#ASEchoJC Twitter Chat
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- **Echocardiographic Correlates of In-Hospital Death in Patients with Acute COVID-19 Infection: The World Alliance Societies of Echocardiography (WASE-COVID) Study (JASE, May 2021)**

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Introduction and Welcome: Welcome everyone to #ASEchoJC @ASE360 on WASE COVID #echofirst study https://bit.ly/3oUSwBb with authors @ilya_tweets @robertomlang @FedericoAsch Co moderated by @ash71us & joined by @NadeenFaza @DocStrom @rajdoc2005 @EGarciaSayan @edwardagill @GWhalleyPhD @onco_cardiology

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The World Alliance Societies of
Echocardiography (WASE-
COVID) Study

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Federico M. Asch, MD, FASE ⚇ ✉ • on behalf of

the WASE-COVID Investigators [1] •

Q1: What was the reason and motivation behind doing this Covid-19 WASE study?

A1 Notable Responses:

@ilya_tweets: The medical community needed urgent answers, so we strategically planned collaborations with efficiency and accuracy in mind: a collaborative model similar to #WASE, with an industry partner that shared our goals and was ready to jump in promptly, **@Ultromics**

@ilya_tweets: We aimed to come together as a global #EchoFirst community during the height of the COVID-19 pandemic to identify the most important clinical and #EchoFirst prognostic factors in hospitalized COVID-19 patients. #EchoFirst #COVID19 #WASE

@iamritu: Seems that this study happened so quickly at the start of this #Covid19 pandemic #echofirst protocols were rapidly evolving then to keep everyone as safe as possible

Q2: How was AI used in this Covid-19 WASE study?

A2 Notable Responses:

@iamritu: @ultromics used CNN to create algorithm & mean of the three LV reads (automated AI, human read 1, & human read 2) was taken as the final value An AI analysis was used to derive interobserver (human vs AI) variability. Interesting that mostly 4c views used

@robertomlang: For each echo, validation of the AI measurements was performed in a centralized manner, together with the RV analysis done with a different semi-automated software (@TOMTEC).

@robertomlang: These algorithms were cloud-based and provided a fully automated LV analysis on the fly, as images were being transferred from centers to the central labs.

@robertomlang: All studies were analyzed using a commercially available AI algorithm created by machine learning (@Ultromics), which generated an initial LVEF, LVESV and LVEDV, and LV longitudinal strain (based on 2CH and 4Ch strain).

@ash71us: Fascinating large scale use of AI in an echo and clinical study to assess clinical outcomes...shows the potential power of AI when used properly

@ilya_tweets: Absolutely, lots of future potential clinical and research applications of this novel AI-based software!

Q3: Of the images you obtained, how many (what percentage) were able to be analyzed by strain?

A3 Notable Responses:

@ilya_tweets: Due to the critically ill nature of many of the hospitalized #COVID19 patients, image quality did not always allow for full AI analysis. LV analysis was possible in 83% of the 870 enrolled patients.

@ash71us: that's a high number for the general echo quality in #COVID19 patients especially the very sick ones.

@ilya_tweets: 75% of the 870 patients had both 4Ch and 2Ch views that were evaluable while an additional 8% had only the 4Ch view

@GWhalleyPhD: how much do you think strain adds beyond LVEF in this cohort?

@ilya_tweets: Great question! Strain added tremendous prognostic value above and beyond LVEF in this study, as was evidenced by its independent association with mortality in the multivariate analysis (in contrast to LVEF).

Q4: How was "the cloud" or other "tools" used to gather the data?

A4 Notable Responses:

@FedericoAsch: The goal was to collect all data ASAP, therefore we aimed at partnering with industry that had commercially available solutions.

@FedericoAsch: All images were de-identified locally prior to leaving enrolling centers and uploaded to a digital cloud. Subsequently were ran through the @Ultromics platform for AI-based analysis while clinical data was uploaded on a Castor electronic platform (@CastorEDC).

@GWhalleyPhD: This study would not have been possible a few years ago #echofirst technology leaps through the cloud

Q5: What were the regional differences in underlying comorbidities & presentation in COVID-19 patients?

A5 Notable Responses:

@iamritu: patients enrolled in Asia had less comorbidities Anatomical heart & lung disease & a better biomarker profile (LDH , BNP, D-dimer) & required less hemodynamic/LV support & mechanical ventilation (was this a less sick cohort or less comorbidities?)

@robertomlang: Patients enrolled in Asia were overall "healthier": had fewer co-morbidities, improved biomarkers, and had less need for mechanical ventilation or hemodynamic support compared to patients in Europe, Latin America, and the USA (in descending order).

@iamritu: Was this related to the fact that Asia got the #SARSCoV2 virus first?

@robertomlang: Probably yes, also the hospitals in Asia admitted less sick patients with COVID compared to USA

@ash71us: Did they also have less rigorous requirements to perform echos that the US, Europe and Latin America?

@ilya_tweets: It is possible that since it was earlier in the pandemic, they performed echos on all-comers rather than just the sickest patients as was commonly done in the USA (as recommended by @ASE360).

Q6: What clinical factors were significantly associated with in-hospital mortality?

A6 Notable Responses:

@ilya_tweets: Overall in-hospital mortality was 21.6% (188 patients). The clinical parameters independently associated with in-hospital mortality (multivariate) were age, LDH, and previous lung disease.

@iamritu: Interesting that troponin was tested only in 35% of patients but was up in nearly all of those tested; did more pts have sepsis in this cohort? such that troponin increase may not due to direct cardiomyocyte

@ilya_tweets: Great point @iamritu! Agreed that the Troponin elevation was likely multi-factorial and possibly related to supply-demand mismatch in the setting of septic shock / critical illness.

Q7: What were the regional differences in echocardiographic parameters in COVID-19 patients?

Which world region demonstrated the worst LV and RV dimensions and function measures in these COVID-19 patients?

A7 Notable Response:

@iamritu: LVEF, LVLS, RVFWS, & RVBasalDistance, had best values in Asia, followed in worsening order by Europe, Latin America, & United States (last place)
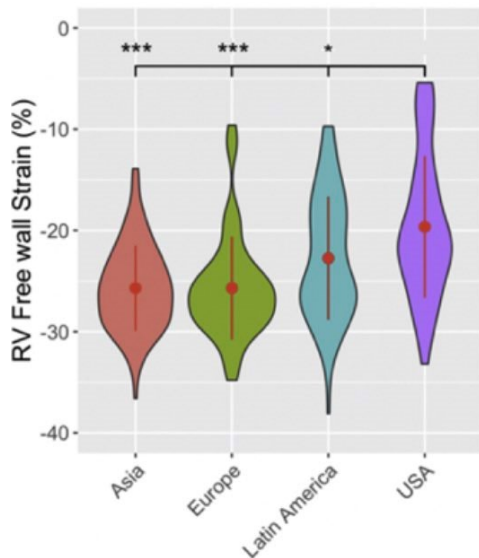
@FedericoAsch: Similar to the clinical parameters, regional differences were observed in LVEF, LV longitudinal strain, RV free wall strain, and RV basal diameter, with the best values seen in Asia, followed in worsening order by Europe, Latin America, and the USA

@kgzimmerman: any studies comparing vaccination rate effects with these parameters?

@ilya_tweets: @kgzimmerman excellent question! Not that we are aware of but would be fascinating to learn more about the effect of the #COVID19 vaccine on these #EchoFirst parameters.

@Tatsu_Miyoshi: I'd like to know whether these echo parameters had gender differences in each region.

@ilya_tweets: Great question@Tatsu_Miyoshi! Would make for an interesting and important sub-study, although it is likely that our study was not powered to answer this particular question on a regional level. #ASEchoJC

Q8: How can we explain these regional differences in parameters of LV and RV function?

A8 Notable Responses:

@iamritu: Pts in Asia had less comorbidities (heart & lung disease) & better biomarker profile (LDH, BNP, D-dimer) & required less hemodynamic/LV support/ mechanical ventilation but improvement in in-hospital deaths from July to September 2020 everywhere

@robertomlang: A couple of potential reasons:

1) Differences in baseline co-morbidities (HTN, obesity).

2) Changes to safer echo practices over time, such as limiting scans to critically ill patients, as recommended by @ASE360 and @ACCinTouch early in the COVID-19 pandemic.

Q9: Which echocardiographic parameters were significantly associated with in-hospital mortality? Which imaging markers stood out as being sensitive for mortality?

A9 Notable Responses:

@ilya_tweets: The echocardiographic parameters independently associated with mortality in multivariate analysis were LVLS and RVFWS, but notably not LVEF.

@iamritu: Surprisingly, while LVLS & RVFWS were independently associated with death, their individual sensitivity is limited, affected ROC analysis (AUC = 0.59 LVLS & 0.65 RVFWS)I wonder how this will change with time & more studies

@ilya_tweets: Great point @iamritu! All of these prognostic markers are more powerful when used together rather than individually.

Q10: What did you learn about collaborating with industry to help solve a common problem: COVID-19?

What are the lessons we can learn in order to continue this trend to improve this type of collaboration?

A10 Notable Responses:

@FedericoAsch: Even in times of global crisis such as the #COVID19 pandemic, it is possible to partner virtually with global investigators such as the @ASE360 #WASE and industry collaborators in order to answer important clinical questions of interest to the global community.

@DavidWienerMD: What an uplifting conclusion about finding advantage in adversity. Nicely put @FedericoAsch

@kgzimmerman: don't you just love it?! global collaboration is key! Go Team!