

Editorial

The history of the debate on whether an intravenous or an inhaled anesthetic is the better method for induction

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In the 1800s and early 1900s, anesthesia was established by administering inhaled anesthetics such as nitrous oxide, ether, or cyclopropane via a mask. In the 1930s, the anesthetic properties of barbiturates were established. Thiopental produced a rapid and short-term loss of consciousness. As a result of the smoothness of the induction of anesthesia with thiopental, a debate developed in the anesthesia literature in the 1930s about whether an intravenous or an inhaled anesthetic was the better method. However, intravenous anesthetics have been the preferred method for some time. In this issue of the *Journal of Anesthesia*, Suzuki and colleagues have carefully examined the efficacy of the induction of anesthesia in adults by using either the inhaled anesthetic sevoflurane or intravenous propofol [1].

A *rapid* induction technique using an inhaled anesthetic, i.e., 4% halothane, was first reported in 1985 [2], although a similar procedure had been described at least 20 years earlier using cyclopropane. In their 1985 paper, Ruffle and Snider described vital capacity rapid inhalational induction (VCRII), and halothane was shown to produce acceptable airway conditions in adults. This novel technique required patients to exhale to their residual volume, and then inhale and hold a *vital capacity* breath of a high concentration of halothane, with or without nitrous oxide, in oxygen. After the breath had been held as long as possible, spontaneous ventilation and loss of consciousness would follow. Since 1985, several other investigators have reported the merits and safety of this technique with other inhaled anesthetics. In 1987, the VCRII technique was applied using isoflurane [3]. A direct relationship was observed between the blood/gas partition coefficient and the speed of induction. However, because of the increased pungency of the newer agents compared with

halothane, there was a higher incidence of airway complications. These included coughing, laryngospasm, and movements by the patient. In addition, patient satisfaction was greatly decreased.

In 1990, sevoflurane, a non-pungent, potent, volatile anesthetic agent, became available for the first time to anesthesiologists in Japan. It was believed that this could be the ideal agent for use with the VCRII technique. Studies performed in both Japan and the United States indicate that sevoflurane is suitable for the induction of anesthesia using a mask. Sevoflurane does not trigger increased airway complications. In the 1930s, intravenous induction techniques challenged the popularity of standard inhalational methods, resulting in considerable discussion in the literature. The promising data published on the speed and quality of induction using mask administration of sevoflurane has revived this debate.

Ruffle and Snider [4] have described a triple-breath method using 4% halothane, but this technique has a weak point in that the second and third breaths are not always performed correctly. Therefore, a modified triple-breath method was designed which involves 2 s inspiration and 3 s exhalation [5]. It has been reported that the triple-breath method using 5% sevoflurane is smooth and useful, and is a good rapid-induction technique for cooperative adult patients. The induction time was 44 s, which is about half that needed with the single-breath method using 4.5% sevoflurane [6].

Inhalational induction with a high concentration of sevoflurane would appear to offer several objective advantages compared with induction using propofol, especially in day-case patients, although a significant minority may dislike this VCRII technique. Recently, a randomized, double-blind clinical study suggested that inhaled anesthetic induction with 8% sevoflurane is an acceptable alternative to propofol induction in elderly patients [7]. Suzuki et al. [1] are to be congratulated for shedding some clinical light on this debate.

In practice, a rapid loss of consciousness may be preferred by the patient, and is nonstressful for the anesthesiologist. The important point to note is that an anesthetic technique could be developed using a breath technique with an inhaled anesthetic as well as an injected dose of an intravenous anesthetic which would be comfortable for both patient and anesthesiologist.

References

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