

# Determination of mean systemic filling pressure: 3 compartments

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To determine the mean systemic filling pressure, the arm-occlusion pressure, the cerebral zero flow pressure and their response to changes in volume status and vasoactive medication. To evaluate and confirm the value of mean systemic filling...

<b>Ethical review</b>	-
<b>Status</b>	Recruitment stopped
<b>Health condition type</b>	Other condition
<b>Study type</b>	Observational invasive

## Summary

### ID

NL-OMON29833

### Source

ToetsingOnline

### Brief title

Mean systemic filling pressure

### Condition

- Other condition
- Coronary artery disorders
- Increased intracranial pressure and hydrocephalus

### Synonym

cardiac surgery patients, cerebral vasospasm after subarachnoid hemorrhage, intracranial hypertension

### Health condition

intensive care patienten

### Research involving

Human

## Sponsors and support

**Primary sponsor:** Academisch Medisch Centrum

**Source(s) of monetary or material Support:** Ministerie van OC&W

## Intervention

**Keyword:** Arm pressure, Mean systemic filling pressure, Volume status, Zero flow pressure

## Outcome measures

### Primary outcome

Thermodilution cardiac output, pulmonary artery pressure and central venous pressure (Swan-Ganz pulmonary artery catheter) in the cardiac surgery patients and a central venous pressure (central venous catheter) in the ICP- and SAH-group.

Radial artery pressure, peripheral venous pressure, stroke volume variation and pulse pressure variation (pulse contour analysis) in all groups.

Median cerebral artery blood flow velocity (transcranial Doppler, insonation depth 45-54 mm) in all groups.

Airway pressures (in the ventilated patients).

Intracranial pressure (intraventricular catheter) in the ICP-group.

### Secondary outcome

NA

## Study description

### Background summary

Determining the volume status is important in critically ill patients. Many variables to determine volume status, are only validated in sedated, ventilated patients with regular heart rate and are influenced by the ventilator settings.

The mean systemic filling pressure (the equilibrium pressure in the systemic circulation when there is no flow) is a measure of volume status. In the patient in the ICU it is not possible to achieve a situation when there is no systemic flow.

We are interested in filling pressures of the entire circulation, but also of the different compartments. At the same time we want to predict fluid responsiveness with less invasive monitoring.

In the entire circulation the mean systemic filling pressure can only be estimated. It is calculated by measuring stroke volume variation and central venous pressure during inspiration and expiration. Another way to calculate mean systemic filling pressure is by measuring arterial systolic blood pressure during short periods of inspiratory holds with different airway pressures.

In the arm it is possible to stop blood flow temporarily by inflating a cuff around the upper arm. A radial artery pressure can be measured in this situation (arm-occlusion pressure, thus the zero flow pressure in the arm).

Combining arterial blood pressure with transcranial Doppler, it is possible to extrapolate to a pressure, when there is no blood flow. Zero flow pressure in the cerebral arteries can thus be determined by synchronized signal analysis of arterial blood pressure and the spectral augmentation of MCA - blood flow velocity measured with transcranial Doppler (TCD).

## **Study objective**

To determine the mean systemic filling pressure, the arm-occlusion pressure, the cerebral zero flow pressure and their response to changes in volume status and vasoactive medication.

To evaluate and confirm the value of mean systemic filling pressure compared with more traditional measures of fluid responsiveness as CVP, PAOP, SVV and PPV.

## **Study design**

This is an observational study during standard treatment.

## **Study burden and risks**

During 90 minutes hemodynamic and respiratory variables and blood flow velocities (transcranial doppler) will be recorded during standard care.

During measurements of arm-occlusion pressure, a cuff around the upper arm will be inflated during 30 seconds.

There are no additional risks for the patient.

## Contacts

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### Scientific

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## Trial sites

### Listed location countries

Netherlands

## Eligibility criteria

### Age

Adults (18-64 years)

Elderly (65 years and older)

### Inclusion criteria

Cardiac surgery patients

Patients with intracranial hypertension

Patients with vasospasm after subarachnoid hemorrhage

### Exclusion criteria

Cardiac arrhythmias

Hemodynamic instability

Intra-aortic balloonpump

## Study design

### Design

**Study type:** Observational invasive

Masking: Open (masking not used)

Control: Uncontrolled

Primary purpose: Diagnostic

### Recruitment

NL

Recruitment status: Recruitment stopped

Start date (anticipated): 01-03-2007

Enrollment: 40

Type: Actual

## Ethics review

Not available

## Study registrations

### Followed up by the following (possibly more current) registration

No registrations found.

### Other (possibly less up-to-date) registrations in this register

No registrations found.

### In other registers

**Register**

CCMO

**ID**

NL12835.058.06