

CANCOV - Canadian Cohort of 1-Year Outcomes in Critically Ill COVID-19 Patients - Determinants of ICU Mortality and Impact of Mechanical Ventilation on Lung Injury Severity.



AUTHORS

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INTRODUCTION

- Mechanical Ventilation (MV) is a life saving intervention for critically ill patients with acute respiratory failure.
- Observational studies demonstrated that lung protective mechanical ventilation (LPV) is associated with increased 60-days Hospital Survival and reduced ICU Mortality.^{1,2}
- However, the causal association between LPV and the trajectory of Lung Injury Severity (LIS) has not been definitely demonstrated.

OBJECTIVES

Aim

- To investigate the relationship between the proportion of time spent within LPV settings and the change over time in LIS in COVID-19 patients requiring MV.

Hypothesis

- The proportion of time spent within LPV settings (defined as daily Static Driving Pressure < 15 cmH₂O) during the initial 7 days of ICU admission, is associated with an improving LIS trajectory among MV COVID-19 patients.

METHOD

- Study sample: 286 MV patients from CANCOV (Canadian COVID-19 Cohort Study), age >16 who required MV during the first 7 days of ICU.
- MV settings and LIS data were collected daily during the first 7-days of ICU and twice weekly thereafter until discharge or patient death.
- Exposure: the proportion of time spent in LPV defined as days with DP < 15 cmH₂O.
- Outcome: LIS trajectory during first 7 days of ICU admission.³
- Linear Mixed Effects:** identified 3 LIS trajectories in the CANCOV sample during the first 7 days after ICU admission (improving LIS - neg slope; unchanged LIS - flat; worsening LIS - positive slope).
- Multivariable logistic regression:** association between the improving LIS trajectory (negative slope of LIS) compared to unchanged and worsening trajectories and the proportion of time spent in LPV.

RESULTS

Table 1a. Patient Characteristics on ICU admission. Median (IQR)

Variable	Overall	Died in ICU	ICU Survivor	p
n	286	88	198	
Age	53 [46, 60]	52.50 [47, 61]	53 [45, 60]	0.4
Male(n,%)	164 (71)	59 (72)	104 (70)	0.9
APACHE II	14 [10, 18]	15 [11,18]	14 [10, 18]	0.3
PaO ₂ /FiO ₂ on admission	81 [63, 108]	73.00 [62,97]	84 [64, 112]	0.1
LIS	3 [3, 4]	3 [3, 4]	3 [3, 4]	0.8

Table 1b. MV settings on ICU admission. Median (IQR)

Prop of Days DP<15 (%)	83[50,100]	71[50,100]	84[50,100]	0.14
Driving Pressure	14 [12, 18]	16 [13, 19]	14 [11, 17]	0.002
Vt on PBW	5.46 [4.72, 6.17]	5.21 [4.66, 5.96]	5.60 [4.93, 6.30]	0.02
Respiratory rate	28 [23, 32]	30 [24, 32]	28 [22, 30]	0.043
PEEP	14 [10, 16]	12 [10, 15]	14 [12, 16]	0.017
PPlat	29 [25, 31]	29 [26, 31]	28 [25, 31]	0.5

