Extracorporeal Clearance Precision Meter

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Invention

Extracorporeal blood purification treatments (such as dialysis) are often required to keep intensive care patients alive. Solute clearance via extracorporeal treatments decreases over time in an unpredictable non-quantifiable way. The extracorporeal clearance precision measurement system allows clearance rate of extracorporeal treatments to be measured in real time and adjusted to patients' needs.

The extracorporeal clearance precision measurement system consists of a mobile sampling device (which takes samples from the extracorporeal circuit in a controlled manner) and a stationary measurement device (which measures target solute concentrations and calculates extracorporeal clearance in the collected samples).

This sampling system allows for safe, automated, collection of biological samples from the extracorporeal circuit under controlled conditions of rate and pressure. Currently, the sampling process involves at least two operators who take simultaneous manual (using needles and syringes) samples from the extracorporeal circuit at three required sampling points (prefilter, postfilter and effluent). As a result, the sampling process is inadequate in almost all cases.

The collected samples are then transferred to the stationary measuring system to determine specific solutes concentrations based on increasing molecular weights and quantify transmembrane clearance. Using interpolation, the system calculates, in real-time, the transmembrane clearance of solutes with different molecular weights, including those used during treatment and for which bedside determination is impossible using current analytical methods.

Industrial applicability

The patented invention can be applied in all patients requiring blood purification.

The advantages of the patented technology are numerous, including:

1. Bedside monitoring of blood purification treatments;
2. Real-time analysis of treatment efficiency in terms of solutes clearance (for solutes of any molecular weight);
3. Calculation of clearance of target solutes used during treatment (non-quantifiable with currently available analytical methods);
4. Accurate management of hemodepurative treatments;
5. Personalization of treatment according to the patient’s concrete clinical needs;
6. Improvement of the outcome of patients admitted to intensive care units (including mortality);
7. Reduction of costs related to the management of hemodepurative treatments.

Possible Developments

The patent is available for exclusive and non-exclusive licensing. Licenses are available for the remaining duration of patent rights.

The Research Group is available for new collaborative and third-party research activities, in-depth technical investigations, scientific advice, also aimed at raising the TRL of the technology.

The TRL of the invention is 3.

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