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A non-invasive tool to quantify autonomic dysfunctuion, A prognostic indicator in Covid-19

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BACKGROUND: The Outbreak of SARS-CoV-2 has caused a major pandemic posing a threat to the millions of lives all over the world. The evidence show that there is a relation between the autonomic nervous system and coronaviruses and likewise, levels of inflammatory markers - C-reactive protein (CRP) and autonomic dysfunction. Autonomic dysfunction is elicited using heart rate variability which in turn quantified using autonomous regulatory index (ARI). Hence this study was conducted to determine if ARI measured could be used as a non-invasive measure of autonomic dysfunction among COVID-19 subjects.

MATERIALS & METHODS: An exploratory study was conducted among randomly selected 22COVID-19 male patients aged more than18years,admittedtoCOVIDward,VictoriaHospital, Bengaluru for 5 days, using ANS Recorder, a non-invasive heart rate variability recorder heart rhythm data were collected, one test per day continuously for 5 days, an ANS Analysis Software instrument was used to record, analyze and interpret the heart rate variability in terms of ARI and CRP levels were measured. Data was analyzed using SPSS version 18.0. A P value of < 0.05 was considered statistically significant

RESULTS: The occurrence of autonomic dysfunction in COVID-19 patients using the Patented NEUROCOR Precision HRV® Solution was found to be among 50.0%. The median scores of average ARI indices were significantly lesser among those with higher health risk (28.39) compared to those with lower health risk (65.95) ($P<0.05$). The Median ARI index showed a weak negative correlation ($r = -0.13$, $P>0.05$) with CRP ($P>0.05$). ARI index showed a significantly excellent predictive ability in detecting the higher health risk with the areas under the curves (AUC) being 0.93 with an optimal cut-off of 40.85 with maximum sensitivity and specificity of 100.0% and93.0%.

CONCLUSION: Autonomous Regulatory Index (ARI) index with significantly excellentpredictive ability in detecting the higher health risk can be used as a non-invasive measure of autonomic dysfunction among COVID-19 subjects.