Journal of Clinical Anesthesia (2016) **35**, 369–375

ELSEVIER

Journal of Clinical Anesthesia

Original Contribution

Quality of recovery from anesthesia of patients undergoing balanced or total intravenous general anesthesia. Prospective randomized clinical trial☆,☆☆,★

Eduardo Toshiyuki Moro MD, PhD (Assistant Professor)[a,*], Fábio Caetano Oliveira Leme MD (Resident of Anesthesiology)[a], Bernardo Roveda Noronha MD (Resident of Anesthesiology)[a], Gustavo Farinha Pinto Saraiva (Graduate Medical Student)[b], Nathália Vianna de Matos Leite (Graduate Medical Student)[b], Laís Helena Camacho Navarro MD, PhD (Assistant Professor)[c]

[a]*Department of Surgery, School of Medical and Health Sciences, Pontifical Catholic University of São Paulo, PUC-SP, São Paulo, SP, Brazil*
[b]*School of Medical and Health Sciences, Pontifical Catholic University of São Paulo, PUC-SP, São Paulo, SP, Brazil*
[c]*Department of Anesthesiology, Botucatu Medical School, São Paulo State University—UNESP, Botucatu, SP, Brazil*

Received 23 September 2015; accepted 9 August 2016

Keywords:
Intravenous anesthesia;
Inhalation anesthesia;
Recovery from anesthesia;
Quality measures;
Patient satisfaction;
Questionnaire

Abstract

Study objectives: The aim of the present study was to assess the quality of recovery from anesthesia of patients subjected to otorhinolaryngological (ORL) surgery under balanced or total intravenous general anesthesia by means of Quality of Recovery-40 (QoR-40) questionnaire.

Design: Prospective randomized clinical trial.

Setting: The setting is at an operating room, a postoperative recovery area, and a hospital ward.

Patients: One-hundred thirty American Society of Anesthesiologists physical status I or II patients scheduled to undergo general anesthesia for ORL interventions under remifentanil, in combination with sevoflurane (balanced technique) or propofol (total intravenous anesthesia).

Measurements: Occurrence of nausea, vomiting, body temperature less than 36°C, and length of stay in the postanesthesia care unit were recorded. The QoR-40 was administered by an investigator blind to group allocation 24 hours after surgery. The quality of recovery, as assessed by the score on the QoR-40, was compared between the groups.

☆ Funding: None.
☆☆ Attestation: ETM and LHCN attest to the integrity of the original data and the analysis reported in this manuscript. FCOL, BRN, FPS, and NVdML approved the final manuscript.
★ Conflicts of interest: All authors have no conflicts of interest to report.
* Corresponding author at: Avenida Araçoiaba, 85, Condomínio Lago Azul, Araçoiaba da Serra, SP 18190-000, Brazil. Tel.: +55 15 3281 3146; fax: +55 15 3212 9900.
E-mail addresses: eduardo_moro@terra.com.br, edumoro85@gmail.com (E.T. Moro), fabio.leme@hotmail.com (F.C.O. Leme), bernardorn@gmail.com (B.R. Noronha), gustavofps@gmail.com (G.F.P. Saraiva), nathalia_vianna@hotmail.com (N.V. de Matos Leite), laishnavarro@fmb.unesp.br (L.H.C. Navarro).

http://dx.doi.org/10.1016/j.jclinane.2016.08.022

Main results: There is no difference regarding the QoR-40 score among intravenous and inhalation anesthesia groups (190.5 vs 189.5, respectively; $P = .33$). Similarly, among the 5 dimensions of the QoR-40, the scores were comparable between the groups. Incidence of hypothermia ($P = .58$), nauseas or vomits ($P = .39$), and length of surgery ($P = .16$) were similar among groups. The evaluation of pain intensity ($P = .80$) and dose of morphine use in the postanesthesia care unit ($P = .4$) was also comparable between groups.

Conclusions: The quality of recovery from anesthesia assessed based on the patients' perception did not differ between the ones subjected to either inhalation or intravenous general anesthesia for ORL surgery based on QoR-40 questionnaire assessment.

