & Ron R. Cutab PT DPT

مدينة الملك فهد الطبية
King Fahad Medical City

Introduction

As the COVID19 Pandemic hit the globe, with devastating acute and critical consequences in the ICU's, a quality improvement initiative by the Physical Therapy department and the ICU administration in KFMC was initiated.

Objectives

The implementation of an early mobility program improves functional outcome, reduces the hospital Length of Stay (LOS), and decreases the cost on the organization. This study aims to demonstrate the effectiveness of an early mobility program for COVID19 admitted patients

Methods

This is a hospital based cohort prospective study. Data were collected by the treating Physiotherapists and from the electronic medical record. Between June 2020 and June 2021, a number of COVID19 patients were screened and followed up with an intensive and structured Physiotherapy program during admission.

The Mobility Score and the 6-click tools were used to highlight the functional improvement between hospital admission and discharge. Moreover, the number of Physiotherapy sessions was calculated to measure the intensity of the service provided.

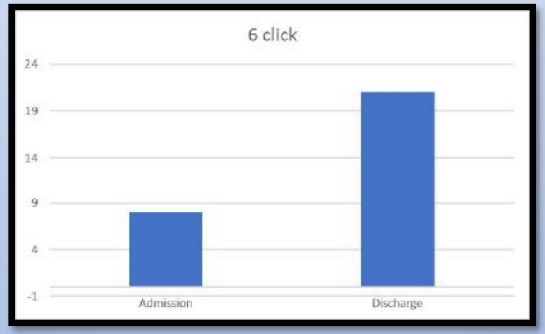




Results

376 patients screened, 115 patients passed away during their hospitalization, 54 patients were still admitted, 7 patients were transferred to other local hospitals and 2 patients were discharged before screening. A 198 patients were discharged home. 1688 Physiotherapy sessions were provided, and the sessions per patient Mean was 8.54 ± 9.76 sessions. Mean LOS of these patients was 22.35 ± 23.49 days, lower than the local average in the region.

For the discharged home patients, there is a significant improvement ($p < 0.001$) noted in the mobility score and 6-click tools between admission and discharge. There is a change by 8 points for mobility score (Median Q1-Q3 admission 1(0-3) and discharge 9(7-10)); and there is a change by 13 points for the 6-click tool (Median Q1-Q3 admission 8(6-10) and discharge 21(16-24)).



Conclusion

Implementing an intensive, structured and early mobility program for COVID19 admitted patients, will improve the functional level, decrease the hospital LOS and decrease the cost on the organization.

References

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Quality Improvement Methodology to Optimize Safe Early Mobility in PICU

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OBJECTIVE

- Utilization of robust QI methodology in conjunction with traditional interventions to enhance an Early Mobility program (EMP) in a tertiary pediatric intensive care unit (PICU).

METHODS

- EMP was implemented in our PICU in May 2017. (Table 1)
- Percentage of appropriate physical (PT) and occupational therapy (OT) consults were determined. We also evaluated the activity levels received by the patient and the levels for which they qualified based on their medical condition.
- Failure Modes and Effects Analysis (FMEA) was performed to identify potential complications related to the mobilization of critically ill children.
- We created 4 simulation scenarios based on FMEA prioritized results to improve staff comfort with EM.

Table 1. EM Guidelines- Patient Activity Levels based on Severity of Illness[1]

Levels	Level 0	Level 1	Level 2	Level 3
Criteria for levels	-Not stable for range of motion (ROM) or stimulation (hemodynamically unstable patients requiring active resuscitation) *PT/OT consulted in anticipation of future therapy needs	-Intubated, FiO_2≥60% -Intubated PEEP≥8 -Oscillator -Extracorporeal Membrane Oxygenator -Critical airway -Vasoactive medications other than milrinone -Femoral access -Acute spinal cord injury or severe traumatic brain injury (<7 days) -Sedated and SBS -3 to -2	-Intubated, FiO_2<60% -Intubated, PEEP <8 -Renal replacement therapy if not femoral access -Arterial line (any location) -Chest tube -New tracheostomy after ties changed if not critical airway -O_2 saturation>92% -SBS -1 to +3	-External ventricular drain cleared by neurosurgery -Baseline pulmonary support -Non-invasive respiratory support with FiO_2<60% -SBS -1 to +3
Therapeutic interventions	PT/OT -Issue appropriate splints PRN -Daily check-ins with team	PT/OT -ROM, splinting -In-bed strengthening -Recommendations for positioning -Positive touch for infants, toddlers Nurses -Skin risk assessment SLP -Assess for communication difficulties	PT/OT -Level 1 activities plus -Bed in chair position -Consider edge of bed sitting -Consider out- of-bed transfer -Consider ambulation unless arterial line in place Nurses -Skin risk assessment SLP -Assess for communication difficulties	PT/OT -Level 1 and 2 activities plus -Out-of-bed to chair -Out-of-bed strengthening -Ambulation Nurses -Activities of daily living -Bedside commode SLP -Assess swallowing

