Bayesian optimized Propofol Target-Controlled Infusion

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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…

Ethische beoordeling	Positief advies
Status	Werving nog niet gestart
Type aandoening	-
Onderzoekstype	Interventie onderzoek

Samenvatting

ID

NL-OMON23794

Bron
NTR

Verkorte titel
BOP-TCI-1

Aandoening

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

Ondersteuning

Primaire sponsor: University medical center groningen, university of groningen, the netherlands
Overige ondersteuning: University medical center groningen, university of groningen, the netherlands

Onderzoeksproduct en/of interventie

Uitkomstmaten

Primaire uitkomstmaten

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

Toelichting onderzoek

Achtergrond van het onderzoek

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.

Doel van het onderzoek

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.

Onderzoeksopzet

1 day = the day of the operation

Onderzoeksproduct en/of interventie

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).

Contactpersonen

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Deelname eisen

Belangrijkste voorwaarden om deel te mogen nemen (Inclusiecriteria)

-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.

Belangrijkste redenen om niet deel te kunnen nemen (Exclusiecriteria)

•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

Onderzoeksopzet

Opzet

Type:	Interventie onderzoek
Onderzoeksmodel:	Parallel
Toewijzing:	Gerandomiseerd
Blindering:	Enkelblind
Controle:	Geneesmiddel

Deelname

Nederland

Status:	Werving nog niet gestart
(Verwachte) startdatum:	01-05-2014
Aantal proefpersonen:	120
Type:	Verwachte startdatum

Ethische beoordeling

Positief advies

Datum:	16-04-2014
Soort:	Eerste indiening

Registraties

Opgevolgd door onderstaande (mogelijk meer actuele) registratie

Geen registraties gevonden.

Andere (mogelijk minder actuele) registraties in dit register

Geen registraties gevonden.

In overige registers

Register	ID
NTR-new	NL4387
NTR-old	NTR4518
Ander register	: METc 2013/374

Resultaten