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The effect of crystalloid co-loading on circulatory stability during general anaesthesia induction

Submission date
26/10/2016

Recruitment status
No longer recruiting

Registration date
15/03/2017

Overall study status
Completed

Last Edited
25/11/2021

Condition category
Surgery

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[ ] Record updated in last year

Plain English summary of protocol

Background and study aims
Most patients undergoing major abdominal surgery are adults or elderly patients with at least one other medical condition. Propofol is the most common induction agent. Although effective, propofol can lead to undesirable side effects such as a decrease in blood pressure and cardiac output (the amount of blood the heart pumps in 1 minute). Vasopressors are a group of drugs that are often given to patients to raise blood pressure. In a previous study, it was shown that this is an effective way of preventing a decrease in blood pressure during induction, but it does not have a significant effect on cardiac output. The aim of this study is to investigate the effects on the heart and circulation of giving an additional dose of crystalloids (co-loading) while simultaneously giving vasopressors compared to a more restrictive fluid regimen.

Who can participate?
Adult/elderly patients undergoing major high-risk abdominal surgery.

What does the study involve?
Patients are randomly allocated into two groups. Both groups are given the vasopressor phenylephrine continually while being put under general anaesthesia with propofol. Those in the control group are given crystalloids (Ringer's solution) in a restrictive regimen during the induction of anaesthesia. Those in the test group are given an additional dose of crystalloids during the induction of anaesthesia. The haemodynamic parameters (e.g. cardiac output and blood pressure) in both groups are measured and compared during and after the induction before surgery begins.

What are the possible benefits and risks of participating?
Patients in both groups benefit from being closely monitored with an advanced circulation monitoring system. There are no notable risks involved with participating.

Where is the study run from?
University Medical Centre Maribor (Slovenia)

When is the study starting and how long is it expected to run for?
November 2016 to December 2019

Who is funding the study?
University Medical Centre Maribor (Slovenia)

Who is the main contact?
Dr Darjan Kos

Contact information

Type(s)
Scientific

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Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
IRP-2015/02-06

Study information

Scientific Title
ASA II-III patients undergoing large abdominal surgery, the impact of crystalloid co-loading (two different rates of infusion) with concomitant phenylephrine infusion on haemodynamic stability during bispectral (BIS) guided anaesthesia induction with propofol, a randomised controlled study

Acronym
BISPROPRINGPHEN

Study objectives
Current study hypothesis as of 24/11/2021:
1. There will be higher stroke volume, cardiac output and mean arterial pressure in the intervention group compared to the control group

2. There will be no difference in heart rate and systemic vascular resistance among groups
3. Stroke volume variation will be lower in the intervention group compared to the control group

Previous study hypothesis:
The aim of this study is to:
1. Compare the bispectral index guided induction of general anaesthesia with propofol combined with phenylephrine and restrictive regime of Ringer solution infusion and propofol combined with phenylephrine and large bolus of Ringer solution infusion
2. Investigate the impact of a larger bolus of Ringer solution on haemodynamic parameters during and after induction

Ethics approval required
Old ethics approval format

Ethics approval(s)
National Medical Ethics Committee, 13/07/2016, ref: 67/05/16

Study design
Single-centre prospective randomized controlled trial

Primary study design
Interventional

Secondary study design
Randomised controlled trial

Study setting(s)
Hospital

Study type(s)
Other

Participant information sheet
Not available in web format, please use the contact details below to request a patient information sheet

Health condition(s) or problem(s) studied
Cardiovascular disease and abdominal surgery

Interventions
In the operating theatre, participants are randomised to one of two groups using envelope randomisation.

Group 1: Participants receive fentanyl in a bolus of 3 mcg/kg after 1 minute of basal monitoring. Then there are additional 2 minutes of monitoring as we have to wait for fentanyl to become effective. 2 minutes after fentanyl (that means 3 minutes after we started monitoring) we begin with the infusion of propofol (0.5 mg/kg/min), phenylephrine (0.5 mcg/kg/min) and Ringer solution (restrictive regime meaning 1 ml/kg in following 15 minutes). The propofol is titrated to reach BIS value 60 (appropriate depth of anaesthesia) in each individual patient. After reaching BIS value 60, the infusion of propofol is stopped and the cumulative quantity measured for each individual patient. While receiving propofol infusion we assess the patient's plapebral reflex and

when lost the patients are given relaxans rocuronium in a bolus of 1 mg/kg. One minute after a bolus of rocuronium the patients are intubated (the time from the beginning of monitoring to intubation is recorded for each patient).
Phenylephrine and Ringer solution infusion is continued at a constant rate (as already mentioned) to the end of monitoring.