RESULTS

- After the implementation of EMP, appropriate PT and OT consults significantly increased (p <0.0001). (Figure 1)
- However, most patients still failed to receive the optimal level of activity recommended by protocol. (Figure 2) This failure was partly due to concern for safety events during mobilization.
- FMEA identified vital sign changes (RPN 97.8), staff injury (RPN 64), and pain/anxiety (RPN 60.5) as potential safety events. (Table 2)

Figure 1. Control Chart with percent of PICU patients receiving appropriate PT and OT consults before and after implementation of EM Guidelines

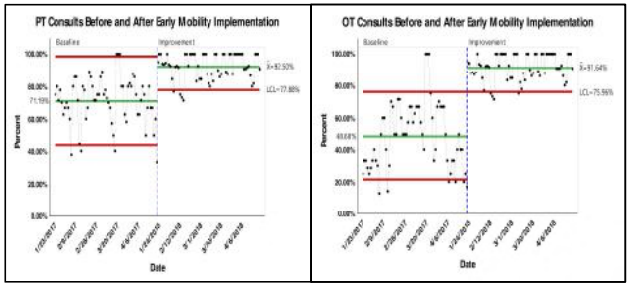

Figure 2. Pareto Charts demonstrating A) frequency of activity levels PICU patients could have received based on our criteria, B) activity levels PICU patients received

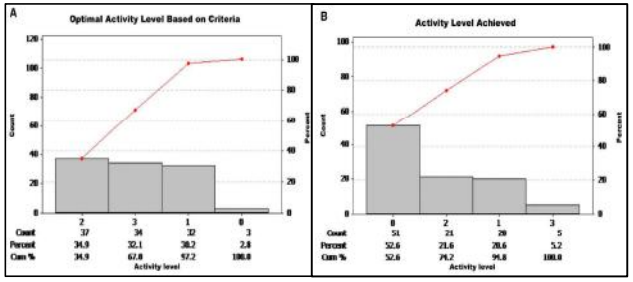

Table 2. Summary of FMEA for Potential Adverse Events During Early Mobility

Failure Modes	Severity (S)	Occurrence (O)	Detectability (D)	Risk Priority Number (RPN)
Vital sign changes (Hypotension/ desaturation)	3.8	6.6	3.9	97.8
Staff injury	8	1	8	64
Pain/fatigue/anxiety/distress	5.6	4.7	2.3	60.5
Fall	7.8	3	1.5	35.1
Equipment failure	8	3	1.3	31.2
Dislodged endotracheal/ tracheostomy tube	8.7	2.1	1.3	23.8
Dislodged devices/lines	5	2.7	1.6	21.6
Staff unavailability	4.8	2.5	1.3	15.6
Pressure injury if left in chair for long time	5	3	1	15
Cardiorespiratory arrest	9.9	1.2	1	11.9

- We performed various in-situ simulation sessions based on these potential events.
- In post-simulation evaluations, 100% of participants agreed that the simulation experience would improve their performance in actual clinical setting.
- Common themes that emerged from participant evaluations included: 1. Preparation, 2. Teamwork, 3. Role clarity and 4. Standardization of the process.
- Feedback from simulations led to the development of an EM patient safety checklist and clinical pathway.

CONCLUSION

- We describe a novel technique of using FMEA to develop scenarios that simulate potential adverse events to optimize safe EM in PICU. An EM checklist and pathway can guide in the implementation of safe EMP.

