Bayesian optimized Propofol Target-Controlled Infusion

No registrations found.

Ethical review	Positive opinion
Status	Pending
Health condition type	-
Study type	Interventional

Summary

ID

NL-OMON23794

Source
NTR

Brief title
BOP-TCI-1

Health condition

elective surgery under general anaesthesia with propofol and requiring an arterial line for invasive blood pressure monitoring as part of their clinical care
Target-Controlled Infusion,propofol,pk/pd

Sponsors and support

Primary sponsor: University medical center groningen, university of groningen, the netherlands
Source(s) of monetary or material Support: University medical center groningen, university of groningen, the netherlands

Intervention

Outcome measures

Primary outcome

We hypothesize that online adaptation or individualization of the population PKPD model of

propofol will decrease the residual error between predicted and measured plasma-concentrations during maintenance of anaesthesia, when the adapted PKPD models are used to calculate propofol infusion rates required for the plasma concentrations set by the responsible anaesthetist

Secondary outcome

Secondly, we will compare the hypnotic and haemodynamic stability before and after the adaptation as measured by EEG and other vital signs clinical monitoring

Study description

Background summary

Population based pharmacokinetic-dynamic (PKPD) models of propofol are used in daily practice to titrate propofol towards a predicted plasmaand/
or effect-site concentration. 1-4 It has been accepted that the population based prediction of the propofol plasma concentration may have
an error of about 20% compared to the measured propofol concentrations in the individual patient. 5 This error is considered acceptable in the
clinically applied new generation target controlled infusion (TCI) systems for propofol administration 6-8.

Recently, new technology has been developed to measure propofol concentrations in plasma with minimal delay of about 10 minutes after
sampling. This technology opens opportunities to decrease the residual error between predicted (population) and measured (individual)
propofol plasma concentrations during maintenance of anaesthesia. A decrease of the prediction error has several potential advantages such
as less accumulation of drug, faster recovery from anaesthesia, less overshoot in propofol effect when adjusting the dose etc…

Our study tests whether online adaptation of the population PKPD model (being used to calculate the infusion rates during maintenance of
anaesthesia), based on differences measured and predicted concentrations, will decrease the residual errors between subsequent
measurements and predicted concentrations. Such an individualization of the population PKPD should be done in a Bayesian approach as it
has been shown to be a good method of updating pharmacokinetic models during infusion, when intermittent drug concentration measurements
are performed 9. This method adapts the starting (population) pharmacokinetic model, on the basis of the measured blood samples to generate
a patient-individualized model.

Study objective

We hypothesize that adaptation or tuning of the population PKPD model of propofol will decrease the residual error between predicted and measured plasma-concentrations during maintenance of anaesthesia. The adapted PKPD models can also be used online to calculate propofol infusion rates required for the target concentrations set by the responsible anaesthetist. Doses given to the patients remain within the control of the attending anaesthetist at all times and within clinically accepted dosing guidelines. We only test whether the error between prediction and measurement decreases when an individualized PKPD model is used to predict required propofol infusion rates compared to a non-adaptive population typical value PKPD model.

Study design

1 day = the day of the operation

Intervention

Patients receive propofol by means of a PKPD model. Initially a classical population based PKPD model is used. Based on results from intra-operative sampling an individualized PKPD model is used. Anesthesiologists will know when changes in regimen can occur. However, due to blinding, they will not know whether the patient is enrolled in the control group (nothing changes) or in the intervention group (regimen is individualized).

Contacts

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Eligibility criteria

Inclusion criteria

-Age between : 18 years and 75 years

-Informed patient consent

-ASA Class (American Society of Anesthesiologists physical status) I- III

- Scheduled for elective surgery under general anaesthesia with propofol and requiring an arterial line for invasive blood pressure monitoring as part of their clinical care will be enrolled.

Exclusion criteria

•patient refusal

•CNS diseases (dementia, CVI, seizures, psychiatric diseases)

•Regular intake of CNS active drugs (benzodiazepines, antidepressants, antipsychotics, anticonvulsants)

•Regular intake of opioids (morphine > 30 mg/day)

•Relevant hepatic disease (Child B or higher)

•Body mass index (BMI) <18 or >35 kg/m2

•Pregnancy, or currently nursing

•Overt signs of alcohol abuse

•Contraindications or allergies to the drugs used in the study

•Expected blood loss during surgery > 2000 ml

Study design

Design

Study type:	Interventional
Intervention model:	Parallel

Allocation:	Randomized controlled trial
Masking:	Single blinded (masking used)
Control:	Active

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	01-05-2014
Enrollment:	120
Type:	Anticipated

Ethics review

Positive opinion

Date:	16-04-2014
Application type:	First submission

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
NTR-new	NL4387
NTR-old	NTR4518
Other	: METc 2013/374

Study results