

Klinik Zürich

Akademischer Bericht 2003

Institut für Anästhesiologie

Leitung in der Berichtsperiode:

Prof. Dr. Thomas Pasch

Cardioprotection by pharmacological and ischemic preconditioning
Ischemic preconditioning represents the most potent means of salvaging cardiomyocytes from irreversible damage following ischemia/reperfusion injury. Myocardial sarcolemmal and/or mitochondrial K_{ATP} channels are the most likely candidates to serve as end-effector proteins in = NP

acute and delayed ischemic preconditioning. Anesthetics significantly modulate ischemic preconditioning, either enhancing or inhibiting its effects. We were able to demonstrate that volatile anesthetics and opioids induce ischemic preconditioning-like effects, whereas ketamine and barbiturates markedly inhibit ischemic preconditioning. Using live cell imaging microscopy in cardiomyocytes we evaluated the effects of most known anesthetics on mitochondrial K_{ATP} channels. Also, we have conducted a clinical study with long-term follow-up evaluating the preconditioning effect of sevoflurane on cardiac tissue in patients undergoing elective coronary artery bypass grafting. Current research by our group is focused on gene expression profiles (gene chips) in ischemic and anesthetic preconditioning.

2.3 Wissenschaftliche Abschlüsse

Am Institut angefertigte Dissertationen

Carlos Garcia: Pharmakologische Präkonditionierung mit Sevofluran schützt Herz und Nieren bei Patienten, die sich einer koronaren Revaskularisation unterziehen müssen (Leitung: PD Dr. M. Zaugg)

Biochemical Evidence for Cardiac Preconditioning by Sevoflurane in Humans. Symposium on Preconditioning Against Ischemia and Reperfusion Injury. ASA Annual Meeting 2003, San Francisco. October 2003

Julier K, da Silva R, Garcia C, Bestmann L, Frascarolo P, Zollinger A, Chassot PG, **Schmid ER**, Turina M, von Segesser LK, **Pasch T**, Spahn DR, **Zaugg M**. Preconditioning by sevoflurane decreases biochemical markers for myocardial and renal dysfunction in coronary artery bypass graft surgery: a double-blinded placebo-controlled multicenter study. *Anesthesiology* 2003;98:1315-1327

<http://clinicaltrials.gov/ct2/show/NCT00484575>

Inhaled Sevoflurane Compared to Intravenous Sedation Post Coronary Artery Bypass Grafting

This study is currently recruiting participants.

Verified by Karolinska Institutet, June 2007

| | |
|--------------------------------|------------------------------|
| Sponsored by: | Karolinska Institutet |
| Information provided by: | Karolinska Institutet |
| ClinicalTrials.gov Identifier: | NCT00484575 |

► Purpose

Inhaled sevoflurane during coronary artery bypass grafting (CABG) reduces postoperative Troponin levels and may be associated with improved outcome. A dose-response effect has been demonstrated by de Hert et al, with greatest reductions of Troponin when Sevoflurane was used during the entire operation, as compared to Sevoflurane during parts of the operation.

Sevoflurane, as other inhaled anesthetic agents, is sedative in low doses. Postoperative sedation after CABG is currently achieved with intravenous propofol.

A new simplified method of administration of isoflurane or sevoflurane has been developed and tested by members of the research group. The Anesthetic Conserving Device is a modified heat-moisture exchanger (HME) that permits direct infusion of sevoflurane to the airway, where it is vaporized in an evaporator rod in the device.

The primary aim (and primary hypothesis) of the current trial is to examine if postoperative sedation with sevoflurane after CABG is associated with improved cardiac outcome, measured as reduced levels of Troponin, BNP and reduced incidence of cardiac events, such as atrial fibrillation, need for inotropic drugs and myocardial infarction, compared with conventional propofol sedation.

Other end-points of the trial are potential renal (protective) effects measured with cystatin C levels, need for dialysis but also measurements of inorganic fluorides in serum, as well as environmental aspects of sevoflurane sedation in a Cardiothoracic Intensive Care Unit. Furthermore, potential differences in ICU memories and well-being during stay in the intensive Care Unit will be investigated via patient questionnaires.

