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Biomarkers and therapeutic targets in prehospital care

Submission date 06/11/2022	**Recruitment status** Recruiting	[X] Prospectively registered [ ] Protocol [ ] Statistical analysis plan [ ] Results [ ] Individual participant data [ ] Record updated in last year
Registration date 08/11/2022	**Overall study status** Ongoing	
Last Edited 08/11/2022	**Condition category** Other	

Plain English summary of protocol

Background and study aims
Time-dependent diseases (cardiac arrest, stroke, heart attack, sepsis and trauma) are one of the most frequent causes of medical consultation, activation of the emergency medical services (EMS), and consequently referral to the emergency department (ED).
The main aim of this study is to develop a specific score to be used in prehospital care with the ability to discriminate the risk of clinical deterioration from the initial moments of prehospital care, and the risk of long-term mortality (death).

Who can participate?
Patients aged over 18 years attended by Advanced Life Support (ALS) in the community of Castilla y León

What does the study involve?
Patients undergo a structured and objective evaluation according to protocol. Respiratory (breathing) rate, saturation, heart rate, blood pressure, temperate, coma scale score, and a complete analysis are carried out (ions, blood gas, cardiac enzymes, coagulation and basic biochemistry). Once the patient is left in the Emergency Department they follow the normal course of treatment. 30 days and 1, 2 and 3 years later an analysis of the electronic clinical history of the participant is made to collect data on their hospital care and mortality data. After 1 year of follow-up, data is collected on mortality from any cause, both in-hospital and out-of-hospital. At this moment, the observation will end. No interventions are performed on patients depending on the outcomes, but if the data indicates urgent pathology, it will be acted on according to the EMS operating procedures. All participants receive the most appropriate treatment for their situation, regardless of the results of the study.

What are the possible benefits and risks of participating?
Through the use of early warning scale and biomarkers, the clinical safety of patients is increased as the health system can perform a comprehensive follow-up of their situation. The scale also uses language easily understood by patients and professionals, which helps to facilitate the transmission of information. A delay in the timely identification of the critical pathology of the patient has a direct impact on the health system, with an increase in diagnostic procedures and surgical techniques, hospitalizations, stays in intensive care units or unexpected

deaths. With the early identification of patients at high risk, it is intended to reduce morbidity (illness) and mortality. There are no known risks to participants.

Where is the study run from?
Health Emergency Management of Castilla y León (Spain), including 23 ALSUs, and 14 hospitals, all belonging to the Public Health System of Castilla y León (Spain).

When is the study starting and how long is it expected to run for?
August 2022 to December 2025

Who is funding the study?
Regional Health Management of Castilla y León (SACYL) (Spain)

Who is the main contact?
Francisco Martín-Rodríguez
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Contact information

Type(s)
Principal investigator

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Additional identifiers

Protocol serial number
A.300/a2

Study information

Scientific Title
Clinical characterization of prehospital emergencies: search for novel biomarkers and therapeutic targets using artificial intelligence techniques

Acronym
PreBIOS_2

Study objectives
Prospectively testing biomarkers available at the bedside (point-of-care testing), and a range as well as other biomarkers analyzed in a clinical laboratory, to develop an early warning score tailored to prehospital care, in order to detect patients at high-risk of impairment in the short, medium and long term.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 10/08/2022, CEIC Área de Salud de Valladolid Oeste (Hospital Universitario Río Hortega, 47012 Valladolid (Valladolid); +34 (0)983 420 400; rconvi@saludcastillayleon.es), ref: 22-PI099

Primary study design
Observational

Study design
Prospective multicentric ambulance-based emergency medical services (EMS)-delivery observational study

Study type(s)
Diagnostic

Health condition(s) or problem(s) studied
Mortality in all types of patients without evident signs of severity

Interventions
Once the patient (or legal guardian) signs the informed consent form, he/she becomes part of the study. Vital signs are taken and a blood sample is taken from the venous line, which is inserted due to the need of their own pathology, not for participating in the study. The prehospital and regular analysis are then performed with this venous sample.

Patients and/or participants undergo a structured and objective evaluation according to protocol and proceed to stabilization. Physiological variables are collected (respiratory rate, saturation, heart rate, blood pressure, temperate, coma scale score) and blood determination.

