TTO4IRCCS

LICENSING OPPORTUNITIES

Fondazione IRCCS
Istituto Nazionale dei Tumori

Sistema Socio Sanitario
Regione Lombardia

PHARMACODYNAMIC ADAPTIVE SYSTEM CONTROLLING THE DEPTH OF ANAESTHESIA

PCT/IB2020/060073

Applications:
- The system is applicable to all surgical procedures that require general anesthesia.
- Decision support system designed to model the entire process of GA control task.

Key benefits:
- Provides anaesthesiologists with the optimal drug infusion recommendation.
- Allows better personalised approach with higher reproducibility.
- Reduces workload and increase clinician vigilance.

Offer:
- Licensing out.
- Co-Development.

TTO4IRCCS
LICENSING OPPORTUNITIES

Fondazione IRCCS
Istituto Nazionale dei Tumori

Sistema Socio Sanitario

Regione
Lombardia
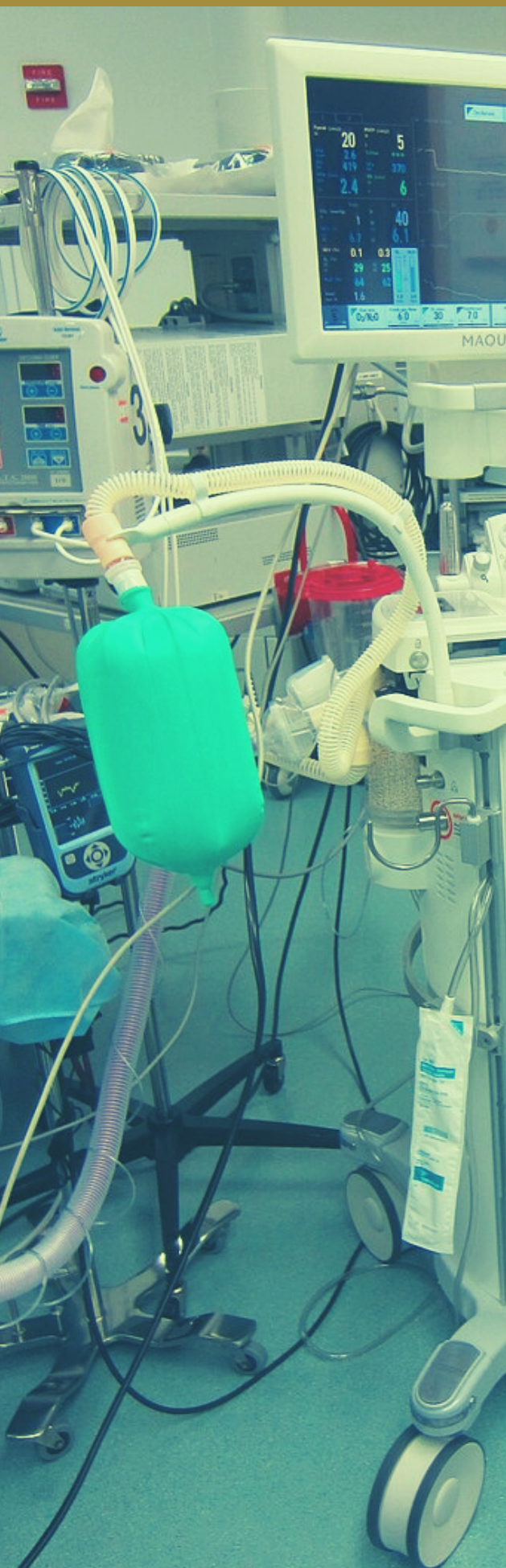
PHARMACODYNAMIC ADAPTIVE SYSTEM CONTROLLING THE DEPTH OF ANAESTHESIA

INVENTION

The invention relates to an algorithm for controlling hypnotic and opioid level throughout the entire control task of General Anaesthesia. In particular, the invention implements a series of steps which allows to optimize the anaesthesia level for the induction and maintenance of a balanced anaesthesia.

BACKGROUND

After induction of General Anaesthesia (GA), the hypnotics and opioid levels need to be constantly adjusted to maintain the patient in an adequate state of anaesthesia. This control task requires repeated interventions to regulate drug dosing accordingly to a measure of drug effect. This reactive approach can be easily recognised as a feedback control system suggesting the implementation of algorithms to standardise and automatise the titration process. So far, the several answers to this issue available in anaesthetic literature have a common denominator in the use of algorithms derived by the experience developed in the engineering context of automated feedback-control systems. While appreciating the potential of this approach, the algorithms proposed so far seem not to take into consideration the synergic-like pharmacodynamic interaction between hypnotics and opioids which is the pharmacological principle underpinning balanced anaesthesia. The answer to this issue is the TI.VA system presented in this document.

TECHNOLOGY

TI.VA system is based on a multiple-input/multiple-output algorithm integrating a hypnotic and stress signal to balance the needs for hypnotics and opioids over the course of general anaesthesia anytime the set levels of anaesthetics result not appropriated to blunt the patient's reaction to procedural stress. The algorithm is composed of four main elements:a Decision-Making Matrix shaped by crossing Bispectral Index as a signal of hypnotic level, and Mean Arterial Pressure as stress index;the patient deviation from the center of the matrix is represented through a vector quantifying the inadequacy of anaesthesia level, the analysis of the vector's main components generates two coefficients weighting the relative contribution of BIS and MAP in the current deviation state;two filter functions which block the interventions on anaesthetic levels anytime the two control variables are fully within the normal range accepted by the algorithm; otherwise, the coefficients generated by the vector analysis are used to quantify the intervention on the hypnotic and opioid drug concentrations.

INVENTOR

Tognoli Emiliano.

INTELLECTUAL PROPERTY RIGHTS

Patent application filed in Italy, PCT application filed.

OFFER

Licensing out & co-development.

CONTACT: segreteria.TTO@istitutotumori.mi.it