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Early Mobilization Nursing Protocols for Critically Ill Adults: An Integrative Review

Kathleen Jarvis, BSN, RN
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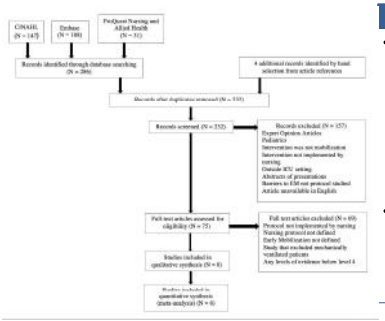
Objectives

- Despite emerging evidence on the health benefits of early mobilization (EM) among critically ill patients, perceived barriers to EM and immobility in the ICU persists.
- This integrative review aimed to summarize existing data on nurse-led EM, including how EM is defined, how EM protocols were developed, and key components of their protocol.



Methods

- The protocol for this integrative review was develop[ed in consultation with a trained librarian. A comprehensive search was conducted using the databases CINAHL, Embase, and ProQuest Nursing and Allied Health in April 2020. Six percent of results were independently screened by 2 reviewers and the remaining were screened by a single reviewer.
- Studies were excluded if they included patients <18 years old, were not in English, did not include original data, if the intervention took place outside of the ICU, and if their study protocol excluded mechanically ventilated patients.

Statistically Significant Findings with EM Nursing Protocols	
Fewer Days Using Vasoactive Drugs **Decreased ICU Mortality**	Negro et al., 2018
Decreased ICU Length of Stay	Winkelman et al., 2018; Klein et al., 2015; Hester et al., 2017
Decreased Overall Hospital Length of Stay	Klein et al., 2015; Hester et al., 2017
Decreased Sedation Days **Decreased Cost per Case** **Decreased Falls**	Hester et al., 2017
Decreased Delirium	Winkelman et al., 2018
Decreased Blood Stream Infections **Decreased Hospital Acquired Pressure Ulcers** **Decreased Anxiety** **Increased Discharges to Home**	Klein et al., 2015
Elimination of Ventilator Associated Pneumonia	Titsworth et al., 2012
Increased Number of Patients Mobilized	Nydahl et al., 2019; Klein et al., 2015; Negro et al., 2018; Titsworth et al., 2012; Winkelman et al., 2018

Results

- Six studies met the search criteria and were included. EM definitions commonly included implementing within a specified time frame. Protocols were developed by adapting protocols that were not initially nurse led, by an expert panel at the institution, or unspecified.
- Positive patient outcomes were associated with nurse-led EM including, but not limited to, reduction or eliminations of hospital acquired infections, reduction of vasoactive agents and sedation, and decreased length of stay with significant hospital cost savings.

Conclusions

- Results highlight the need for consensus on nurse-led EM approaches to facilitate clinical translation and improve patient outcomes.
- Future research is needed to develop an evidence-based protocol for nurse-led EM among critically ill adults.

Contact

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Title: Perceived barriers to early goal-directed mobility in the intensive care unit: Results from a quality improvement evaluation

PRESENTER:
Albahi Malik

BACKGROUND

Early, goal directed mobility implemented by nurses have shown to improve intensive care unit (ICU) outcomes. Implementation, as part of clinical practice, is generally low. The aim of this study was to evaluate barriers to nursing mobility, using a validated survey, during an ongoing quality improvement (QI) project (2019) in the medical ICU and determine changes from pre-QI (2017) baseline.

METHODS

Nurses, nurse practitioners, physician assistants, and clinical technicians completed the 26-item Patient Mobilization Attitudes and Beliefs Survey for the ICU (PMBAS-ICU). An overall score and 3 subscale scores (knowledge, attitudes, behavior), each ranging 0-100, were calculated; higher scores indicated greater barriers.

RESULTS

Number (%) of survey respondents, by clinical role and year of completion

	2017	2019	Both 2017 & 2019	Only 2017	Only 2019
RN	85 (86%)	75 (80%)	37 (81%)	48 (91%)	38 (79%)
Clinical technician	7 (7%)	11 (12%)	2 (4%)	5 (9%)	9 (19%)
NP/PA	7 (7%)	8 (8%)	7 (15%)	0 (0%)	1 (2%)
Total	99	94	46	53	48

Abbreviations: RN, registered nurse. NP, nurse practitioner. PA, physician assistant.

Conclusion

There was a decrease in perceived barriers to mobility. Compared to the pre-QI, there are reduced barriers to early, goal-directed mobility implemented by nurses, suggesting a positive cultural change.

Reduced barriers suggest a positive cultural change to early, goal-directed mobility implemented by nurses.

Comparison of scores for those completing survey in both 2017 and 2019.