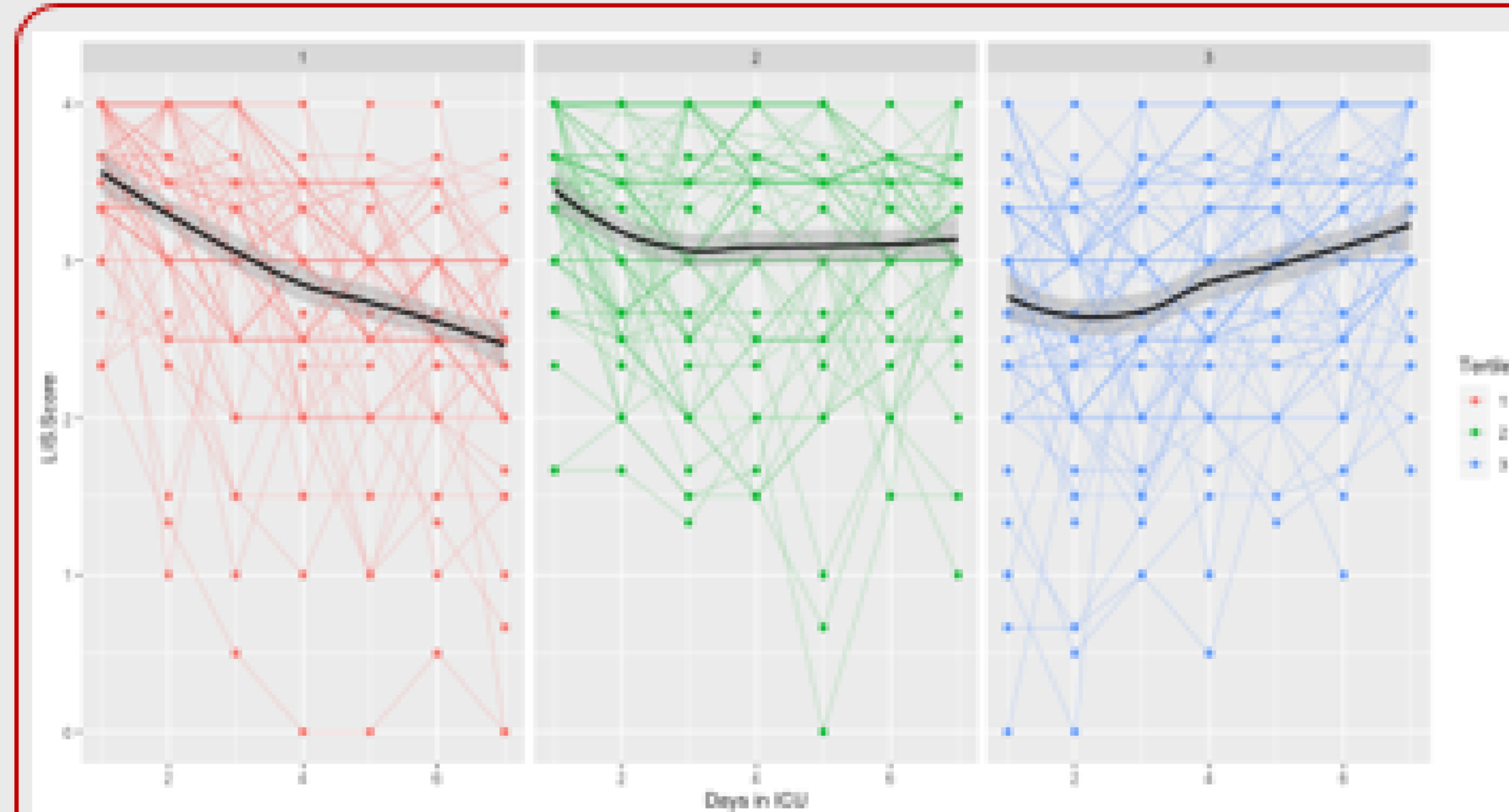


Figure.1 Linear Mixed Effects Model (3 LIS trajectories) during first 7 days of ICU: Improving LIS (red) - negative slope, Unchanged LIS (green) - flat, Worsening LIS (blue) - positive slope.

Table 2. Multivariable logistic regression model comparing improving LIS trajectory with unchanged or worsening LIS trajectory.

Variable	Odds Ratios	95% CI	P-value
Prop of Days DP<15 (%)	0.997	0.985, 1.009	0.593
Age	0.972	0.94, 1.005	0.101
Sex	0.774	0.359, 1.611	0.500
Charlson Score	1.124	0.905, 1.392	0.279

CONCLUSION

- In this CANCOV cohort, the proportion of days spent with DP<15 during the first 7 days of ICU was high (83%).
- We identified 3 different trajectories of LIS in the first 7 days in severely ill COVID-19 ARDS patients: improving LIS - negative slope; unchanged LIS - flat; worsening LIS - positive slope.
- In this preliminary multivariable logistic regression analysis, the proportion of LPV days in the first 7 days of ICU was not significantly associated with an improving LIS trajectory.

