Total intravenous anesthesia

Total intravenous anaesthesia (TIVA) is a technique of general anaesthesia which uses a combination of agents given exclusively by the intravenous route without the use of inhalation agents (Gas Anaesthesia).

There is a solid rationale for the use of TIVA in some patient cases where the delivery of inhaled anesthetics is impossible or disadvantageous, or in scenarios where traditional anaesthetic delivery systems may be unavailable or impractical. In other cases, the use of TIVA could make the process more efficient and advantageous for the patient.

Compared generally to traditional volatile anaesthetic techniques, TIVA offers several potential advantages. These include reduced incidence of post-operative nausea and vomiting, reduced atmospheric pollution, more predictable and rapid recovery, greater haemodynamic stability, preservation of hypoxic pulmonary vasoconstriction, reduction in intracerebral pressure and reduced risk of organ toxicity.

In recent years, TIVA has become more popular, practical and possible due to two main reasons - firstly, the pharmacokinetic and pharmacodynamic properties of drugs such as Propofol and newer short-acting opioids, which make them suitable for intravenous administration. Secondly, new concepts in pharmacokinetic modeling coupled with advances in the technology of infusion pumps which allow the use of algorithms such as Target Controlled Infusion (TCI).

In comparison to traditional inhalation anaesthesia, the inherent benefits of TIVA via a Target Controlled Infusion (TCI) make it a more straightforward and user-friendly technique for the caregiver, while at the same time offering a faster and more comfortable patient recovery.

TIVA is purely an anaesthetic technique, when used in cases where post-operative pain management will be required, multimodal pain management strategies could be applied such as conducting regional anaesthesia prior to the TIVA for post-operative use to improve patient recovery.

Increasing evidence suggests that total intravenous anaesthesia (TIVA) may be the preferred anaesthetic for cancer resection surgery. To assist the preparation of a randomised controlled trial (RCT) examining Volatile (versus TIVA) Anaesthesia and Perioperative Outcomes Related to Cancer (VAPOR-C) we developed an 18-question electronic survey to investigate practice patterns and perspectives (emphasising indications, barriers, and impact on cancer outcomes) of TIVA versus inhalational general anaesthesia in Australasia. The survey was emailed to 1,000 (of 5,300 active Fellows) randomly selected Australian and New Zealand College of Anaesthetists (ANZCA) Fellows. The response rate was 27.5% (n=275). Of the respondents, 18% use TIVA for the majority of cases. In contrast, 46% use TIVA 20% of the time or less. Respondents described indications for TIVA as high risk of nausea, neurosurgery, and susceptibility to malignant hyperthermia. Lack of equipment, lack of education and cost were not considered barriers to TIVA use, and a significant proportion (41%) of respondents would use TIVA more often if setup were easier. Of the respondents, 43% thought that TIVA was associated with less cancer recurrence than inhalational anaesthesia, while 46% thought that there was no difference. Yet, only 29% of respondents reported that they use TIVA often or very often for cancer surgery. In Australasia, there is generally a low frequency of TIVA use despite a perception of benefit when compared with inhalational anaesthesia. Anaesthetists are willing to use TIVA for indications where sufficient evidence supports a meaningful level of improvement in clinical

outcome. The survey explores attitudes towards use of TIVA for cancer surgery and demonstrates equipoise in anaesthetists' opinions regarding this indication. The inconsistent use of TIVA in Australasia, minimal barriers to its use, and the equipoise in anaesthetists' opinions regarding the effect of TIVA versus inhalational anaesthesia on cancer outcomes support the need for a large prospective RCT [1)].

1)
Lim A, Braat S, Hiller J, Riedel B. Inhalational versus propofol-based total intravenous anaesthesia: practice patterns and perspectives among Australasian anaesthetists. Anaesth Intensive Care. 2018 Sep;46(5):480-487. PubMed PMID: 30189822.