	All respondents (N=46)				Nurses only (N=37)			
	Mean (SD)		Mean difference		Mean (SD)		Mean difference	
Survey component	2017	2019	(95% CI)*	P value†	2017	2019	(95% CI)*	P value†
Overall score	35 (8)	32 (8)	-3.1 (-5.8, -0.5)	0.022	36 (9)	33 (8)	-2.4 (-5.3, 0.4)	0.093
Knowledge subscale	29 (13)	24 (10)	-5.1 (-8.9, -1.3)	0.010	29 (12)	24 (10)	-5.3 (-9.2, -1.3)	0.010
Attitudes subscale	37 (11)	33 (11)	-3.9 (-7.3, -0.6)	0.023	38 (11)	34 (11)	-3.5 (-6.8, -0.2)	0.041
Behaviors subscale	36 (9)	34 (9)	-2.0 (-5.1, 1.1)	0.199	36 (10)	36 (8)	-0.8 (-4.3, 2.7)	0.632

Comparison of scores for those completing survey only in 2019 vs in 2017.

	All respondents				Nurses only			
	Mean (SD)				Mean (SD)			
	2017 (N=99)	2019 (N=48)	Difference in Means* (95% CI)	P value†	2017 (N=85)	2019 (N=38)	Difference in Means* (95% CI)	P value†
Overall	36 (8)	32 (7)	-3.8 (-6.5, -1.1)	0.007	36 (8)	31 (7)	-4.3 (-7.4, -1.2)	0.007
Knowledge subscale	27 (12)	20 (12)	-6.9 (-11.0, -2.7)	0.001	27 (11)	19 (11)	-7.2 (-11.6, -2.9)	0.001
Attitudes subscale	37 (11)	33 (11)	-4.3 (-8.1, -0.5)	0.027	37 (11)	33 (11)	-4.0 (-8.2, 0.3)	0.070
Behaviors subscale	37 (9)	35 (8)	-2.5 (-5.5, 0.4)	0.089	38 (9)	34 (8)	-3.7 (-7.0, -0.3)	0.031

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Knowledge subscale barriers

Time period	Barrier
2017	Inadequate education regarding logistics of mobilization
2017& 2019	Inadequate knowledge/ understanding of JH-HLM

Attitude subscale barriers

Time Period	Barrier
2017	Patients too sick
2017	Mobility not a part of nursing routine
2017&2019	Mobility not a nursing task
2019	Adds to documentation burden

Behavior subscale barriers

Time period	Barrier
2017	Patient contraindications to mobility: sedation, restraints, pain, delirium
2017&2019	Inadequate support from providers (e.g. not discussing mobility on rounds)
2017&2019	Inadequate staffing/Lack of time
2017&2019	Safety concerns
2019	Inadequate communication between rehabilitation staff and nurses
2019	Patients refuse

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JOHNS HOPKINS MEDICINE

Multidisciplinary ICU Team Beliefs About Early Mobility

Susan E. Piras, PhD, RN, CNE & Amy Garrett, RN, BSN, CCRN

Tennessee Tech University and Cookeville Regional Medical Center

Background

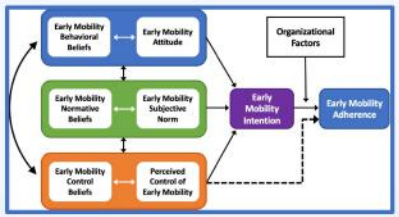
A cycle of oversedation and immobility in the Intensive Care Unit (ICU) leads to acute physical impairment: **ICU-acquired weakness (ICU-AW)**.[1]

- ICU-AW predicts prolonged physical impairment, increased length of stay, and decreased quality of life in the survivor.[2]
- Early mobility (EM), as part of evidence-based bundle, improves patient outcomes.[3]
- In the ICU, EM is the most difficult component of the bundle to implement.[4]

Research describing discipline-specific barriers to the intention and performance of EM is limited.

