

# Comparison of different blood flow monitoring systems in critically ill patients

<b>Submission date</b> 30/11/2019	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 15/12/2019	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 17/01/2023	<b>Condition category</b> Circulatory System	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

In critically ill patients it is important to closely monitor aspects of blood flow (haemodynamic parameters) such as amount of blood flow, the blood pressure, the heart output. The technique used to measure this is known as transpulmonary thermodilution and pulse contour analysis. The measurements can be performed using a tube attached to sensory equipment inserted into a large blood vessel (central venous catheter). Precise and reliable measurements are important. At the present time there are two devices which are routinely using transpulmonary thermodilution and pulse contour analysis to determine extended haemodynamic parameters: PiCCO and EV1000 monitoring systems. The aim of this study is to compare the PiCCO and EV1000 for neck vein (jugular) and leg vein (femoral) measurements.

### Who can participate?

Patients aged 18 years or above who are being treated in the intensive care unit.

### What does the study involve?

In this study EV1000 will be replaced by PiCCO device or vice-versa. During the exchange of these monitoring systems, measurements will be performed using the jugular and femoral central venous catheter to allow the comparison of both haemodynamic monitoring systems.

### What are the possible benefits and risks of participating?

The measurements during the exchange from one to another monitoring system guarantee the reliability of determined parameters and its usefulness for further therapeutic management. As both systems are clinically approved and routinely used, there is no additional risk by the devices. The decision for exchange of arterial or central venous/shaldon catheter will be made irrespective of the study according to local standards. The most common complication of replacement of arterial or central venous line are vascular-, pulmonary-, cardiac-complications, catheter dysfunction or infection.

### Where is the study run from?

Klinik und Poliklinik für Innere Medizin II am Klinikum rechts der Isar, Technische Universität München, Germany

When is the study starting and how long is it expected to run for?

January 2017 to March 2017

Who is funding the study?

Klinik und Poliklinik für Innere Medizin II am Klinikum rechts der Isar, Technische Universität München, Germany

Who is the main contact?

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The usefulness of transpulmonary thermodilution (TPTD) for the measurement of extended hemodynamic parameters (e.g. cardiac index (CI), global end-diastolic volume index (GEDVI), extra vascular lung water index (EVLWI), pulmonary vascular permeability index (PVPI) and global ejection fraction (GEF)) has been demonstrated in a number of studies. Usually TPTD is performed by indicator injection via the jugular or subclavian vein. However, under certain circumstances, superior vena cava access is not feasible. In these cases, femoral access can be used for measurement. Femoral Indicator bolus injections using PiCCO®-device have demonstrated significant overestimation particularly of GEDVI due to the additional volume of the inferior vena cava. This overestimation was corrected by formula and integrated in the newest algorithm used by PiCCO®-device. Recently, in addition to the PiCCO® device, another commercially available device for TPTD has been introduced, EV1000/VolumeView® which uses similar methodologies and algorithms as the PiCCO® device. However, there are no systematic data on the impact of femoral indicator injection for the EV-1000® device. Therefore, we compared the agreement of hemodynamic parameters sequentially derived by femoral as well as jugular indicator injection using the EV-1000® and the PiCCO® device in patients equipped with both jugular and femoral venous access.

## Contact information

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**Additional identifiers****Clinical Trials Information System (CTIS)**

Nil known

**ClinicalTrials.gov (NCT)**

Nil known

**Protocol serial number**

EV-1000

**Study information****Scientific Title**

Comparison of global end-diastolic volume index derived from jugular and femoral indicator injection in patients equipped with both a PiCCO-2 and an EV-1000-device

**Study objectives**

Are parameters derived by PiCCO and EV-1000-device comparable?

**Ethics approval required**

Old ethics approval format

**Ethics approval(s)**

Approved 28/06/2012, Ethikkommission; Fakultät für Medizin; Technische Universität München (Ismaninger Straße 22, 81675, München, Germany; +49 4140-7737; ethikkommission@mri.tum.de), ref: 5384/12

**Study design**

Prospective observational study

**Primary study design**

Observational

**Study type(s)**

Diagnostic

**Health condition(s) or problem(s) studied**

Critically ill patients with the need for extended hemodynamic monitoring

**Interventions**

First, only patients already equipped with a central venous catheter/dialysis catheter and PiCCO or EV-1000 monitoring system will be enrolled in this study.

Second, the treating physician (not involved in the study) performs the change of the CVC and the arterial line in patients with pre-existing and continuous need for advanced haemodynamic (transpulmonary thermodilution)-monitoring. This decision will be made irrespective of the study according to local standards. During the change of catheters, measurements with PiCCO- and EV-1000-device will be performed. A measurement consists of a triplicate injection of indicator (15 ml ice cold 0,9% saline solution). Duration of the measurement is around 15 minutes. There is no other intervention or follow up.

**Intervention Type**

Device

**Phase**

Not Applicable

**Drug/device/biological/vaccine name(s)**

PiCCO® device EV-1000® device

**Primary outcome(s)**

Global end-diastolic volume (index) measured using PiCCO and EV1000

**Key secondary outcome(s)**

Measured using PiCCO and EV1000

1. Cardiac output/index
2. Cardiac function index
3. Global ejection fraction
4. Extravascular lung water index
5. Pulmonary vascular permeability index
6. Central venous pressure
7. Systolic volume variation
8. Pulse pressure variation

**Completion date**

31/03/2017

**Eligibility****Key inclusion criteria**

1. Patients treated on the intensive care unit
2. Critically ill patients
3. Patients with the need of a change of CVC and arterial line in patients with pre-existing and

continuing need for TPTD-monitoring

4. Hemodynamic stable patients without vasopressors or with a constant vasopressor-dosage

**Participant type(s)**

Patient

**Healthy volunteers allowed**

No

**Age group**

Adult

**Sex**

All

**Total final enrolment**

10

**Key exclusion criteria**

1. Pregnant
2. Younger than 18 years old

**Date of first enrolment**

25/01/2017

**Date of final enrolment**

31/03/2017

## **Locations**

**Countries of recruitment**

Germany

**Study participating centre**

Klinikum rechts der Isar, Technische Universität München

Ismaningerstraße 22

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## **Sponsor information**

**Organisation**

Klinikum der Universität München

ROR

<https://ror.org/02jet3w32>

## Funder(s)

### Funder type

Hospital/treatment centre

### Funder Name

Technische Universität München

### Alternative Name(s)

Technical University of Munich, TUM

### Funding Body Type

Government organisation

### Funding Body Subtype

Universities (academic only)

### Location

Germany

## Results and Publications

### Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request

### IPD sharing plan summary

Available on request

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>		27/11/2020	17/01/2023	Yes	No
<a href="#">Participant information sheet</a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes