TITLE (SHORT, 200 CHARACTERS MAX.):

# ACUTE COR PULMONALE POST-CARDIAC ARREST

## MAIN HYPOTHESES TESTED (2 MAX)

Is the Acute cor pulmonale (ACP) risk score, which has been previously validated in ARDS patients, applicable to OOHCA patients?

The ACP risk score, which consists of a maximum of 4 points one for each of; pneumonia, hypercapnia ($PaCO_2$ > 48 mmHg), high driving pressures (DP > 18 cmh20) and low PF ratios (P/F < 150 mmHg), has previously been validated in ARDS patients by AM Dessap *et al* and KC See *et al*. ACP has multiple definitions but is most regularly defined on TTE by a ratio of right ventricular to left ventricular and diastolic area > 0.6 with associated intraventricular septum dyskinesia in end-systole.

The clinical relevance of this is that in other cohorts, namely ARDS patients, early detection of ACP can alter management to a more bespoke right ventricular protective strategy to improve outcomes.

We propose that patients with an ACP score of 2 or more have a focused right ventricular trans thoracic echocardiogram to see if the ACP predicts the prevalence of ACP in OOHCA patients.

In addition, we propose that markers of right ventricular size, function and PA pressure estimation are concurrently collected to see if the ACP score predicts alterations in RV size, function or rising estimations of PA pressure and the risk of pulmonary hypertension.

## SINGLE CENTER [ ] , MULTICENTER [ X ]

## PICO

No formal sample size will be calculated as we will take a convenience sample from participating sites.

To participate a site must have the ability to perform a transthoracic echocardiogram (TTE) within 24 hours of an ACP score of 2 or more. The details of the TTE information required are listed below.

Patients: All patients with an ACP score of 2 or more are to receive a transthoracic echocardiogram within 24 hours of scoring at sites participating in the substudy. The logistics are discussed below.

Outcome: Validation of risk score for the prevalence of ACP. Additional assessment of ACP scores to predict alterations in RV size, function and estimations of PA pressure.

## DATA NEEDED FOR THE ANALYSIS (SPECIFY VARIABLES AND MOTIVATE ANY PROPOSED ADDITIONS TO THE ECRF)

Echocardiographic parameters to be collected:

RV/LV end-diastolic area ratio, septum flattening or dyskinesia (Y/N), RV S', tricuspid annular plane systolic excursion (TAPSE), RV fractional area change, RV diameters 1-3 (RVD1, RVD2, RVD3), Pulmonary Valve acceleration time (PV AT), Tricuspid valve regurgitation ( TR Vmax)

## LOGISTICS – HOW WILL ADDITIONAL DATA BE GATHERED?

Patients are to be screened daily at participating STEP-CARE sub-study participating sites with an ACP score for the first 5 days of admission. If the ACP score is 2 or more on any of the first 5 days they are to have a focused transthoracic study within the next 24 hours before the next round of ACP scoring.

The focused echocardiogram requires the following transthoracic views:- Apical 4 chamber (AP4C), Parasternal short axis (PSAX). At each window the following variables are obtained;

AP4C = RV/LV end-diastolic area, RV S', TAPSE, RV fractional area change, RVD 1, RVD2, RVD3, TR Vmax

PSAX = PV AT (PSAX aortic window), TR Vmax

This does not constitute a full echocardiographic study and logistically should take 5-10 minutes per study by an experienced echocardiographer. We appreciate given the scanning modality that due to potentially poor echocardiographic windows on some patients, not all data points may be collected on each TTE study.

Echocardiographers should be fully accreditated to perform these measurements by the relevant organisations governing the local delivery of transthoracic echocardiography

(eg in the UK this is the British Society of Echocardiography (BSE) and echocardiographers would require full accreditation with the BSE)

## BRIEF STATISTICAL ANALYSIS PLAN AND SAMPLE SIZE ESTIMATE

Multiple logistic regression analysis between ACP score and variables of RV size, function and PA pressure estimation.

ACP Score (1 point for each of)=

Pneumonia, $PaCO_2$ > 48 mmHG, Driving pressure > 18 $cmH_2o$, P/F ratio < 150 mmHG

Echocardiographic parameters:-

RV size = RV/LV end-diastolic area ratio, RVD1, RVD2, RVD3, RV end diastolic area (AP4C), RV end systolic area (AP4C)

RV function = TAPSE, Fractional area change, RV S'

PA pressure estimation = PV AT, TR Vmax

## FUNDING (IF APPLICABLE)

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