TITLE (SHORT, 200 CHARACTERS MAX.):

PREVENTION OF VAP WITH PROPHYLACTIC ANTIBIOTICS

MAIN HYPOTHESES TESTED (2 MAX)

Patients with an out of hospital cardiac arrest admitted to critical care are at high risk of pneumonia because they often aspirate secretions from the upper airway or stomach whilst unconscious and they are ventilated for several days. Rates of pneumonia in this patient population are around 50% and associated with increased mortality irrespective of temperature management (https://doi.org/10.1164/rccm.201102-0331OC**).** Proton pump inhibitor use is common amongst the general population. These drugs are very effective at reducing acid production and once the pH of the stomach is >4 there is an outgrowth of Gram negative bacteria. Aspiration in these individuals might there be more likely to lead to a GNB bacterial pneumonia. Some centres use prophylactic antibiotics and a number of small observational studies suggest that there is a reduction in pneumonia, however there is no evidence from systematic reviews to support this (Couper K, Laloo R, Field R, Perkins GD, Thomas M, Yeung J. Prophylactic antibiotic use following cardiac arrest: A systematic review and meta-analysis. Resuscitation. 2019 Aug;141:166-173. doi: 10.1016/j.resuscitation.2019.04.047. Epub 2019 May 11. PMID: 31085216.). Pepsin is produced in the stomach and can be easily assayed using a point of care commercially available test (Peptest for Pepsin Analysis - Peptest - a reflux diagnostic device). We have used this in another study looking at aspiration events in mechanically ventilated patients. There are a number of specific questions that can be examined around measuring pepsin on arrival to ICU in the lung. What is the incidence of gastric aspiration in this population? Are pepsin positive patients more likely to develop pneumonia or respiratory failure, is this increased by prior PPI use? Do antibiotics <24 hours either prevent these or alter outcomes?

1. Do antibiotics administered within 24 hours of OHCA prevent pneumonia and/or sepsis?
2. If patients have evidence of gastric aspiration on admission are they more likely to develop pneumonia or have worse outcomes
3. Are pepsin positive patients with prior PPI use more likely to get an early bacterial pneumonia?
4. What is the rate of diagnosed pneumonia in the pepsin test group

MULTICENTER [X]

<Site 1> All

<Site 2> Pepsin assays probably limited to UK because of processing

PICO

Patients: All patients in Stepcare

Intervention/Exposure/Prognostic factor: Antibiotics administered within 24 hours of OHCA

Comparison: Antibiotics in first 24 hours vs no antibiotics <24 hours

Outcome: Pneumonia, sepsis, respiratory failure, death, LOS

In a subset of participating centres a pepsin measurement will be taken from tracheal aspirates when the patient arrives on ICU using a Peptest.

Please send this form as a pdf to josef.dankiewicz@gmail.com

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

Antibiotics prescribed <24 hours

Pepsin positive/negative on tracheal aspirate at admission

Should also record if unit uses SDD or SOD or has a prophylactic antibiotic policy

Pneumonia rate

LOGISTICS – HOW WILL ADDITIONAL DATA BE GATHERED?

eRCF

Antibiotics administered <24 hours

Pepsin detected on ET aspirate on admission (participating sites)

SDD, SOD, or prophylactic antibiotic policy

BRIEF STATISTICAL ANALYSIS PLAN AND SAMPLE SIZE ESTIMATE

<text>

FUNDING (IF APPLICBABLE)

None

We have measured pepsin from the lung and subglottic space from a study on two types of endotracheal tube using the commercially available Peptest which is ongoing (VAP-X - Health Technology Research Centre (nhs.wales). WE have got this at commercial cost. The sample is posted to the company (has to be within 7 days) and processed – would probably limit this to the UK. Currently exploring up to date costs. I expect this to be in the region of £10-20 per sample/patient. With our current study scientist from Peptest will be included as co-authors. The data analysis and design (other than technical aspects of the test) are done independently from Peptest.

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