

**Does Low Flow Anesthesia Affect Cerebral Oxygenization in Bariatric Surgery?
Prospective Randomized Clinical Study**

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Study Protocol

This study will perform in 60 adult patients who undergoing laparoscopic sleeve gastrectomy or gastric bypass surgery. Morbidly obese patients with ASA (American Society of Anesthesiology) score I-III, aged 18-65 years, BMI > 35 will include in the study. Patients with ASA IV, under 18 years, over 65 years, obstetric patients, uncontrolled diabetes mellitus, cardiovascular and pulmonary disease, cerebrovascular disease and patients who refused informed consent forms will exclude from the study.

Heart rate (HR), noninvasive blood pressure, electrocardiogram (ECG) and peripheral oxygen saturation (SpO₂), monitoring will perform to all patients in operation room without premedication. In addition, regional cerebral oxygen saturation (Near-infrared spectroscopy system, NIRS, INVOS 4100 Cerebral Oximeter, Software Version 7.2.5.0, Somanetics Corporation) and BIS (Bispectral Index, VISTA™ Monitoring System) monitoring will perform to all patients. Two cerebral sensors of NIRS and BIS sensors will glue to the right and left frontal areas under the hairline and covered with tape to prevent exposure to light.

After preoxygenation (100% 4 L/min O₂ for 3 minutes), propofol (1-2 mg/kg), rocuronium (0.8 mg/kg) and fentanyl (0.1 µg/kg) will administer in anesthesia induction via intravenous route at doses calculated according to ideal body weights. Randomly select patients will divide into two groups: Group L: low flow desflurane and group N: normal flow desflurane. Initially, anesthesia maintain with desflurane inhalation with a flow of 2 L/min in 0.5 O₂ oxygen-air mixture in both groups. While target minimum alveolar concentration (MAC) was 1-1.5 and BIS values are 40-60 concurrently, the flow rate adjust to 0.75 L/min in Group L and 1.5 L/min in Group N. Age-related MAC values will determine and express as a percentage of volume. The ventilation parameters will adjust to maintain the end-tidal carbon dioxide (EtCO₂) values at 35-45 mmHg. Neuromuscular blocker will administer based on Train of Four (TOF, Datex-Ohmeda) values.

HR, SpO₂, EtCO₂, mean arterial pressure (MAP), BIS values, left regional cerebral oxygen saturations (LrSO₂) and right regional cerebral oxygen saturations (RrSO₂) will record at before anesthesia (T₀), after intubation (T₁), before insufflation of CO₂ (T₂), after insufflation of CO₂ (T₃), after reverse trendelenburg position (T₄), after supine position (T₅), after desufflation of CO₂ (T₆), after awakening from anesthesia (T₇). Also anesthesia and surgery times, perioperative and postoperative complications will record. Postoperative analgesia was achieved in all patients with appropriate doses of tramadol and paracetamol via intravenous route.

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Statistical Analysis

Statistical analysis will carry out by using SPSS program (SPSS for Windows version 22). T-test and Chi-Square Test will be used for the comparison between groups. Correlation analysis will be based on the calculation of Pearson's rank correlation coefficients. Value of p below 0.05 will be considered as statistically significant. Consent to conduct the study was obtained from Local Ethic Committee of Inonu University.