# TITLE: METHOD AND APPARATUS FOR THE CARDIOVASCULAR ASSESSMENT OF A SUBJECT IN NEED THEREOF

## FIELD OF INTEREST

Medical Devices

## CLINICAL NEED

Heart lung interactions result from the close anatomical and functional relationship between respiratory and cardiovascular system. Changes in lungs and airway volume and pressure affect the heart load which result in a modulation in hemodynamic variables. Besides the physiological relevance, heart lung interactions are applied for monitoring purposes and they are useful to predict fluid responsiveness. However they have a bigger potential.

We create new technology that is able to estimate the effect of the respiration on hemodynamic signals and offer relevant clinical information that can be applied for:

- Estimation of pleural pressure based on hemodynamic signal without using esophageal balloon.
- Prediction of fluid responsiveness.
- Evaluation of the effect of respiration on vascular mechanics.

This application can be useful for the management of patients subjected to mechanical ventilation, patients in risk of right ventricle failure, hemodynamic unstable patients. These application can be particularly relevant as:

- The development of right ventricle failure is an important prognosis marker in patients with acute respiratory distress syndrome.
- Fluid management is a very important clinical aspect and is related with patient outcomes. The tools for prediction fluid responsiveness are necessary but limited to certain groups of patients.
- Tools for adequate setting of mechanical ventilation are required to avoid the development of lung injury.

## DESCRIPTION OF THE INVENTION

The invention relates to an apparatus and method by which the cardiovascular status of patients, who are optionally mechanically ventilated, can be assessed by analyzing hemodynamic signals reordered according to the respiratory cycle time at which the heart beat occurs. By means of this a waveform that represent the effect of breathing on a cardiovascular variables is created. According to the clinical need this waveform can be used to:

1) Estimate pleural pressure
2) Predict fluid responsiveness.
3) Evaluate the change in a hemodynamic signal according to the respiration stage (inhalation or exhalation).

## ADVANTAGES

Improvement of Patient monitoring
Estimation of pleural pressure without using esophageal balloon.
Prediction of response to fluids in a wider subsets of patients.

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**TECHNOLOGY KEYWORDS**

Cardiovascular assessment, mechanical ventilation, pleural pressure, heart lung interactions.

**IPR STATUS**

Patent application number: EP18382080.2 and PCT/EP2019/053586

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**TYPE AND ROLE OF PARTNER**

Looking for commercial partners interested in elaborating the medical device and licensing.

Estructura de gestión y apoyo