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...

Ethical review	-
Status	Recruitment stopped
Health condition type	Other condition
Study type	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 prerssure, 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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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	ID
CCMO	NL12835.058.06