Objectives

Guided by the Theory of Planned Behavior, the purpose of this study is to describe multidisciplinary ICU providers' beliefs about EM.[5]



Methods

In this qualitative descriptive study, data were collected November 2018 to February 2019 in two acute care hospitals from 95 ICU team members using the Early Mobility Salient Belief tool consisting of 7 open-ended questions eliciting EM:

- Behavioral attitudes: benefits, disadvantages, and overall beliefs about EM
- Subjective norms: positive and negative social influence on EM performance
- Perceived control: barriers and facilitators[5]

Results

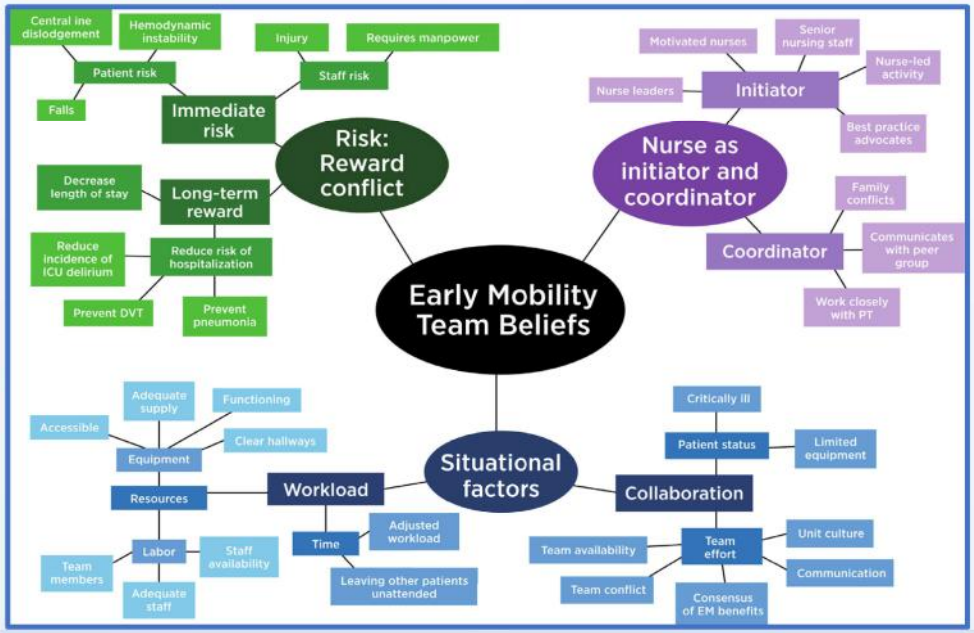
Study Participation (n) by Site, Unit, and Discipline.

Discipline	Site 1 CVICU	MICU	SICU	Site 2 CVICU	ICU	Total
Registered Nurse	21	17	8	10	7	**63**
Patient Care Assistant	0	1	1	3	4	**9**
Physical/Occupational Therapist	2	2	0	1	1	**6**
Respiratory Therapist	5	5	1	3	3	**17**
Total	**28**	**25**	**10**	**17**	**15**	**95**

A stepwise theory-driven thematic analysis using a cross case approach and a constant comparison method resulted in three major themes:

- **Immediate risk vs. long-term reward conflict**
- **Nurse is the EM initiator and coordinator**
- **Situational factors**
  - **Workload**
  - **Collaboration**

Multidisciplinary ICU Team Belief Themes



Conclusions

Nurses weigh the risk versus reward of EM

- Fear of falls, line dislodgement, and hemodynamic instability
- Research reports adverse events during EM are rare.

Nurses major influencers of EM performance

- Nurses are the main coordinators of EM team task.
- EM is unlikely if the nurse is unsupportive

Limited time, staffing, and equipment are major barriers to EM

EM is more likely if:

- EM is an expectation within the unit
- Adequate staff and equipment available.[5]

Implications for Practice

- EM protocols and education can help influence EM behaviors in ICU team members.
- EM requirements include available team members, accessible and functional equipment, coordinated timing, and stable patient hemodynamic status.
- Nurses are the major initiators and coordinators of EM performance and set positive and/or negative examples on their unit.[5]

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Occupational Therapy for Individuals with COVID-19 Requiring Ventilator Support: A Case Study

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SETTINGS AND BACKGROUND

In hospitals across the country, there are individuals in the intensive care unit (ICU) who are diagnosed with the novel coronavirus (COVID-19) and require ventilator support. This population may experience deficits secondary to their hospitalization and the prolonged use of the ventilator. One of the deficits that individuals are at risk for is ICU acquired delirium (Tobar et al., 2017). Occupational therapists are a member of the rehabilitation team who are trained to manage the deficits associated with the ICU, such as delirium; however, there are ICUs that do not utilize occupational therapists for this population (Schweickert et al., 2009). The objective of this case study is to report on the effect that occupational therapy sessions focused on early engagement in activities of daily living (ADLs) have on individuals diagnosed with COVID-19 requiring ventilator support.

