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Doctor of Physical Therapy

Patients Intubated At Least 48 Hours in Critical Care Are At Risk for Inactivity and Isolation

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Background

- Patients who are critically ill, especially those requiring mechanical ventilation (MV) while in the intensive care unit (ICU), are at risk for short and long-term functional deficits. Increased levels of physical activity have been hypothesized to improve outcomes; however, to date, there is only one report describing physical activity patterns in this cohort and that report occurred outside the U.S. (Berney et al. 2015).

Purpose

- Measure patterns of physical activity in a group of patients who are in critical care at an academic medical center in the U.S.

Methods

- Single center observational behavioral mapping study of 47 patients admitted to the medical (n=18), surgical (n=6) or cardiothoracic (n=23) ICU at Duke University Hospital who were 18 yrs or older and required MV for at least 48 hrs.

- Observations occurred for 1 min, every 10 min over 15 hours (6AM-9PM). Patient location, persons present in room, and highest level of physical activity were recorded at each time point. A total of 3,463 observations were recorded, 3,302 (95.35%) while on MV and 161 (4.65%) while not on MV.

- Activity was qualified using the ICU Mobility Scale (IMS) scores and was further classified into no/minimal, low, moderate, or high activity categories.

IMS Reference: Hodgson, et al. (2014). Feasibility and inter-rater reliability of ICU Mobility Scale. *Heart & Lung, 43*, 19-24.

Observed Motor Activity	Activity Level
Lying in Bed	No/Minimal Activity
Passive ROM by staff	
Non-purposeful movement	
Purposeful UE movement	
Purposeful LE movement	
Sitting/Exercises in bed	
Sitting in chair	Low Intensity
Sitting at EOB	
Standing	Moderate Intensity
Moving from bed to chair	
Marching in place	
Walking with assistance of 1	High Intensity
Walking with assistance of 2	

Statistical Analyses:
- Descriptive statistics described the patient sample.
- A Fisher's exact test compared activity restriction status to eligibility for PT.
- Chi-square tests compared activity levels across units.

Outcomes

Table 1: Patient Demographics.

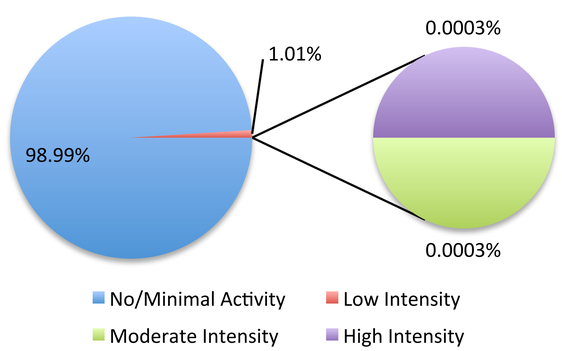
Age (mean ± SD)	54.57 ± 13.88
Sex (male) (%)	(31) 66%
APACHE II score (mean ± SD)	18.60 ± 5.74
SOFA score (mean ± SD)	7.55 ± 3.11
ICU length of stay (LOS) [median (IQR)	7.00 (2-49)
MV days [median (IQR)]	7.00 (3-12)
Mobility eligible [RASS (Richmond Agitation Sedation Scale) +1 to -1], n (%)	22 (46.8%)
Medically restricted	30 (63.8%)
28 day mortality, n (%)	
Alive	32 (68.1%)
Deceased	15 (31.9%)

Table 2: Patients were in bed for nearly all observations and spent nearly one-third of the 15-hour time period alone.

Location and interaction	All (n=47)	Eligible		Restricted	
		Yes (n=21)	No (n=25)	Yes (n=30)	No (n=17)
Bed	100% (99%-100%)	100% (100%-100%)	100% (100%-100%)	100% (100%-100%)	100% (100%-100%)
In room	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)
In bathroom	nc	nc	nc	nc	nc
In chair	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)
Off unit	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)
Alone	29% (15%-48%)	24% (17%-39%)	33% (15%-49%)	32% (21%-48%)	19% (6%-39%)
Family	22% (6%-63%)	28% (1%-73%)	19% (8%-47%)	13% (4%-34%)	47% (26%-77%)
Nursing	45% (32%-62%)	44% (31%-62%)	47% (36%-61%)	50% (34%-61%)	40% (31%-63%)
Medical	3% (0%-5%)	1% (0%-5%)	3% (0%-5%)	3% (1%-5%)	1% (0%-4%)
PT	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)

Data presented as median [IQR]

Figure 1: Patients rarely engaged in physical activity.



Outcomes

Table 3: Patients may have been inappropriately restricted from physical activity when otherwise eligible for mobility.

Relationship between activity restriction and eligibility for mobility			Restricted		Total
			No	Yes	
Eligible	No	Count	5	20	25
		% within Restricted	29.4%	69.0%	54.3%
	Yes	Count	12	9	21
		% within Restricted	70.6%	31.0%	45.7%
Total		Count	17	29	46
		% within Restricted	100.0%	100.0%	100.0%

Table 4: Despite similar characteristics (age, illness severity, sedation level, LOS), patients in SICU were more active.

Cross unit comparison	Patient Unit			*p*- value
	MICU	SICU	CTICU	
# Patients Observed	18	6	23	
No/minimal intensity, n (%)	1348 (99.93%)	427 (95%)	1638 (98.3%)	<0.001
Low Intensity, n (%)	1 (0.07%)	23 (5%)	11 (1.0%)	<0.001
Moderate Intensity, n (%)	0 (0%)	0 (0%)	1 (0.07%)	0.59
High Intensity, n (%)	0 (0%)	0 (0%)	1 (0.07%)	0.59

Conclusions

- In agreement with the previous report, **patients in critical care are minimally active and relatively isolated**. Characteristics such as age, illness severity, sedation level, and LOS had limited utility in predicting activity levels.

- Despite the hypothesized benefits of physical activity, **limited amounts of time in either incidental or structured activity, even in those eligible for mobility**, places patients who are critically ill at-risk for short and long-term functional deficits.

- **To address these disparities, strategies to foster a culture of physical activity and interaction in the critical care setting are required.**

References

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