Low Flow Rate Anesthesia

An essay

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Introduction

For most clinicians, selecting a fresh flow gas higher than 3-5 L/min was widely accepted as a routine anesthesia technique. The introduction onto the market of new volatile agents as well as advanced anesthesia machines accompanied by highly reliable monitoring systems, made minimal flow or closed system anesthesia feasible on a daily basis. Clinical, cultural, environmental, technological and economic reasons, force the modern anesthesiologist to reconsider the role of minimal flow and closed circuit volatile anesthesia, in clinical practice. (Vecil et al., 2008).

Anesthetic breathing systems have traditionally been categorized as open, semi-open or semi-closed depending on the degree of rebreathing of gases. Semi-closed systems may be further classified according to the fresh-gas flow as high-flow (2 L/min), low-flow (1 L/min) or minimal-flow (0.5 L/min).

When fresh-gas flow is further reduced to a degree exactly matching uptake, the breathing circuit is referred to as closed (Schober and Loer, 2006).

Even when anesthesia does not represent a major part of the expense of a given surgical operation, reducing costs is not negligible because the large number of patients passing through a department of anesthesia accounts for a huge annual budget.

Volatile anesthetics contribute 20% of the drug expenses in anesthesia, coming just behind the myorelaxants; however, the cost of halogenated agents has potential for savings because a significant part of the delivered amount is wasted when a non-partial-rebreathing system is used. The cost of inhaled agents is related to more than the amount taken up; it also depends on their market prices, their relative potencies, the amount of vapour released per millilitre of liquid, and last but not least the freshgas flow rate (FGF) delivered to the vaporizer—the most important factor determining the cost of anesthesia (Odin and Feiss, 2005).
The advantages of low flow anesthesia are obvious and indisputable: the reduction of anesthetic gas and vapor consumption, decrease in atmospheric pollution with inhalation anesthetics, the improvement in anesthetic gas climate, and the significant reduction in costs (Baum, 1999).

There are a number of possible drawbacks to the use of low flow anesthesia. These include: changes in agent concentration take longer, inspired anesthetic concentration is lower than that set at the vaporizer, delivery of a hypoxic mixture, high humidity and moisture levels accumulate in the circuit (Ting, 2003).

Although there are potential risks associated with low-flow anesthesia, modern anesthesia machines meet all the technical requirements for the safe use of low-flow techniques if they are used in conjunction with equipment for monitoring inhaled and exhaled gas concentrations; these monitors are already increasingly available and, in the near future, are likely to become an obligatory safety standard in many countries.

For both economic and ecological reasons, the use of new inhalational anesthetics, with low tissue solubility and low anaesthetic potency, can be justified only if the efficiency of administration is optimised by using low-flow anesthetic techniques (Baum and Aitkenhead, 1995).
Aim of the work.

The aim of the work is to review and update the advantages and limitations of low flow rate anesthesia.
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REFERENCES