Intervention Type
Mixed

Primary outcome(s)
The following are evaluated at first attention at the scene of the incident:
1. Respiratory frequency, assessed using clinical observation at baseline
2. Oxygen saturation, assessed using a Physio LifePAK® 15 monitor at baseline
3. Heart rate, assessed using a Physio LifePAK® 15 monitor at baseline
4. Blood pressure, assessed using a Physio LifePAK® 15 monitor at baseline
5. Tympanic temperature assessed using a Braun model ThermoScan® PRO 6000 at baseline
6. Patient consciousness, assessed using the Glasgow Coma Scale at baseline
7. Use of oxygen (or not), evaluated using clinical observation at baseline
8. Analytical biomarkers: pH, pCO_2, pO_2, $cHCO_3$-, BE (ecf), cSO_2, Na+, K+, Ca++, Cl-, TCO_2, Agap,

AGapK, Hct, Hb, BE (b), Glu, Lac, BUN, Urea and Crea, assessed using EPOC Siemens Healthcare at baseline, cardiac enzymes (proBNP, myoglobin, CK, D dimer and troponin) with Roche Cobas 232 and INR with Roche coagucheck
9. Electrocardiogram assessed using a Physio LifePAK® 15 monitor at baseline
10. Initial and route FiO2 assessed using a Physio LifePAK® 15 monitor at baseline
11. Pupillometry with NPi-300 Pupillometer System
12. Pain scores: visual analog scale, graphic category scale and Wong-Baker scale

The following are evaluated before arrival at the hospital:
1. Respiratory frequency, assessed using clinical observation at baseline
2. Oxygen saturation, assessed using a Physio LifePAK® 15 monitor at baseline
3. Heart rate, assessed using a Physio LifePAK® 15 monitor at baseline
4. Blood pressure, assessed using a Physio LifePAK® 15 monitor at baseline
5. Tympanic temperature assessed using a Braun model ThermoScan® PRO 6000 at baseline
6. Patient consciousness, assessed using the Glasgow Coma Scale at baseline
7. Use of oxygen (or not), evaluated using clinical observation at baseline
8. Prehospital diagnosis according to the Medical Priority Dispatch System incident code at baseline
9. Pupillometry with NPi-300 Pupillometer System
10. Pain scores: visual analog scale, graphic category scale and Wong-Baker scale

Finally, the clinical laboratory will analyze the following using Affias 6 © Boditech Med Inc. (maximum 24 hours following care by emergency medical services):
1. Troponin
2. Myoglobin
3. Creatine kinase-MB (CK-MB)
4. Thyroid stimulating hormone
5. Cortisol
6. C-reactive protein
7. Procalcitonin
8. Interleukin 6

Key secondary outcome(s)
Collected by electronic medical record review:
1. Mortality at 1, 2, 7, 14 and 28 days
2. Out-of-hospital mortality during a follow-up period of up to 3 years
3. Presence of serious adverse events in prehospital scope at baseline
4. Presence of serious adverse events in hospital at 48 hours
5. Need for the Intensive Care Unit by review of the electronic medical record upon patient admission to the emergency department
6. Analytical data from the first blood draw at the hospital: leukocytes, hemoglobin, hematocrit, platelets, sodium, potassium, calcium, chloride, glucose, creatinine, bilirubin, CRP, PCT, troponin, D-dimer, proBNP and CK
7. Comorbidities by review of the electronic medical record upon patient admission to the emergency department
8. Triage level in the first contact in the emergency department

Completion date
31/12/2029

Eligibility

Key inclusion criteria
1. Evaluated by an EMS
2. Transfer to hospital in advanced or basic life support
3. Aged over 18 years
4. Provide informed consent

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 Years

Sex
All

Key exclusion criteria
1. Aged under 18 years
2. Cardiorespiratory arrest or exitus prior to arrival at the hospital
3. Pregnant
4. Psychiatric pathology
5. Diagnosis of end-stage disease (in treatment at a palliative care unit)
6. Advanced life support unit (ALSU) takes longer than 45 minutes to arrive
7. Do not require transfer to the hospital

Date of first enrolment
01/12/2022

Date of final enrolment
31/12/2027

Locations

Countries of recruitment
Spain

Study participating centre
Gerencia de Emergencias Sanitarias de Castilla y León
C/ Antiguo Hospital Militar, s/n
Valladolid
Spain
47006

Study participating centre
Factultad de Medicina
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Study participating centre
Hospital Universitario Rio Hortega
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Study participating centre
Hospital Clinico Universitario de Valladolid
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Sponsor information

Organisation
Junta de Castilla y León

ROR
https://ror.org/02s8dab97

Funder(s)

Funder type
Government

Funder Name
Gerencia Regional de Salud de Castilla y León

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study are/will be available upon request from F. Martín-Rodríguez (fmartin@saludcastillayleon.es). Statistical data will be available from the end of the data collection phase for 4 years. The data may be shared with researchers carrying out similar studies, provided that the exchange of information is mutual, by sending the anonymized data of patients. Patients will have signed informed consent for data sharing

IPD sharing plan summary
Available on request