

Title: APPLICABILITY AND SAFETY OF LOW FLOW CLOSED CIRCUIT ANESTHESIA IN PEDIATRICS

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Introduction: Application of low flow closed circuit anesthesia in pediatrics can have several advantages: economy, freedom from pollution, and conservation of heat and moisture¹. The main concerns related to technique in this field however, have been its safety and applicability. In the present study, the authors attempted to examine some of the aspects of closed circuit anesthesia in pediatrics, especially with relation to the status of oxygenation and ventilation and ease of application.

Methods: Thirty ASA I and II with ages ranging from 1 month-12 years were included in the study. Bloomquist circle system was used in patients weighing less than 15 Kgm while adult soda lime absorber circuit was used for patients weighing > 15 Kgm. Fluotec Mark III vaporizer was used to deliver halothane. An intravenous or inhalation induction was carried out depending on availability of intravenous access. Induction and intubation were carried out using high gas flows of nitrous oxide and oxygen (TGF 3-5 liters). The high gas flows were maintained till FiO₂ of 0.4-0.5 and end tidal halothane of 1-1.2 was achieved, this was achieved within 3-5 minutes. The circuit was then closed and TGF reduced to 0.3-0.6 L/Min. The gas flows were adjusted to maintain FiO₂ of 0.4-0.5 and end tidal halothane concentration of 1-1.5; the ventilation was controlled in all the cases. At completion of surgery, circuit was opened, nitrous oxide and halothane turned off, and the

oxygen flow increased to 3-5 liters/Min. Study variables included oxygen saturation, end tidal CO₂, FiO₂, dialed and end tidal halothane, oxygen and nitrous flow rates.

Results: Patients weights ranged from 3-45 Kgm. Twenty one patients were below 20 Kgm in weight. Duration of low flow closed circuit ranged at 82 ± 45 minutes. Patients maintained their O₂ saturation at 98-100 percent and end tidal CO₂ 26-35 mm Hg for the whole duration of anesthesia. The FiO₂ remained stable for the whole duration of closed circuit anesthesia and frequent adjustments of O₂ flow rates were not required (Fig 1) The difference between dialed halothane and end tidal halothane decreased as anesthesia progressed on low flows (Figure 2). Patients remained hemodynamically stable and body temperature was maintained within normal limits.

Discussion: The study indicates that low flow closed circuit anesthesia can be practiced in pediatric patients safely and easily. With easy availability of pulse oximetry and capnography, the technique can be applied to all pediatric age groups.

Bibliography:

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