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Spotlight on Special Topics

CLUSTERING OF CLINICAL-ECHOCARDIOGRAPHIC PHENOTYPES OF COVID-19 DISEASE USING MACHINE-LEARNING TECHNIQUES

Poster Contributions
For exact presentation time, refer to the online ACC.22 Program Planner at https://www.abstractsonline.com/pp8/#!/10461

Session Title: Spotlight on Special Topics Flatboard Poster Selections: COVID
Abstract Category: 61. Spotlight on Special Topics: Coronavirus Disease (COVID-19)

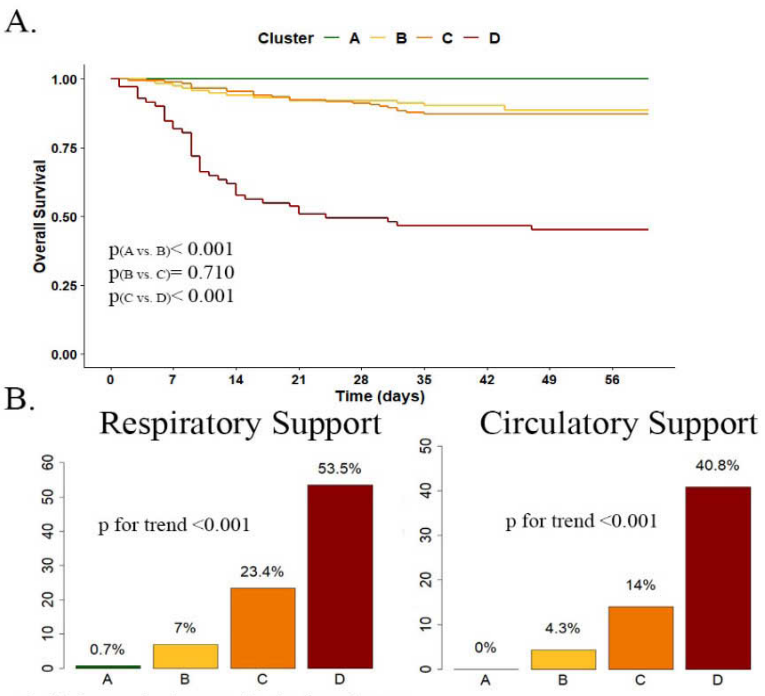
Authors: *Aviram Hochstadt, Eran Shpigelman, Dan Coster, Ilan Merdler, Yan Topilsky, Ron Shamir, Tel-Aviv Medical Center, Tel-Aviv, Israel, The Blavatnik School of Computer Science, Tel Aviv University, Tel-Aviv, Israel*

Background: The spectrum of cardiac manifestations in COVID-19 has been described, using cardiac markers and echocardiography. Studies suggested that cardiac involvement in the infection is heterogeneous. Machine learning based discovery of subtypes of a clinical entity has been previously used in cardiology to define sub-phenotypes of common diseases. We sought to use an unsupervised machine learning technique to divide hospitalized COVID-19 patients into identifiable phenotypical clusters in order to shed light on the pathogenesis of the disease.

Methods: 506 patients hospitalized with COVID-19 infection underwent complete evaluation including echocardiography and lung ultrasound at admission. All patients' clinical and imaging data at admission was input to a k-prototype clustering algorithm in order to divide the patients into clusters.

Results: Patients were partitioned into 4 phenotypical clusters based on clinical and imaging data at admission. Clusters A-B were younger and healthier, C and D were older with worse cardiac indexes, while clusters B and D had a more robust inflammatory response. Survival was best for cluster A, worst for cluster D and intermediate for clusters B-C. Interestingly, cluster C showed a harsher course B, as manifested by propensity for respiratory and hemodynamic support, but with similar survival.

Conclusion: COVID-19 manifests differently for distinctive clusters of patients. These clusters have an influence of disease manifestation and prognosis.



A. 60 day survival curves for the four clusters
B. Proprtions of need for respiratory or circulatory support for the four clusters