PICO QUESTION

Is the early engagement in activities of daily living an effective intervention to improve delirium for individuals in the intensive care unit who are diagnosed with COVID-19 requiring ventilator support?

SIGNIFICANCE

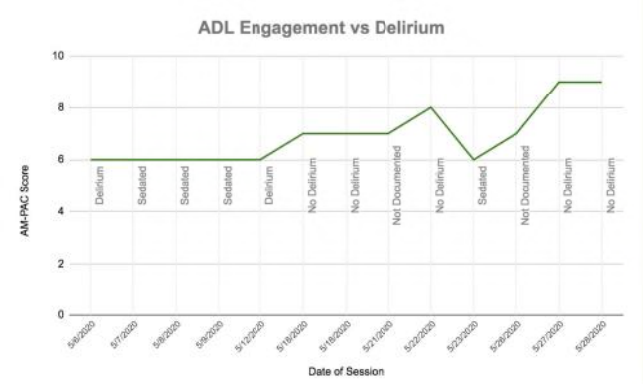
Occupational therapists are a member of the rehabilitation team who are trained to work with individuals, such as those diagnosed with COVID-19, who require ventilator support in order to manage and prevent deficits, such as delirium; however, it is not clear how the effects of occupational therapy may affect this relatively new population in the ICU (Schweickert et al., 2009; Tobar et al., 2017). By better understanding the effects of occupational therapy interventions on this population, hospitals will be able to better allocate rehabilitation resources and occupational therapists will be able to better prioritize their patients.

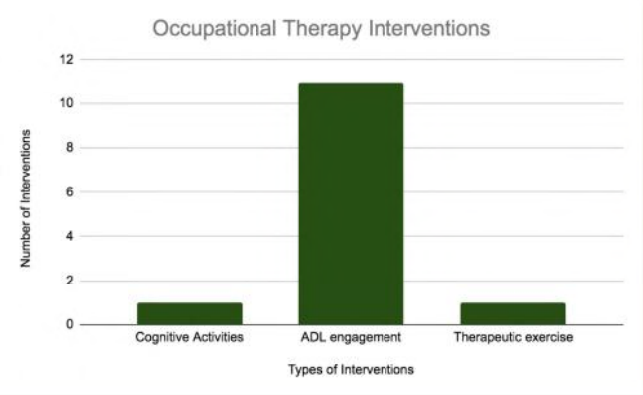
LITERATURE REVIEW

It has been established that it is feasible to initiate occupational therapy services for intubated patients as soon as mechanical ventilation is initiated without high risk of adverse events (Pholman et al., 2010). Individuals who are critically-ill and intubated who receive early initiation of occupational therapy services may have shorter durations of delirium (Schweickert et al., 2009). By decreasing time on the ventilator and decreasing the duration of delirium, occupational therapy services may increase functional independence at baseline, promote shorter hospital stays, and decrease the risk of post-intensive care syndrome (Schweickert et al., 2009).

METHODS

The participant of the study is a 21-year-old individual diagnosed with COVID-19 admitted to the Medical-Surgical Intensive Care Unit at a level I trauma hospital in Northeastern Pennsylvania. He required ventilator support, prone therapy, and was on a paralytic for approximately 48 hours. He demonstrated hyperactive delirium throughout his hospitalization. The individual received occupational therapy throughout his ICU stay. Examination of occupational therapy services will be measured using the Confusion Assessment Method for the ICU (CAM-ICU) to assess delirium and the Activity Measure of Post-Acute Care (AM-PAC) to assess independence in ADL engagement.





RESULTS

- The patient engaged in 10 occupational therapy sessions while in the MSICU. One follow-up visit was completed on the floor.
- Activities of daily living (ADL) self-care interventions were the primary focus of services (>90% of sessions) while this patient was receiving occupational therapy in the MSICU.
- The patient demonstrated 5 consistent delirium-free days as occupational therapy services increased.
- As the patient received occupational therapy services, he demonstrated improved independence during occupational performance.
  - AMPAC on initial evaluation: 6/24
  - AMPAC on final session: 9/24

SUMMARY

In conclusion, initiating occupational therapy services with a focus on self-care interventions demonstrated to be an effective intervention in managing delirium and increasing independence during occupational performance for an individual diagnosed with COVID-19 requiring ventilator support. Future research is needed in order to better understand occupational therapy services for this population.

