

# The ELSA — Transsonic's Extracorporeal Life Support Assurance Monitor Optimizes ECMO Therapy & Safeguards A Hospital's ECMO Program

## To Measure is to Know!

For the past 35 years Transsonic has been providing the world's most precise measurement solutions for medicine and research.

Hand in hand with the evolution of extracorporeal membrane oxygenation (ECMO) has been Transsonic's development of Flowsensors that clamp onto sterile tubing to measure the volume flow inside the circuit.

The first Transsonic Tubing Flowsensors were introduced in 1987. Continuous improvements in the sensors has expanded their measurement capability so that now the 300–500 mL/min low flows typical in ECMO circuits can now be accurately measured.

*"The ELSA monitor provides an easy to use, non-invasive method to measure recirculation in VV ECMO without blood sampling."*

Said MM et al, *Children's Hospital, Washington, DC, "Influence of central hemodynamics on VV ECMO oxygen delivery in neonatal animal model," J Neonatal Perinatal Med 2017.*



ELSA Monitor



Clamp-on Tubing Sensors

# Optimize ECMO Delivery

## What Does the ELSA Monitor Do?

The Transonic® ELSA Monitor is a state-of-the-art instrument that is used to optimize and safeguard extracorporeal membrane oxygenation (ECMO) therapy in infants, children and adults.

It uses two gold standard technologies (transit-time ultrasound & ultrasound flow/dilution) to:

- Measure true blood flow in ECMO circuits;
- Quantify recirculation during VV ECMO;
- Detect and trend oxygenator clotting.

### The ELSA Verifies Delivered Blood Flow

Delivered blood flow errors and recirculation compromise the delivery of oxygenated blood to the fragile ECMO patient.

The Transonic® ELSA Monitor measures true delivered blood flow through the ECMO circuit using “gold standard” transit-time ultrasound technology. When the actual delivered blood flow is compared to the flow reading on the pump, flow limiting causes such as incorrect cannula placement can be identified and corrected on the spot.

### ELSA Recirculation Measurements Help Optimize ECMO Therapy

Measuring recirculation with the Transonic ELSA Monitor provides the intensivist with vital information about the patient and ECMO performance. High recirculation during VV ECMO may indicate:

- Cannula misplacement;
- Hypovolemia;
- Cardiac failure.

Knowing recirculation helps an intensivist establish an optimal pump setting before recirculation occurs to minimize the length of ECMO runs, identify cannula migration, and identify restricted flow due to hypovolemia and/or cardiac failure.

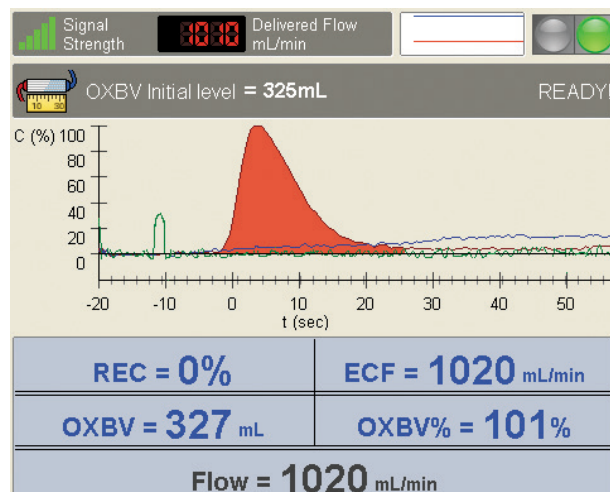


Fig. 1: Oxygenator Blood Volume (OXBV) plus Recirculation Results screen during VV ECMO.

### The ELSA Detects Clotting

Clotting in the ECMO oxygenator is one of the major complications of ECMO. The challenge for the team is to limit clotting and prevent thrombotic emboli from occurring.

The ELSA Monitor measures oxygenator blood volume to identify the amount of clot formation in the oxygenator. This gives the perfusionist a wider window of opportunity to perform oxygenator change-outs, if necessary.

#### HOW THE ELSA WORKS

ELSA Flow/Dilution Sensors use ultrasonic transit-time sensors to measure delivered volume flow in fluids with the highest accuracy. When a bolus of saline is injected into the circuit, the Transonic® ELSA Monitor detects and quantifies recirculation in VV ECMO single- or dual- cannula configurations. It also quantifies oxygenator clotting in VV or VA circuits.

No physical contact is made with the fluid so circuit sterility is maintained at all times.

# Maximize ECMO Efficiency

## The ELSA Helps Surgeons & Intensivists



The ELSA Monitor helps the surgeons and intensivists provide optimal cannula placement and ECMO delivery by the following:

- With the ELSA, the perfusionist can achieve a maximum flow setting that minimizes recirculation;
- Elevated rates of recirculation identified by the ELSA tell the intensivist that the cannulas are not optimally positioned, the patient is hypovolemic, or that the patient is undergoing cardiac failure.
- The perfusionist has more time to change out the oxygenator when the ELSA identifies unacceptably high clot development in an ECMO oxygenator.

## The ELSA Helps Patients

Using the ELSA Monitor directly helps fragile ECMO patients as ICU staff seek to save their lives with ECMO therapy:

- Catastrophic circuit failures with dire consequences can be averted because actual blood flow through the circuit is known at all times and kinks and circuit blockages can be immediately identified and corrected.
- The time that the patient has to be on ECMO is shortened when known values for flow and recirculation are used and optimal cannula placement is achieved.



## The ELSA Helps Hospitals

Using the ELSA Monitor during ECMO directly helps your hospital.

- Shorter ECMO runs translate into cost savings for your hospital;
- Better outcomes improve your hospital's quality scores;
- Optimizing ECMO facilitates better outcomes that enhance a hospital's reputation for delivering the highest quality care with state-of-the-art instrumentation and adherence to best practices;
- Averting catastrophic circuit failures safeguards your hospital's ELSA program.

# Annotated References

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Said MM, Mikesell GT, Rivera O, Khodayar Rais-Bahrami K, **"Precision and Accuracy of the New Transonic ELSA Monitor to Quantify Oxygenator Blood Volume (in-vivo and in-vitro studies),"** 2015 PAS Annual Meeting and Eastern SPR Annual Meeting. (Transonic Reference # ELS10230V) *The ELSA monitor would be a valuable tool to identify early clot formation in ECMO circuits and allow device change outs before they become a clinically emergent.*

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ELS10231V) *"Using the injection of a small volume of saline, the ELSA monitor provides a non-invasive method to measure recirculation and optimize catheter performance in an ECMO circuit."*

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Transonic Systems Inc. is a global manufacturer of innovative biomedical measurement equipment. Founded in 1983, Transonic sells "gold standard" transit-time ultrasound flowmeters and monitors for surgical, hemodialysis, pediatric critical care, perfusion, interventional radiology and research applications. In addition, Transonic provides pressure and pressure volume systems, laser Doppler flowmeters and telemetry systems.

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