



MESPERE LIFESCIENCES' COMPREHENSIVE HEMODYNAMIC MONITORING SOLUTION FOR ECMO

The use of Extracorporeal Membrane Oxygenation (ECMO) is increasing for patients suffering from cardiac and respiratory failure. ECMO provides prolonged pulmonary and/or circulatory support by removing venous blood, pumping it across an oxygenator for gas exchange, and returning the oxygenated blood back to the patient. The purpose is to help restore, support, and maintain systemic perfusion. Although there is no consensus on daily management, general guidelines have been developed for the optimal management for patients undergoing ECMO where hemodynamic monitoring has been proven to be an integral part from initiation to weaning[1].

Hemodynamic monitoring for patients undergoing ECMO provides intensivists with early identification and intervention capabilities before the development of irreversible injuries. 3 key aspects that are monitored are [1]:

1. **Perfusion** in order to maintain optimal blood flow and oxygen supply for adequate systemic and global tissue perfusion.
2. **Adequate Flow** in order to balance the patient's native blood flow to the external ECMO flow.
3. **Cardiac Function** in order to prevent further cardiac dysfunction and/or failure.

“OPTIMAL MANAGEMENT APPROACHES INVOLVED SEVERAL INPUTS SUCH AS CIRCULATORY SUPPORT, INFECTION PREVENTION, AND NUTRITION SUPPORT, WHERE HEMODYNAMIC MONITORING PLAYS A FUNDAMENTAL ROLE IN VA-ECMO, FROM INITIATION TO WEANING”

- ANN TRANSL ED 2020;8(12):792

The current gold standard for hemodynamic management is by using a pulmonary artery catheter (PAC) or central venous catheter (CVC). Due to the complexity and highly invasive nature of these catheters, the chance of infection and catheter-related complications is high and it has been suggested that PAC should not be used routinely in hemodynamically unstable patients [2]. Transthoracic Echocardiography (TTE) is an accurate and precise method for estimating cardiac hemodynamics however it provides intermittent measurements and there is high operator dependency[3]. Easy to use, noninvasive, and continuous hemodynamic monitoring coupled with guidelines is a critical tool needed for intensivists to support patients on ECMO.

Mespere LifeSciences has developed a completely noninvasive, comprehensive, cardiac and cerebral hemodynamic monitoring platform that meets all 3 key monitoring aspects.

OUR CARDIAC SOLUTION

The VenArt Cardiac Output monitoring system noninvasively obtains venous and arterial oxygen saturation values - and then performs a beat-by-beat Fick Principle calculation in order to derive cardiac output, cardiac index, stroke volume, and stroke volume variations.

PERFUSION

Venous Oxygen Saturation (SjvO₂) -

systemic oxygen consumption

Arterial Oxygen Saturation (SpO₂) -

systemic oxygen supply

“THE BEST MEASURE OF ADEQUATE SYSTEMIC PERFUSION IS VENOUS SATURATION GREATER THAN 70%”

- ELSO GUIDELINES V1.4

“DURING ECMO REDUCTION, MONITORING CENTRAL VENOUS AND ARTERIAL SATURATION WAS ESSENTIAL”

