Results: When ABT was applied, it was possible to prevent barotrauma earlier than the traditional medical observation. However, since the application of ABT requires the patient's voluntary cooperation, it is difficult to prevent barotrauma if a patient has reduced consciousness or is unable to follow the instructions of the medical staff.

Conclusion: Applying ABT is an appropriate method for early detection of barotrauma. However, in order to be applicable to patients with reduced consciousness or difficulty in cooperation, an automatic intrinsic pressure reduction system should be developed.

Machine Learning Prediction for Supplemental Oxygen Requirement in Patients with COVID-19

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Introduction: The coronavirus disease (COVID-19) poses an urgent threat to global public health and is characterized by rapid disease progression even in mild cases. In this study, we investigated whether machine learning can be used to predict which patients will have a deteriorated condition and require oxygenation in asymptomatic or mild cases of COVID-19.

Method: This single-center, retrospective, observational study included COVID-19 patients admitted to the hospital from February 1, 2020, to May 31, 2020, and who were either asymptomatic or presented with mild symptoms and did not require oxygen support on admission. Data on patient characteristics and vital signs were collected upon admission. We used seven machine learning algorithms, assessed their capability to predict exacerbation, and analyzed important influencing features using the best algorithm.

Results: In total, 210 patients were included in the study. Among them, 43 (19%) required oxygen therapy. Of all the models, the logistic regression model had the highest accuracy and precision. Logistic regression analysis showed that the model had an accuracy of 0.900, precision of 0.893, and recall of 0.605. The most important parameter for predictive capability was SpO_2, followed by age, respiratory rate, and systolic blood pressure.

Conclusion: In this study, we developed a machine learning model that can be used as a triage tool by clinicians to detect high-risk patients and disease progression earlier. Prospective validation studies are needed to verify the application of the tool in clinical practice.

An Innovative Mobile Hospital for the Management of a Massive Flow of Victims.

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Introduction: In order to deal with disastrous situations needing massive healthcare support, a new tool, financed by FEDER European funds (Interreg POCTEFA program) has been designed: the multipurpose mobile hospital Europe Occitanie (UMPEO). It is a projectable, foldable, versatile and autonomous truck with an interchangeable function from advanced medical post to operational command center, for acute events involving mass gathering or during multiple victims disasters. This study aims to show the usefulness of this structure during the COVID-19 health crisis.

Method: The UMPEO is a shelter deployable in an emergency ward or intensive care unit, mobilizable in one hour, projectable by truck and autonomous for the first two hours. A descriptive, transversal, European study was carried out to describe its use in the cross-border countries of the Pyrenees (France, Spain and Andorra). When applicable, demographic data were gathered and/or a satisfaction questionnaire was given to the caregivers involved.

Results: Between September 8, 2020 andFebruary 25, 2021, UMPEO was mobilized as a COVID-19 testing center, emergency department, vaccination center or as a command center at a political summit. Thus, 1322 screening tests were carried out over the screening three weeks deployment and 91% of the volunteers considered the screening operation useful. Used as a hospitalization ward, UMPEO was able to accommodate 266 patients over a period of four weeks. Eight hundred people were able to benefit from two doses of vaccines during the six weeks of the mobile vaccination campaign.

Conclusion: This tool, initially designed to be used in the event of a catastrophic event of an accidental or terrorist type or as a help station during mass gathering, has been diverted without any modification of its structure to meet the challenges of the global health crisis and provide a solution adapted to the population of countries bordering the Pyrenees.