Features of the use of esCCO technology for the diagnosis of human condition

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Abstract

The necessity of expanding the use of esCCO technology to determine the state of human health, especially if he is in a critical and close to it state, is justified. In this case, it is important to get the necessary information in a shorter period of time than using other methods. The features of the application of esCCO technology to determine the human condition in various situations by changing cardiac output are established. Examples of registration of various parameters for calculating cardiac output using esCCO technology and experimental data on changes in cardiac output over time are presented.

Intridaction

Nowadays, there are a large number of factors that affect a person's condition. The state of human health in the course of life, basically, worsens. Therefore, in order to slow down the process of deterioration, people use various means and medications. To make sure of the effectiveness of their use, you need a quick and effective control of your health. Special attention is paid to the methods of express diagnostics of the state of the cardiovascular system, since diseases of such important organs are most common. The esCCO (estimated Continuous Cardiac Output — calculated continuous measurement of cardiac output) method has a number of features. Its use makes it easier and better to find out the necessary information. In addition, the advantage of the esCCO method is minimally invasive and accessible in various aspects of medicine. This method allows for a smaller number of different manipulations to obtain more detailed data. esCCO simultaneously uses ECG electrodes and a pulse oximeter sensor (several different research methods are combined). In addition, taking measurements on different devices at the same time allows you to more accurately notice changes in human health. The use of esCCO technology improves the quality of monitoring of hemodynamic parameters during treatment of any intensity.

FEATURES OF USING ESCCO TECHNOLOGY AND EXPEREMENTAL RESULTS

The specifics of using the esCCO method should be taken into account from the fact that the information obtained for analysis is a calculated continuous cardiac output, which is calculated based on the parameters of vital activity. The following formula is used to calculate cardiac output:

$$esCCO = k\cdot(\alpha\cdot PWTT+\beta)\cdot HR$$

Fig. 1. Nihon Kohden Bsm PVM-2703 bedside monitor

In our work, the features of the application of non-invasive esCCO calibration are considered. In this case, the echo signal is calibrated to a standard cardiac output signal for a certain group of people with certain parameters that are in a narrow range of variation. In the work on Fig. 2, this calibration option is presented.

Analysis of the obtained data on cardiac output shows that the human condition is unstable. There are processes in the body that change over time, leading to various cardiovascular disorders. This leads to an increase in the minute cardiac output and to a decrease in blood pressure and vascular resistance. It should be noted that an essential feature of the esCCO methodology is that special skills and additional sensors are not required when making measurements. The method is easy to use and can be used by specialists of various profiles

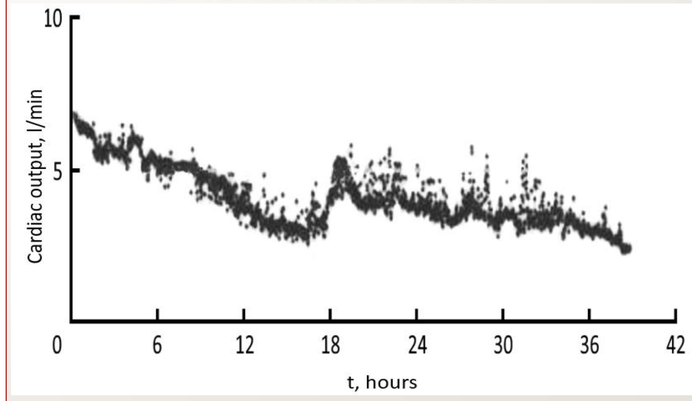

Fig. 3. The dependence of the change in the minute cardiac output on time.

Conclusion

The results obtained by us show that esCCO technology is the most effective and practical for use in various cases. With its help, the diagnosis of a person's health can be carried out during treatment of any intensity (not only during serious operations), but also during less risky procedures that can lead to complications, for example, from the point of view of hemodynamics.

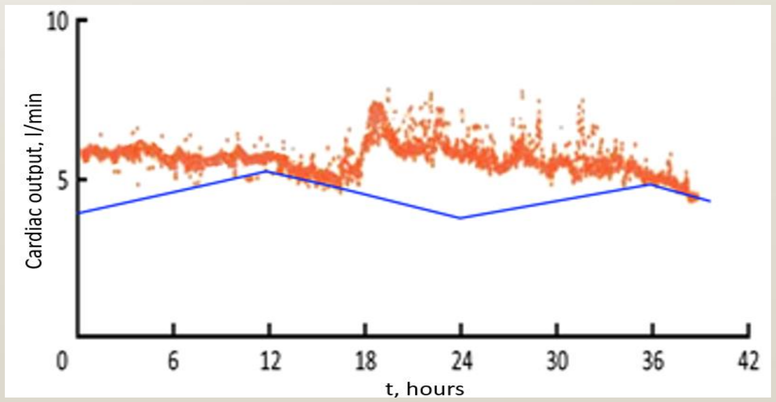

Fig. 2. The dependence of the change in the minute cardiac output on time over a certain life cycle.