Automated titration of vasopressor infusion within predefined guardrails for efficient hypotension management

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BRIEF DESCRIPTION

The invention automatically controls the blood pressure of patients on a continuous basis. It monitors the blood pressure and takes an action, within safety limits, whenever needed. The invention represents a dramatic improvement in the hypotension and critical care management.

FULL DESCRIPTION

Hypotension management is a critical component of intensive care and clinical anesthesiology. Mismanagement of a patient suffering from hypotension may result in organ damage, ischemia, stroke, heart attack and even death. To reverse the effects of hypotension, physicians administer a vasopressor either by infusions or bolus. But unfortunately infusion can be difficult to adjust and bolus administration suffers from inconsistent delivery of medication. There appears to be a need for a system that responds rapidly and yields accurate results.

Inventors at UCI devised a simple yet efficient self-titrating infusion controller. It's a closed loop system that uses feedback from patient monitors and controls the patient's blood pressure accordingly. The invention is unique with its safety limits. Not only does it validate the blood pressure readings to avoid any false measurements, it also sets safety limits, e.g., "guardrails" which accommodates for the natural clinical variability and fluctuation without causing oscillation to the controller. The invention can improve the critical care management systems, making them more efficient and precise.

SUGGESTED USES

· Intensive care and clinical anesthesiology

· Hypotension Management

· Blood pressure control for individuals who need continuous monitoring.

ADVANTAGES

· Patients' blood pressure can be smoothly controlled on a continuing basis

· Minimal supervisor workload and attention

· Allows the bedside provider to focus on other tasks of critical care management

· Safety systems to validate the patient blood pressure and protect against false measurements

· Allowing a target "range", instead of just one single value

CONTACT

Alvin Viray
aviray@uci.edu
tel: 949-824-3104.

OTHER INFORMATION

KEYWORDS

Hypotension management, Blood-pressure management, Closed loop, ICUs, Blood pressure, Vasopressors

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Engineering**
  - Engineering
- **Medical**
  - Delivery Systems
  - Software

RELATED CASES

2016-337-0

· Allowance of buffer region around the target value permits normal clinical variability and fluctuation without causing controller’s oscillation.

STATE OF DEVELOPMENT

Computer model simulation

RELATED MATERIALS

» Rinehart J, C. Canales (2015). "Closed-loop pharmacology in anesthesia and critical care: benefits and limitations." Int Anesthesiol Clin 53(2): 91-101. - 01/01/2015

» Evaluation of a novel closed-loop fluid-administration system based on dynamic predictors of fluid responsiveness: an in silico simulation study - 11/23/2011

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5270 California Avenue / Irvine,CA
92697-7700 / Tel: 949.824.2683