Besides routine blood sampling, plasma will be saved for later analysis of inflammatory mediators (biobank).

| Condition | Intervention | Phase |
|--|------------------------------|-----------------------|
| Myocardial Reperfusion Injury Atrial Fibrillation | Drug: Sevoflurane | Phase I Phase II |

[Genetics Home Reference](#) related topics: [familial atrial fibrillation](#)

[MedlinePlus](#) related topics: [Arrhythmia](#) [Cardiomyopathy](#) [Vascular Diseases](#)

[ChemIDplus](#) related topics: [Sevoflurane](#)

[U.S. FDA Resources](#)

Study Type: Interventional

Study Design: Treatment, Randomized, Single Blind, Active Control, Parallel Assignment, Safety/Efficacy Study

Official Title: Inhaled Sevoflurane Compared to Intravenous Sedation Post Coronary Artery Bypass Grafting

Further study details as provided by Karolinska Institutet:

Primary Outcome Measures:


- Troponin and BNP levels [Time Frame: 2 days]

Secondary Outcome Measures:

- renal function [Time Frame: 1 week]
- ambient sevoflurane levels [Time Frame: 2 days]
- cognitive function and memory panorama post ICU [Time Frame: 1 week]
- attenuation of inflammatory response [Time Frame: 2 days]

Estimated Enrollment: 120
Study Start Date: June 2007
Estimated Study Completion Date: November 2007

 [Show Detailed Description](#)

 Eligibility

Genders Eligible for Study: Both
Accepts Healthy Volunteers: No


Criteria

Inclusion Criteria:

- Planned coronary artery bypass grafting

Exclusion Criteria:

- Combined heart valve surgery
- Malignant Hyperthermia
- Postoperative need for mechanical circulation support

 Contacts and Locations

Please refer to this study by its ClinicalTrials.gov identifier: NCT00484575

Contacts

Contact: Jan-Olof Hellström, MD +46706687420 jan-olof.hellstrom@karolinska.se

Contact: Peter V Sackey, MD, PhD +46707710364 peter.sackey@karolinska.se

Anesthetics, General
Therapeutic Uses
Physiological Effects of Drugs
Hematologic Agents
Central Nervous System Depressants

Platelet Aggregation Inhibitors
Cardiovascular Diseases
Central Nervous System Agents
Pharmacologic Actions
Pathological Conditions, Signs and Symptoms

ClinicalTrials.gov processed this record on April 23, 2008

<http://clinicaltrialsfeeds.org/clinical-trials/show/NCT00586118>

Inhalative Sedation in ICU With Sevoflurane Via Anaesthetic Conserving Device Compared to Propofol

The evaluation of the presented study will work on the practicability of inhalative sedation on the ICU, potential benefits and limitations of the ACD system in a postoperative sedated patient population in comparison to a standard intravenous sedation regimen with propofol, and focus on renal and hepatic function, cardioprotection and...

Date First Received: December 21, 2007

Last Updated: January 3, 2008

Verified by: Klinikum Ludwigshafen, December 2007

Clinical Trial Phase: N/A | Start Date: December 2006

Overall Status: Completed

Estimated Enrollment: 120

Brief Summary

Condition Keyword(s):

- Recovery From Sedation
- Sevoflurane Consumption
- Renal Function
- Hepatic Function
- Cardioprotection

Intervention(s):

- Drug: Sevoflurane
- Drug: Propofol

The evaluation of the presented study will work on the practicability of inhalative sedation on the ICU, potential benefits and limitations of the ACD system in a postoperative

sedated patient population in comparison to a standard intravenous sedation regimen with propofol, and focus on renal and hepatic function, cardioprotection and pharmacoeconomics

