**Appendix to the manuscript entitled “Prediction of expiratory desflurane and sevoflurane concentrations in lung-healthy patients utilizing cardiac output and alveolar ventilation matched pharmacokinetic models – a comparative observational study”.**

Jonas Weber MD,1\* Claudia Mißbach,1 Johannes Schmidt MD,1 Christin Wenzel,1 Stefan Schumann PhD,1 James H. Philip MD,2 Steffen Wirth MD1

1Department of Anesthesiology and Critical Care, Medical Center – University of Freiburg, Faculty of Medicine, University of Freiburg, Freiburg, Germany.

2Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, 02115, USA.

The negative inotropic and chronotropic effects of anesthetic drugs are factors to reduce the cardiac performance during general anesthesia.[1,2] Besides the cardiac side effects of anesthetics, numerous patient-individual factors can also affect the stroke volume and thus cardiac output (CO) during anesthesia (e.g. intrinsic cardiac regulation, cardiac autonomic nerve responsiveness).[3] To measure hemodynamic variables with a high accuracy, the thermo-dilution method (requiring a pulmonary artery catheterization) is still the most common practice. Since the pulmonary artery catheterization can be associated with various potential risks (e.g. cardiac arrhythmia, puncture of the carotid artery, damage of cardiac structures, thrombosis and infection), it should not be used without strict indication.[4] In the present study, we used a comparative literature analysis to estimate the cardiac performance during general anesthesia. To measure the predictive performance of the parameter-matched Gas Man models, we used the estimated stroke volume of this comparative literature analysis and the mean heart rate of each individual patient during induction and emergence to calculate the CO.

**Table 1**: Comparative literature analysis on invasively measured hemodynamic variables during general anesthesia. The estimated hemodynamic variables were used to modify the parameter-matched simulation model patient-individually.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Authors** | **Measurement method** | **Patient characteristics** | **Stroke volume (mL)** | **Cardiac output (L∙min-1)** |
| Catcart et al.[5] | Indicator-dilution (T-1824) | 19 consecutive patients without impaired cardiopulmonary function |  | 3.8 (1.3) |
| Heilbrunn et al.[6] | Dye dilutition method | 12 volunteers without systemic diseases | 83.3 (12.3) | 5.8 (1.7) |
| Delia Rocca et al.[7] | Pulse Contour Cardiac Output (PiCCO) | 41 consecutive patients undergoing major thoracic/abdominal surgery |  | 4.91 |
| Kapoor et al.[8] | Pulse Contour analysis | 30 consecutive patients undergoing cardiac surgery | 82.22 | 5.43 |
| Noblett et al.[9] | Esophageal Doppler | 103 consecutive patients undergoing colorectal surgery | 84.4 (26.8)4 | 5.8 (2.2)4 |
| Gan et al.[10] | Esophageal Doppler | 100 consecutive patients undergoing general, gynecological andurological surgery | 68.5 (20.5)5 | 5.1 (1.7)5 |
| Conway et al.[11] | Esophageal Doppler  | 57 patients undergoing major abdominal surgery | 70.9 (18.3)6 | 4.6 (1.4)6 |
| **Mean** |  |  | **77.9** | **5.1** |

1Assuming an average body height of 167.6 cm and an average body weight of 64.6 kg in the investigated study population.[12]

2Average heart rate in the studied patient population: 95.7∙min-1.

3Average height in the studied patient population: 161.15 cm, average weight in the studied patient population: 67.85 kg.

4Hemodynamic variables after induction of anesthesia before the beginning of surgical procedure.

5Average hemodynamic variables during baseline measurement in general anesthesia before operation started.

6Hemodynamic variables after induction of anesthesia before the beginning of surgical procedure.

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