- J THORAC CARDIOVASC SURG 2011;142:1199

ADEQUATE FLOW

Cardiac Output (CO) -

native cardiac blood flow

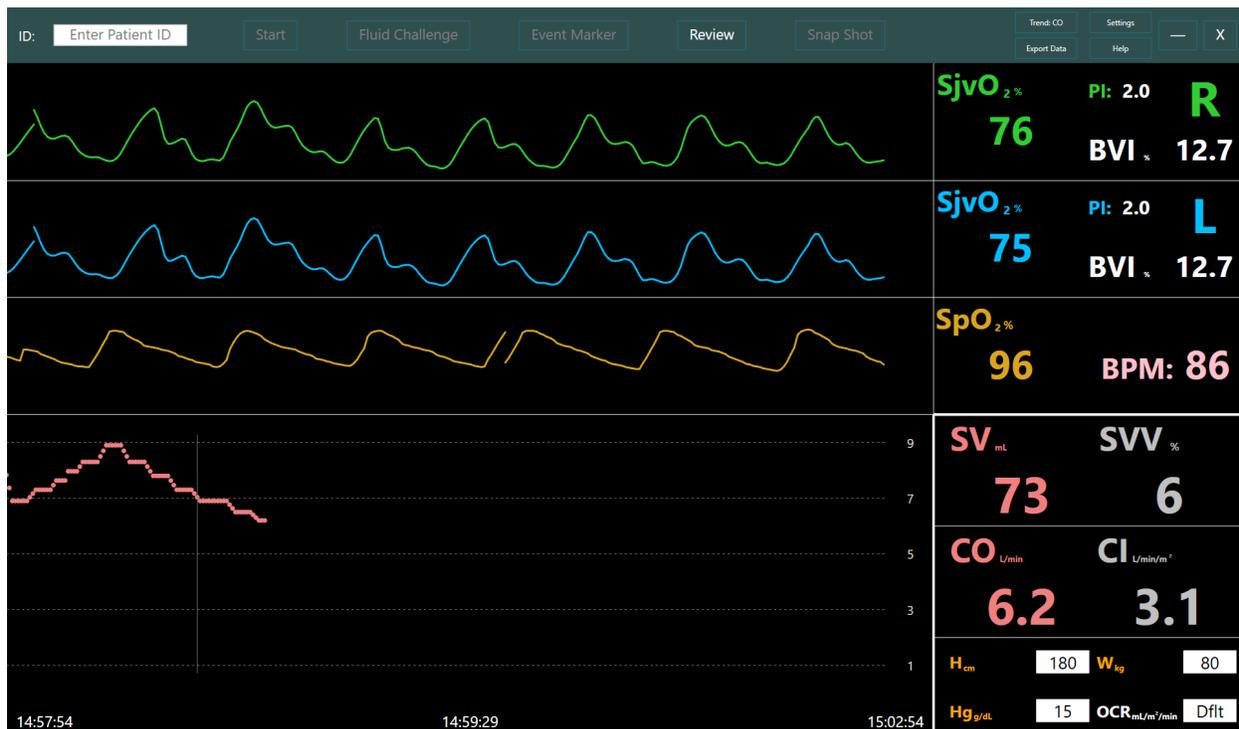
CARDIAC FUNCTION

Stroke Volume (SV) -

left ventricular function

Arterial and Venous Waveform -

pulsatility monitoring



OUR CEREBRAL & TISSUE SOLUTION

The only cerebral and tissue oximeter with both regional oxygenation and blood volume, proving to be the most accurate, cost effective, and user friendly cerebral and tissue oximetry system on the market

PERFUSION

Regional Tissue Oxygen Saturation (StO₂) –

balance between oxygen delivery and consumption for cerebral or lower extremity tissue

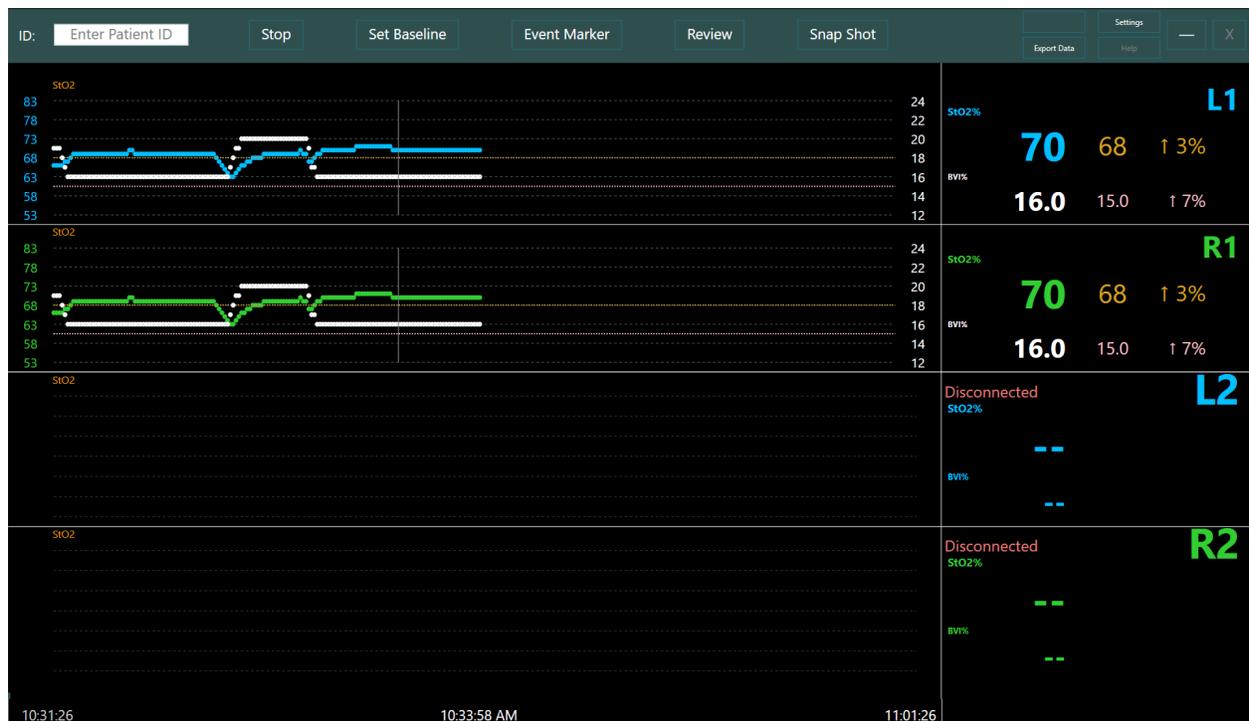
ADEQUATE FLOW

Blood Volume Index (BVI) -

blood volume in regional tissue beneath the sensor

“CONTINUOUS MONITORING OF CEREBRAL AND LOWER EXTREMITY REGIONAL SATURATION OXYGEN LEVELS COULD PROVIDE INTENSIVISTS WITH EARLY IDENTIFICATION AND INTERVENTION CAPABILITIES BEFORE THE DEVELOPMENT OF IRREVERSIBLE INJURY, AND COULD SERVE AS AN ADJUNCTIVE INDICATOR OF NEUROLOGIC OR LOWER EXTREMITY STATUS IN VA-ECMO PATIENTS”

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