

DIAPHRAGM FUNCTION IN PULMONARY REHABILITATION OF PATIENTS WITH POST COVID-19 SYNDROME



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INTRODUCTION

Many patients with **post COVID-19 syndrome** have persistent respiratory symptoms such as dyspnea and fatigue. Some studies have proposed that these symptoms may derive from **diaphragm dysfunction (DD)**. Here we evaluate the diaphragmatic function of patients with Post COVID-19 Syndrome by diaphragmatic ultrasound.

METHODS

15 patients with post COVID-19 syndrome (59.4 ± 13.9 years) admitted to a pulmonary rehabilitation program were included. **Diaphragmatic excursion (Ed)** was quantified during deep breathing with a 3.5 MHz convex transducer, using an anterior subcostal view (Figure 1). **Diaphragmatic thickness (Td)** was measured at maximal inspiration (Tdi) and at end-expiration (Tde) with a 12 MHz linear transducer, through the 9th intercostal space. The thickening fraction (TF%) was calculated as follows: $(Tdi - Tde/Tde) * 100$. Normal values have been established for Ed (6 – 9 cm), Tdi (>4 mm) and TF% (28 – 96). Clinical data and functional tests were recorded from the clinical history. For statistical analysis, **bayesian kendall's tau correlation** (Table 1) and Bayesian mann whitney u test were performed.

Bayesian Kendall's Tau Correlations ▼					
	n	Kendall's tau B	BF ₁₀	Lower 95% CI	Upper 95% CI
RightEd - FSS63	15	-0.458	4.425	-0.688	-0.054
LeftEd - FSS63	15	-0.571	18.644	-0.768	-0.146
LeftEd - Speedaverage6MWT	15	0.546	13.234	0.126	0.750
LeftEd - 6MWTDistance	15	0.456	4.358	0.052	0.687
RighTdi - Borg scale at rest	15	-0.370	1.808	-0.623	0.018
Tf% - Borg post1min 6MWT	15	0.524	9.917	0.108	0.735
Tf% - SatO2 post1min 6MWT	15	0.343	1.421	-0.041	0.601

Tab 1 Bayesian kendall's tau correlation

RESULTS

53.3% of patients had DD. Ed had a negative correlation with Fatigue Severity Scale and positive correlation with walking distance and velocity of six-minute walk test (6MWT) (strong evidence, Bayes factor (BF₁₀) >10). Tdi was negatively correlated with Borg scale at rest (weak evidence, $1 < BF_{10} \leq 3$) and TF% had positive correlation with oxygen saturation post 6MWT (moderate evidence, $3 < BF_{10} \leq 10$).

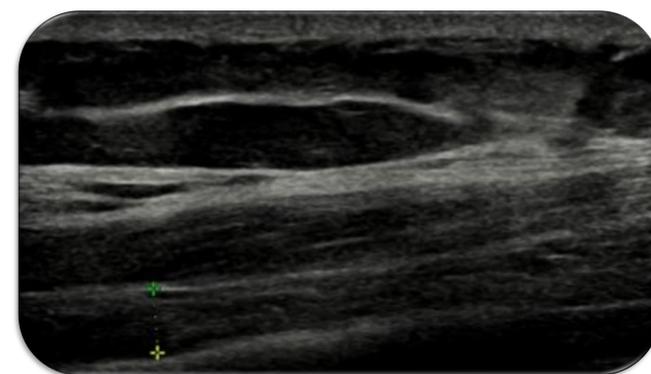


Fig 1 Diaphragmatic excursion (Ed) during deep breathing.

CONCLUSIONS

In post covid syndrome, **DD is associated with decreased physical performance** but not with respiratory symptoms during physical activity. These symptoms may stem from other possibilities, such as involvement of the lung parenchyma or dysautonomia.