Group 2: Participants receive the same regime of drugs except the Ringer solution infusion is different as they are given a large bolus of 10 ml/kg in 15 minutes following the start of induction.

Protocol for both groups of participants includes rescue measurements also in case of haemodynamic instability:
1. Bradycardia (<40 beats per minute for more than 1 minute): bolus of atropine 0,3 mg, repeated until effective
2. Tachycardia (>100 beats per minute for more than 1 minute): bolus of fentanyl 3 mcg/kg max 3 times, then a bolus of esmolol 1mg/kg
3. Hypotension (MAP <55 mmHg for more than 1 minute): additional phenylephrine boluses of 50 mcg
4. Hypertension (MAP >100 mmHg for more than 1minute): the infusion of phenylephrine will be stopped, then a bolus of fentanyl 3 mcg/kg max 3 times

Participants have their cardiac output, stroke volume and mean arterial pressure measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia.

Intervention Type
Procedure/Surgery

Primary outcome measure
Current primary outcome measures as of 24/11/2021:
1. Cardiac output is measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia
2. Mean arterial pressure is measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia

Previous primary outcome measures:
1. Cardiac output is measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia
2. Stroke volume is measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia
3. Mean arterial pressure is measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia

Secondary outcome measures
Current secondary outcome measures as of 24/11/2021:
1. Heart rate is measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia
2. Stroke volume is measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia
3. Systemic vascular resistance is measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia
4. Stroke volume variation is measured using a LiDCOrapid monitor at baseline and for 15

minutes during the induction of anaesthesia.
5. Dose of propofol is measured at the end of induction (the cumulative dose is given on the perfusor screen)
6. Time from the start of anaesthesia induction to laryngoscopy and intubation is measured for each patient using the timer on the screen of the anaesthesia machine
7. Potential rescue management is recorded for each patient at the end of induction
8. Doses of drugs needed is calculated at the end of induction for each patient

Previous secondary outcome measures:
1. Heart rate is measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia
2. Systemic vascular resistance is measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia
3. Bispectral index is measured using a LiDCOrapid monitor at baseline and for 15 minutes during the induction of anaesthesia
4. Dose of propofol is measured at the end of induction (the cumulative dose is given on the perfusor screen)
5. Time from start of anaesthesia induction to laryngoscopy and intubation is measured for each patient using the timer on the screen of the anaesthesia machine
6. Potential rescue management is recorded for each patient at the end of induction
7. Doses of drugs needed is calculated at the end of induction for each patient

Overall study start date
01/05/2016

Completion date
31/12/2019

Eligibility

Key inclusion criteria
1. Aged 50 years and over
2. ASA II-III
3. Patients scheduled for major abdominal surgery

Participant type(s)
Patient

Age group
Mixed

Sex
Both

Target number of participants
50

Total final enrolment
60

Key exclusion criteria
1. Heart failure (known ejection fraction less than 30%)
2. Manifest liver disease
3. Kidney disease (serum creatinine more than 120 mmol/L)
4. BMI more than 30
5. Anticipated difficult intubation (Mallampati score 3 and 4)
6. Drug abuse (including alcohol)
7. Chronic use of benzodiazepines, opioids or other psychotropic substances

Date of first enrolment
01/01/2017

Date of final enrolment
31/07/2019

Locations

Countries of recruitment
Slovenia

Study participating centre
University Medical Centre Maribor
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Sponsor information

Organisation
University Medical Centre Maribor

Sponsor details
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Sponsor type
Hospital/treatment centre

ROR
https://ror.org/02rjj7s91

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
University Medical Centre Maribor

Results and Publications

Publication and dissemination plan
Planned publication in a high-impact peer-reviewed journal.

Intention to publish date
31/12/2021

Individual participant data (IPD) sharing plan
The datasets generated and analysed during the current study will be included in the subsequent results publication.

IPD sharing plan summary
Other