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Better anaesthesia with intravenous drugs

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ADVERSE EFFECTS OF INHALATIONAL ANAESTHETICS

Concern has been expressed for many years over pollution of the operating environment with inhalational agents and it is likely that nitrous oxide may have been unacceptable if introduced as a new drug. Studies have shown increased production of fluoride ions occurs after the administration of sevoflurane and after prolonged use of isoflurane. Concern about the genetic damage caused by routine exposure to inhalational agents has been expressed and exposure to even trace concentrations of waste anaesthetic agents may cause genetic damage comparable with smoking 11-20 cigarettes per day.

The toxic effects of inhalational agents on alveolar surfactant production have been reported with no adverse effect caused by IV agents. There are certain operative procedures such as bronchoscopy or thoracic surgery where IV anaesthesia may be more suitable. Volatile agents are among those which must be avoided in patients who suffer from malignant hyperpyrexia and intravenous anaesthesia has been reported as a safe alternative.

Maintenance with inhalational agents has been reported widely to be associated with more PONV compared with a TIVA technique. Even when opioids are avoided, TIVA is still associated with significantly less PONV compared with volatile agents. A further factor is that induction with volatile agents is not universally acceptable to patients.

BENEFICIAL EFFECTS OF INTRAVENOUS ANAESTHETICS

Unlike inhalational drugs, the IV agents have been demonstrated to be safe both for the patient and for the staff. The use of propofol has been demonstrated to be associated with significantly less PONV compared with inhalational agents, and a TIVA technique is associated with a high level of patient acceptance, and possibly decreased overall cost. Animal studies have shown the beneficial effects of IV drugs after cerebral infarction, during aortic cross-clamping and during cardiac surgery.

The wide variation in pharmacodynamic response to both inhalational and intravenous anaesthetics is well recognised. However, a major benefit of intravenous anaesthesia using a target-controlled infusion is the ability to calibrate the individual patient's requirements for anaesthesia. This is not possible at present with inhalational techniques. The final benefit of intravenous drugs is that this will be the future course of development of all new agents. New anaesthetic drugs will be administered intravenously and this is likely to be the future for anaesthesia.