Study Type: Observational

Study Design: Case Control, Prospective

Detailed Clinical Trial Description

A goal-oriented sedation complies the ability to sedate the patient as deeply as necessary, and allow a modern ventilation regimen with early spontaneous breathing and a pain-free cooperative patient. The ideal sedative agent - with a short duration of action, predictable wake-up times, low drug toxicity, haemodynamic stability and less side effects, and a rational pharmacoeconomic impact nowadays - has still to be found. Inhalative anaesthetics show these properties, but until the introduction of AnaConDa© (Anesthetic Conserving Device, ACD) in 2005, the use of volatile anaesthetics on the intensive care unit (ICU) required specific evaporating devices or scavenging systems. The ACD, a modified heat- moisture filter, is connected to the breathing circuit of conventional ICU ventilators and a syringe pump delivers the volatile anaesthetic to the ACD where it is vaporized through a rod. Most of the exhaled gas is absorbed in a charcoal filter's membrane and reflected to the patient in the following inspiration. Randomised, controlled and comparative studies to the use of volatile anaesthetics in ICU via this innovative device are still missing. Isoflurane has been studied in small patient populations and in comparison to midazolam, while Sevoflurane - a newer volatile agent with short action, brief elimination time, and low hepatic biodegradation - has only been studied intraoperatively and in short-term sedation. This is the first prospective, randomised, clinical study on the feasibility of sevoflurane via the ACD for sedation in ICU patients until 72 hours in comparison to a standard intravenous sedation with propofol. The investigation will work on potential benefits and limitations of the use of volatile agents on the ICU, the quality of sedation (Richmond Agitation Sedation Scale, BIS), infusion rate stability of sevoflurane and respiratory parameters, short-term recovery (time from discontinuation of infusion until following verbal commands and extubation), haemodynamics, renal and hepatic function and adverse side effects.

Outcome Measures for this Clinical Trial

Primary:

- Extubation time Termination of sedation to extubation

Secondary:

- Consumption of anaesthetics until discharge from hospital
- Renal function until discharge from hospital
- Hepatic function until discharge from hospital
- Cardioprotection until discharge from hospital
- Costs until discharge from hospital

Criteria for Participation in this Clinical Trial

Inclusion Criteria:

- 18-80 years
- elective operative procedure, and indication for admission to the ICU for postoperative sedation
- ASA I-III
- weight 50-120 kg
- Haemoglobin > 10 g/dl
- ability and acceptance to agree to the study participation

Exclusion Criteria:

- malignant hyperthermia
- muscle diseases or weakness
- liver insufficiency (ASAT, ALAT > 40 U/min)
- pancreas insufficiency
- emergencies
- women in child bearing age and missing negative pregnancy test, pregnancy or lactation
- diseases from the central nervous system (such as M. Parkinson and multiple sclerosis)
- increased intracranial pressure, head trauma
- pre-existing delirium, agitation and psychiatric derangements
- alcohol and drug abuse (including opioid abuse)
- allergy to any of the study agents
- refusal from the patient to participate in the study
- participation in another study project.

Clinical Trials Locations, Contact Details, and Sponsors

Lead Sponsor: Klinikum Ludwigshafen

Overall Clinical Trial Officials and Contacts

Kerstin D. Röhm, Dr. med. Principal Investigator Klinikum Ludwigshafen, Department of Anaesthesiology, Ludwigshafen, Germany

Related Publications

References

Sackey PV, Martling CR, Nise G, Radell PJ. Ambient isoflurane pollution and isoflurane consumption during intensive care unit sedation with the Anesthetic Conserving Device. *Crit Care Med.* 2005 Mar;33(3):585-90.

Sackey PV, Martling CR, Granath F, Radell PJ. Prolonged isoflurane sedation of intensive care unit patients with the Anesthetic Conserving Device. *Crit Care Med.* 2004 Nov;32(11):2241-6.

Berton J, Sargentini C, Nguyen JL, Belii A, Beydon L. AnaConDa reflection filter: bench and patient evaluation of safety and volatile anesthetic conservation. *Anesth Analg.* 2007 Jan;104(1):130-4.