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A Progressive Mobility Pathway for Patients on Veno-venous ECMO with Femoral Cannulation - A Quality Improvement Project

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INTRODUCTION

Patients are placed on extracorporeal membrane oxygenation (ECMO) as a life saving measure or bridge to transplantation. The literature supports physical therapy (PT) intervention while on ECMO (1,2).

There is currently limited research on the safety and feasibility of performing out-of-bed (OOB) mobility for patients that require femoral cannulation.

OBJECTIVE

The purpose of this quality improvement project was to determine the safety and feasibility of progressive OOB mobility in patients with a femoral venous ECMO cannula.

An assessment tool (hip flexion screen) was developed by our team to ensure safe mobilization with a femoral cannulation.

BACKGROUND

At our institution, femorally-cannulated ECMO patients were typically kept on bedrest. In 2017, we developed a protocol to mobilize patients on a specialized tilt bed (VitalGo Systems, Fort Lauderdale, FL, USA) to optimize upright positioning/lower body weight bearing, while avoiding hip flexion (3). Upon further assessment of cannulae flexibility, review of literature, and consulting with other academic medical centers, a trial of OOB mobility was established with approval from our CT surgery team.

The femoral cannula has a metal inner lining and is sutured to the patient for added stability. Cannulae vary between 19 and 27 Fr, depending on patient size.

METHODS

A cohort of 10 patients participated in a progressive OOB mobility trial while receiving veno-venous ECMO.

- Inclusion Criteria
  - Richmond Agitation Sedation Scale (RASS) of -1 to 1
  - Femoral vein to internal jugular vein ECMO cannulation
  - Hip Flexion Screen passed
- Mobility progression: bed-in-chair mode, sitting edge of bed, standing transfers, sitting in chair, and gait training
- Outcome measure: Functional Status Score for the Intensive Care Unit (FSS-ICU)
- Documentation: hemodynamics, cannulation integrity (pre,during and post session)
- Frequency: 3-4 days per week
- Duration: 30 - 55 minutes per session
- Multidisciplinary team: physical therapist or occupational therapist, perfusionist, and nurse (each session)

Steps to Progressive Mobility

Hip Flexion Screen

The "Hip Flexion Screen" is a short screening tool that was developed with the assistance of the perfusion department. The screen consists of 3 parts.

- Supine passive hip flexion
- Active hip flexion, and
- Transition to chair mode in bed.

The test is considered "passed" if patient is able to complete all 3 steps to at least 90 degrees.

RESULTS

A total of 38 treatment sessions were completed in the 10 patients.

The average increase in the FSS-ICU score was 5.6 (Range: 0 - 14). Femoral cannula integrity was preserved throughout all sessions, and hip flexion did not impede ECMO flow.

DISCUSSION

This mobility trial gave our patients the opportunity to participate in progressive OOB mobility. Progressive mobility while on ECMO requires a specialized multidisciplinary team with strong communication skills to be carried out safely. Consideration must be made for the amount of staffing and resources required to perform mobility in this manner.

There were no adverse events within this cohort related to ECMO circuitry. An adverse event was defined as interruption of ECMO flow, cannula dislodgement, and/or bleeding from the cannulation site.

Progressive mobility allowed these patients to better participate with occupational therapy and speech language pathology. Early mobility is shown in the literature to reduce delirium, assist with ventilator weaning, and improve overall well being, which was showcased in these patients.

CONCLUSION

While more investigation is needed, we hypothesize that mobility progression on ECMO, highlighting OOB functional training, can be performed safely with patients requiring a femoral venous cannulation.

This quality improvement project demonstrated that an ECMO femoral cannula alone should not hinder OOB mobility. A progressive mobility program is feasible and can demonstrate functional recovery in this high-risk population.

FUTURE GROWTH

- Assess long term functional outcomes after ECMO decannulation
- Investigate progressive OOB mobility while on femorally cannulated veno-arterial (VA) ECMO

PATIENT PERSPECTIVE

"I was in the ICU for 11 days flat on my back with ECMO and a ventilator [attached to me]. When I woke up, the PT team didn't waste much time. They wanted me to sit, stand, and then sit in a chair. I didn't think it was possible. We did it! I think if they hadn't started moving me as soon as they did, I wouldn't have been able to regain my strength back as fast as I did."

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