

The effect of sedation and inotropic support on mobilisation in burns patients admitted to ICU

A retrospective observational cohort study

Highlights

- TBSA was not a predictor of achievement of functional verticality
- Presence of inotrope infusion reduced the odds of achieving functional verticality
- Sedation, or agitation, reduced the odds of achieving functional verticality
- Considerable staff resources were required to facilitate mobilisation

Background

- ICU admission often involves prescribed bed rest and presents multiple barriers to mobilisation, including cardiovascular instability, sedation & skin reconstruction
- Evidence suggests that active mobilisation in ICU is associated with reducing the effects of ICU-acquired weakness and improving function and quality of life [1]
- Mobilisation is feasible and safe, when appropriate, with guidelines suggesting:
 - Richmond Agitation-Sedation Scale (RASS) -2 to +2
 - No consensus for safe levels of inotropic support [2]
- Practical issues are faced by physiotherapy teams when translating research outcomes into practice

+ 4	Combative
+ 3	Very agitated
+ 2	Agitated
+ 1	Restless
0	Alert and calm
- 1	Drowsy
- 2	Light sedation
- 3	Moderate sedation
- 4	Deep sedation
- 5	Unarousable

Figure 1. RASS [3]

Aims

To identify the effect of sedation and inotropic support on the achievement of verticality, the cessation of complete bed rest, where verticality includes:

- Sitting on edge of bed
- Standing
- Marching on the spot
- Step transfer
- Ambulation
- Tilt table

Methods

Setting

The ICU at Fiona Stanley Hospital (FSH) provides care for patients admitted under the State Adult Burns Unit of Western Australia. This study considered sedation and inotropic practices during working hours (0800-1700hrs). All patients that survived ICU admission from February 2015 to April 2019 were included in the study.

Primary Covariates		Outcomes
Infused Inotropes → Yes/No → Rate	Noradrenaline Metaraminol Dobutamine	Verticality → 1 st achievement → Time to achievement → Subsequent events → Assistance → Barriers
Sedation Levels → Max RASS → Min RASS	GREEN -2 to +2 RED <-2 OR >+2	
Infused Sedatives → Yes/No	Deep sedatives Light sedatives Opioid derivatives	

Data Analysis

Descriptive statistics and mixed model logistic regression. Multivariable models included TBSA or mechanical ventilation.

Results

Overview of Cohort (N=64)

- 71.9% subjects required mechanical ventilation (MV)

Achievement of Verticality

- 68.8% achieved verticality
- Verticality achieved on 24.2% (128 of 529) of ICU days

Table 1. Achievement of verticality task during ICU admission and time to first event if achieved

	n (%)	M (IQR)	Minimum	Maximum
SOEOB	42 (65.6)	2 (1-7)	0	25
Stand	37 (57.8)	2 (1-8)	0	53
MOTS	18 (28.1)	2 (1-11)	0	36
Step Transfer	18 (28.1)	3 (1-16)	0	36
Walk	24 (37.5)	3 (2-8)	0	40
Tilt Table	7 (10.9)	21 (8-26)	7	34
Vertical without PT	5 (7.8)			

*SOEOB=sitting on edge of bed; MOTS=marching on the spot; M=median; IQR=interquartile range; PT=physiotherapy

Inotropes

- Odds of verticality reduced by 12% (95% CI 0.82-0.94; p<0.001) for every 1mL/hr increase of noradrenaline

Sedation

- Odds of verticality were 13.48x (95% CI 4.71-38.60; p<0.001) higher when maximum RASS between -2 to +2
- Odds of verticality reduced by 80% (95% CI 0.10-0.40; p<0.001) with infusion of deep sedatives

*MV included in logistic regression models

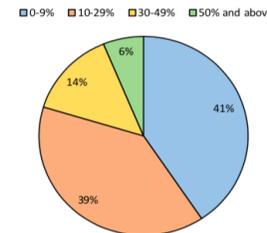


Figure 2. TBSA categories

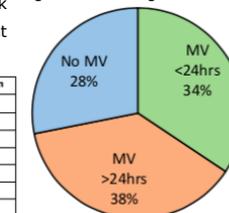


Figure 3. Proportion MV <24hrs

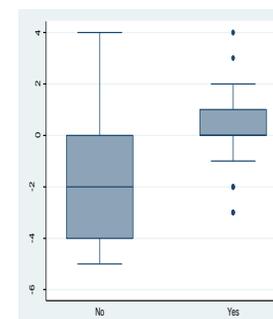


Figure 4. Box plot of maximum RASS when verticality achieved or not

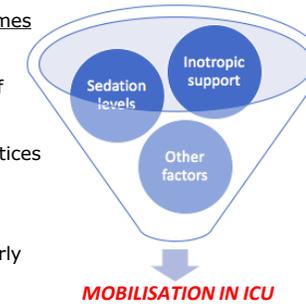
Discussion and Conclusion

Implementing Research Outcomes

- Goal directed sedation
- Guidelines for safe levels of inotropic support
- Mechanical ventilation practices

Future Research Direction

- Multi-centre study to evaluate differences in early mobilisation practices
- Relationships between early mobilisation and complications of ICU stay
- Associations between mobilisation in ICU and long term outcomes



Conclusion

High sedation & agitation scores, sedative infusion and inotropic support are significant in reducing mobilisation in this population.

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