Additional Information

Information obtained from ClinicalTrials.gov on April 23, 2008

Link to the current ClinicalTrials.gov record. <http://clinicaltrials.gov/show/NCT00586118>

Study ID Number: ANA06104

ClinicalTrials.gov Identifier: NCT00586118

Health Authority: Germany: Federal Institute for Drugs and Medicinal Devices (BfArM), Bonn, Germany

Clinical Trials Authorship and Review

Clinical Trials content is provided directly by the U.S. National Institutes of Health via ClinicalTrials.gov and is not reviewed separately by ClinicalTrialsFeeds.org. Every page of specific clinical trials information contains a unique identifier which can be used to find further details directly from the National Institutes of Health.

Inhalative Sedation in ICU With Sevoflurane Via Anaesthetic Conserving Device Compared to Propofol

This study has been completed.

| | |
|--------------------------------|--|
| Sponsors and Collaborators: | Klinikum Ludwigshafen University Hospital Mannheim |
| Information provided by: | Klinikum Ludwigshafen |
| ClinicalTrials.gov Identifier: | NCT00586118 |

Purpose

The evaluation of the presented study will work on the practicability of inhalative sedation on the ICU, potential benefits and limitations of the ACD system in a postoperative sedated patient population in comparison to a standard intravenous sedation regimen with propofol, and focus on renal and hepatic function, cardioprotection and pharmacoeconomics

| <u>Condition</u> | <u>Intervention</u> |
|---|-------------------------------------|
| Recovery From Sedation Sevoflurane Consumption Renal Function Hepatic Function Cardioprotection | Drug: Sevoflurane Drug: Propofol |

[ChemIDplus](#) related topics: [Propofol](#) [Sevoflurane](#)

[U.S. FDA Resources](#)

Study Type: Observational
Study Design: Case Control, Prospective

Further study details as provided by Klinikum Ludwigshafen:

Primary Outcome Measures:

- Extubation time [Time Frame: Termination of sedation to extubation]
[Designated as safety issue: No]

Secondary Outcome Measures:

- Consumption of anaesthetics [Time Frame: until discharge from hospital]
[Designated as safety issue: Yes]
- Renal function [Time Frame: until discharge from hospital]
[Designated as safety issue: Yes]
- Hepatic function [Time Frame: until discharge from hospital]
[Designated as safety issue: Yes]
- Cardioprotection [Time Frame: until discharge from hospital]
[Designated as safety issue: Yes]
- Costs [Time Frame: until discharge from hospital] [Designated as safety issue: Yes]

Biospecimen Retention: None Retained

Biospecimen Description:

Enrollment: 120
Study Start Date: December 2006
Study Completion Date: December 2007
Primary Completion Date: December 2007 (Final data collection date for primary outcome measure)

| Groups/Cohorts | Assigned Interventions |
|---|---|
| 1-Sevo Sevoflurane/ACD group (n=60) | Drug: Sevoflurane Sevoflurane sedation, 0.5-1 Vol%, continuously via syringe pump, up to 72 hours in ICU |
| 2-Propofol Propofol group (n=60) | Drug: Propofol Propofol, 1.5-3 mg/kgBW/h, continuously via syringe pump, up to 72 hours |

Detailed Description:

A goal-oriented sedation complies the ability to sedate the patient as deeply as necessary, and allow a modern ventilation regimen with early spontaneous breathing and a pain-free cooperative patient. The ideal sedative agent - with a short duration of action, predictable wake-up times, low drug toxicity, haemodynamic stability and less side effects, and a rational pharmaco-economic impact nowadays - has still to be found. Inhalative anaesthetics show these properties, but until the introduction of AnaConDa® (Anesthetic Conserving Device, ACD) in 2005, the use of volatile anaesthetics on the intensive care unit (ICU) required specific evaporating devices or scavenging systems. The ACD, a modified heat- moisture filter, is connected to the breathing circuit of conventional ICU ventilators and a syringe pump delivers the volatile anaesthetic to the ACD where it is vaporized through a rod. Most of the exhaled gas is absorbed in a charcoal filter's membrane and reflected to the patient in the following inspiration. Randomised, controlled and comparative studies to the use of volatile anaesthetics in ICU via this innovative device are still missing. Isoflurane has been studied in small patient populations and in comparison to midazolam, while Sevoflurane - a newer volatile agent with short action, brief elimination time, and low hepatic biodegradation - has only been studied intraoperatively and in short-term sedation. This is the first prospective, randomised, clinical study on the feasibility of sevoflurane via the ACD for sedation in ICU patients until 72 hours in comparison to a standard intravenous sedation with propofol. The investigation will work on potential benefits and limitations of the use of volatile agents on the ICU, the quality of sedation (Richmond Agitation Sedation Scale, BIS), infusion rate stability of sevoflurane and respiratory parameters, short-term recovery (time from discontinuation of infusion until following verbal commands and extubation), haemodynamics, renal and hepatic function and adverse side effects.

▶ Eligibility

Ages Eligible for Study: 18 Years to 80 Years

Genders Eligible for Study: Both

Accepts Healthy Volunteers: No

Study Population

120 patients, scheduled for elective major surgery and postoperative admission to the ICU, are screened the day before surgery for potential in- and exclusion criteria.

Criteria

Inclusion Criteria:

- 18-80 years
- elective operative procedure, and indication for admission to the ICU for postoperative sedation
- ASA I-III
- weight 50-120 kg
- Haemoglobin > 10 g/dl
- ability and acceptance to agree to the study participation

Exclusion Criteria:

- malignant hyperthermia
- muscle diseases or weakness

- liver insufficiency (ASAT, ALAT > 40 U/min)
- pancreas insufficiency
- emergencies
- women in child bearing age and missing negative pregnancy test, pregnancy or lactation
- diseases from the central nervous system (such as M. Parkinson and multiple sclerosis)
- increased intracranial pressure, head trauma
- pre-existing delirium, agitation and psychiatric derangements
- alcohol and drug abuse (including opioid abuse)
- allergy to any of the study agents
- refusal from the patient to participate in the study
- participation in another study project.

▶ Contacts and Locations

Please refer to this study by its ClinicalTrials.gov identifier: NCT00586118

Sponsors and Collaborators

Klinikum Ludwigshafen

University Hospital Mannheim

Investigators

Principal Investigator: Kerstin D. Röhm, Dr. med. Klinikum Ludwigshafen, Department of Anaesthesiology, Ludwigshafen, Germany

▶ More Information

Publications:

[Sackey PV, Martling CR, Nise G, Radell PJ. Ambient isoflurane pollution and isoflurane consumption during intensive care unit sedation with the Anesthetic Conserving Device. Crit Care Med. 2005 Mar;33\(3\):585-90.](#)

[Sackey PV, Martling CR, Granath F, Radell PJ. Prolonged isoflurane sedation of intensive care unit patients with the Anesthetic Conserving Device. Crit Care Med. 2004 Nov;32\(11\):2241-6.](#)

[Berton J, Sargentini C, Nguyen JL, Belii A, Beydon L. AnaConDa reflection filter: bench and patient evaluation of safety and volatile anesthetic conservation. Anesth Analg. 2007 Jan;104\(1\):130-4.](#)

| | |
|--------------------|--|
| Responsible Party: | Dr. K. D. Röhm, Klinikum Ludwigshafen, Dep. of Anaesthesiology (Klinikum Ludwigshafen, Department of Anaesthesiology and Intensive Care) |
| Study ID Numbers: | ANA06104, ANA06104 |
| First Received: | December 21, 2007 |

Last Updated: January 3, 2008
ClinicalTrials.gov Identifier: [NCT00586118](#)
Health Authority: Germany: Federal Institute for Drugs and Medicinal Devices
(BfArM), Bonn, Germany

Keywords provided by Klinikum Ludwigshafen:

Sedation
Volatile anaesthetic
Sevoflurane
Propofol
Recovery

Study placed in the following topic categories:

Propofol
Sevoflurane

Additional relevant MeSH terms:

| | |
|------------------------------------|---------------------------------|
| Sevoflurane | Anesthetics, Inhalation |
| Anesthetics, Intravenous | Anesthetics, General |
| Physiological Effects of Drugs | Therapeutic Uses |
| Hematologic Agents | Hypnotics and Sedatives |
| Anesthetics | Platelet Aggregation Inhibitors |
| Central Nervous System Depressants | Central Nervous System Agents |
| Pharmacologic Actions | |

http://www.ingentaconnect.com/search/article;jsessionid=2b1fy4hw7pfm3.alexandra?title=anaesthetics+volatile&title_type=ka&year_from=1998&year_to=2008&database=1&pageSize=20&index=1

Cardiac Protection by Volatile Anaesthetics: A Review

Authors: Landoni, Giovanni; Fochi, Oliviero; Torri, Giorgio

Source: [Current Vascular Pharmacology](#), Volume 6, Number 2, April 2008 , pp. 108-111(4)

Publisher: [Bentham Science Publishers](#)

Abstract:

Ischaemic preconditioning, a response to brief sublethal episodes of ischaemia leading to a pronounced protection against subsequent lethal ischaemia, is mimicked by some pharmacological agents. Halogenated anaesthetics alone exhibit cardioprotective properties at therapeutic doses, independent of their anaesthetic and haemodynamic effect, leading to the concept of anaesthetic preconditioning.

Only recently has research turned to clinical application of preconditioning protocols, and anaesthetic preconditioning has indeed been demonstrated in randomised clinical trials conducted in patients undergoing cardiac surgery - mostly coronary artery bypass graft. Most of these trials demonstrate cardiac protection by assessing postprocedural release of cardiac troponin or early postoperative cardiac function. Few studies focus on clinical outcomes, and none demonstrates an advantage in terms of mortality or cardiac morbidity.

A recent meta-analysis, pooling data regarding the use of desflurane and sevoflurane, found significant reductions of inhospital mortality, myocardial infarction rate, intensive care unit and hospital stay, time on mechanical ventilation and incidence of long term cardiac events. In conclusion, the use of desflurane and sevoflurane appears to yield a better outcome, in terms of mortality and cardiac morbidity, in patients undergoing cardiac surgery. A definitive demonstration of this concept represents a difficult task because of the low mortality rate in modern cardiac surgery and because of the number of interfering factors. Whether these cardioprotective properties also exist in non-coronary surgery settings is still controversial owing to the scarce available data.

Keywords: [Anaesthesia](#); [Mortality](#); [Myocardial Infarction](#); [Volatile Anaesthetics](#); [Desflurane](#); [Sevoflurane](#); [Meta-analysis](#)

Document Type: Research article

DOI: 10.2174/157016108783955284

http://www.ingentaconnect.com/search/article;jsessionid=2b1fy4hw7pfm3.alexandra?title=anaesthetics+volatile&title_type=tka&year_from=1998&year_to=2008&database=1&pageSize=20&index=3

AnaConDa® als Ultima-Ratio-Therapie: Fallbericht einer chronisch obstruktiven Lungenerkrankung

Authors: Nickel, E.A.¹; Benken, I.; Bartels, U.; Voelckel, W.G.; Quintel, M.

Source: [Der Anaesthesist](#), Volume 56, Number 6, June 2007 , pp. 587-591(5)

Publisher: [Springer](#)

Abstract:

Die Behandlung von Patienten mit einer dekompensierten chronisch obstruktiven Lungenerkrankung („chronic obstructive pulmonary disease“, COPD), die auf bronchodilatatorische Pharmakotherapie nicht mehr anspricht, ist eine Herausforderung an die Intensivmedizin. Eine Anwendung von Inhalationsanästhetika kann in diesen Fällen manchmal die noch einzig mögliche Behandlungsoption darstellen. Es wird von einer 65-jährigen Patientin mit einer infektexazerbierten COPD berichtet, bei der eine suffiziente Ventilation trotz umfassender pharmakologischer Intervention unmöglich war. Für die Durchführung einer Inhalationsanästhesie auf der Intensivstation wurde das „Anaesthetic Conserving Device“ (ACD, AnaConDa®) verwendet, das die Verdampfung und die Beimischung eines volatilen Anästhetikums an einem Intensivrespirator einfach und sicher