ACKNOWLEDGEMENTS

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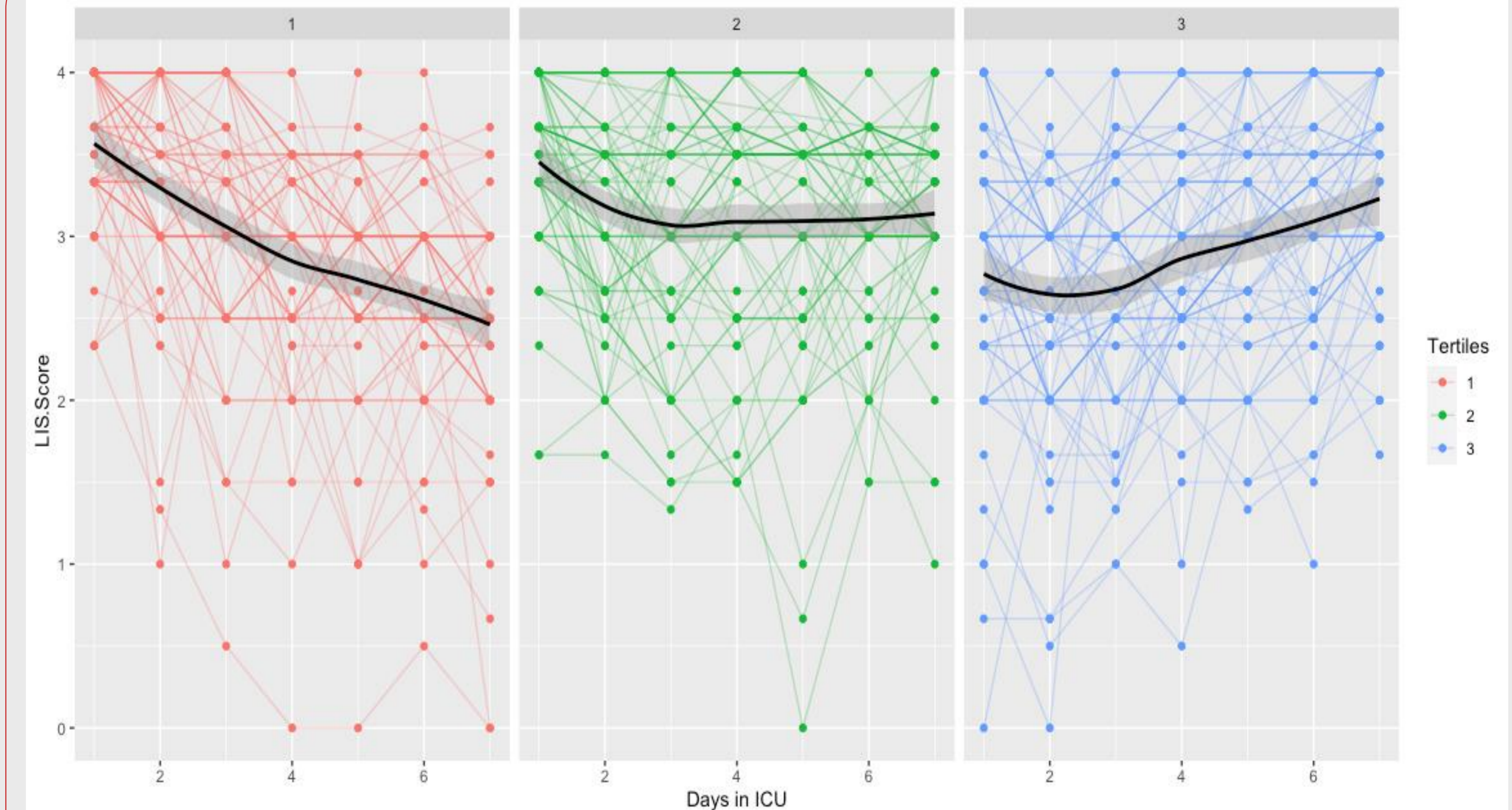


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1. Amato MB, Meade MO, Slutsky AS, Brochard L, Costa EL, Schoenfeld DA, Stewart TE, Briel M, Talmor D, Mercat A, Richard JC, Carvalho CR, Brower RG. Driving pressure and survival in the acute respiratory distress syndrome. *N Engl J Med*. 2015 Feb 19;372(8):747-55. doi: 10.1056/NEJMsa1410639.
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