1. Introduction

General anesthesia can be performed with intravenous and/or inhalation anesthetics. The most common agents used in everyday practice for such purposes are sevoflurane (inhalation anesthesia) and propofol (intravenous anesthesia). Although a large number of studies have been conducted to establish which technique is best, both exhibit specific advantages as a function of the assessed outcomes: nausea, vomiting, pain, cost, speed of recovery of cognitive functions, cardioprotection, and patient satisfaction [1]. Concerning patient satisfaction, an increasing number of authors have been assessing the quality of recovery from anesthesia by measures that probes quality of life from the perspective of the patient [1-3]. Quality of Recovery-40 (QoR-40) questionnaire, a validated instrument to assess the quality of recovery from anesthesia, allows for an objective evaluation of the factors that might influence the patients' perception upon comparing different therapeutic approaches [2]. A recent study using the QoR-40 questionnaire showed that the quality of recovery for female patients who underwent thyroid surgery was significantly better when intravenous anesthesia was used when compared with inhalation anesthesia with desflurane [4]. However, no study has yet used the QoR-40 to assess the quality of recovery of patients from both sexes undergoing intravenous anesthesia with propofol and remifentanil vs balanced anesthesia with sevoflurane and remifentanil.

Accordingly, the primary objective of the study was to assess the quality of recovery from anesthesia of patients undergoing otorhinolaryngological (ORL) surgical procedures under balanced or total intravenous general anesthesia through the application of the QoR-40 questionnaire. As secondary outcomes, we also assessed the rates of postoperative nausea, vomiting, and pain for each anesthetic technique.

2. Materials and methods

This double-blind, randomized trial was approved by the Research Ethics Committee of the School of Medical and Health Sciences, Pontifical Catholic University of São Paulo (Pontifícia Universidade Católica de São Paulo), CAAE 17618013.3.0000.5373 (http://aplicacao.saude.gov.br/plataformabrasil). Written consent form was obtained from all participants. One-hundred thirty patients aged 18 to 65 years, with an American Society of Anesthesiologists physical status I or II [5], who were scheduled to undergo general anesthesia for ORL surgery at Santa Lucinda Hospital were enrolled in the study. Patients who (i) refused to participate in the study; (ii) were not able to communicate due to alterations in the level of consciousness, or neurologic, or psychiatric disease; (iii) presented with contraindication to any of the drugs used in the present study; (iv) had history of alcohol or drug dependence; (v) were super obese as defined by a body mass index $\geq$40 kg/m^2; and (vi) underwent uvulopalatopharyngoplasty (because he/she exhibits higher potential for postoperative pain compared with the other procedures) were excluded from the study. Importantly, items (iv) and (v) represent conditions liable to alter the pharmacokinetic and pharmacodynamic behaviors of the intravenous and inhalation anesthetics and, therefore, were exclusion criteria in the present study [6-8].

The internal consistency and Cronbach α and split-half correlations of the QoR-40 questionnaire were assessed in a pilot study conducted with 30 patients. The sample size for the following step was calculated considering 80% power to detect a 10-point difference in QoR-40 [9], which indicated the need to include 50 participants in each group. Taking possible losses into consideration, the final sample included 130 participants, which were allocated to 2 groups according to a random number sequence from a Web-based random-number generator (available at www.random.com). Because of significant difference between the anesthetic techniques, the anesthesia provider could not be blinded to group identity. However, both the patient and the investigators were blinded to group allocation. The anesthetic technique to be used for each individual participant was kept in an opaque and sealed envelope, which was opened at the time of surgery.

No participant took any preanesthetic medication before surgery. After arrival in the operating room, standard American Society of Anesthesiologists monitors were applied. Midazolam 0.06 mg kg^{-1} and 1% lidocaine (30 mg) were administered intravenously immediately after venoclysis. After anesthesia induction, capnographic monitoring was added and the neuromuscular blockade was evaluated using acceleromyography (TOF Watch SX, Bluestar Enterprises,