möglich macht. Durch die besondere Technik des AnaConDa® wird aus dem halb offenen Intensivrespirator ein de facto halb geschlossenes Beatmungsgerät. Nach einer 48-stündigen Anwendung von Halothan verbesserte sich die stark eingeschränkte pulmonale Compliance der Patientin signifikant, sodass bei dann problemloser CO₂-Elimination trotz Absetzen des Halothans auf eine nichtinvasive Beatmung umgestellt werden konnte und sich der Zustand der Patientin weiter stabilisierte. Nach abschließender chirurgischer Sanierung eines Infektherdes konnte die Patientin nach 78-tägigem Intensivaufenthalt in die Rehabilitation entlassen werden.

Keywords: [Anaesthetic Conserving Device](#); [AnaConDa®](#); [Chronisch obstruktive Lungenerkrankung](#); [Volatile Anästhetika](#); [Intensivstation](#); [Anaesthetic Conserving Device](#); [AnaConDa®](#); [Chronic obstructive pulmonary disease](#); [Volatile anaesthetics](#); [Intensive care unit](#)

Document Type: Research article

DOI: 10.1007/s00101-007-1152-6

Affiliations: 1: Email: enickel@zari.de

http://www.ingentaconnect.com/search/article;jsessionid=2b1fy4hw7pfm3.alexandra?title=anaesthetics+volatile&title_type=tka&year_from=1998&year_to=2008&database=1&pageSize=20&index=10

Effects of sevoflurane and propofol on left ventricular diastolic function in patients with pre-existing diastolic dysfunction

Authors: Filipovic, M.; Michaux, I.; Wang, J.; Hunziker, P.; Skarvan, K.; Seeberger, M.

Source: [BJA: British Journal of Anaesthesia](#), Volume 98, Number 1, January 2007 , pp. 12-18(7)

Publisher: [Oxford University Press](#)

Abstract:

Background. The effects of anaesthetics on left ventricular (LV) diastolic function in patients with pre-existing diastolic dysfunction are not well known. We hypothesized that propofol but not sevoflurane will worsen the pre-existing LV diastolic dysfunction.

Methods. Of 24 randomized patients, 23 fulfilled the predefined echocardiographic criterion for diastolic dysfunction. They received general anaesthesia with sevoflurane 1 MAC ($n=12$) or propofol 4 $\mu\text{g ml}^{-1}$ ($n=11$). Echocardiographic examinations were performed at baseline and in anaesthetized patients under spontaneous breathing and under positive pressure ventilation. Analysis focused on peak early diastolic velocity of the mitral annulus (E_{a}).

Results. During spontaneous breathing, E_{a} was higher in the sevoflurane than in the propofol group [mean (95% CI) 7.0 (5.9-8.1) vs 5.5 (4.7-6.3) cm s⁻¹; $P<0.05$], reflecting an increase of E_{a} from baseline only in the sevoflurane group ($P<0.01$).

Haemodynamic findings were similar in both groups, but the end-tidal carbon dioxide content was more elevated in the propofol group ($P<0.01$). During positive pressure ventilation, E_{a} was similarly low in the sevoflurane and propofol groups [5.3 (4.2-6.3) and 4.4 (3.6-5.2) cm s⁻¹, respectively].

Conclusions. During spontaneous breathing, early diastolic function improved in the sevoflurane but not in the propofol group. However, during positive pressure ventilation and balanced anaesthesia, there was no evidence of different effects caused by the two anaesthetics.

Keywords: [anaesthetics volatile, sevoflurane](#); [anaesthetics i.v., propofol](#); [heart, myocardial function](#); [measurement technique, Doppler echocardiography](#)

Document Type: Research article

DOI: 10.1093/bja/ael277
