

## Peroperative Management for Ambulatory Anaesthesia : Does the Choice of Drug matter ?

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During the last ten years ambulatory surgery has gained increasing popularity worldwide in such an extent that 70% of all elective surgical procedures in the USA and 50% in the UK are actually performed on an ambulatory basis.

This evolution, mainly triggered by economic concerns, has been made possible through the emergence of new minimally invasive surgical techniques. Despite their greater cost, the new short acting agents such as propofol, sevoflurane, desflurane and remifentanyl have become very popular in this setting in an attempt to facilitate rapid recovery and early discharge from the ambulatory surgical unit (ASU).

Recovery from anaesthesia is usually divided in three successive yet overlapping phases. Early recovery (phase 1) takes place in the operating room (OR) and/or the postanesthesia care unit (PACU). Intermediate recovery (phase 2) takes place in the ASU and ends with home readiness. Late recovery (phase 3) takes place at home and ends with return to preoperative physical and mental conditions when patients resume their usual activities.

Speed of awakening is far from being the only limitation for rapid hospital discharge.

Beside dizziness and residual sedation, pain and postoperative nausea and vomiting (PONV) are the most common reasons for delayed discharge or unplanned admission (1-4).

Many studies have investigated whether the theoretical pharmacokinetic advantages of the so-called newer agents really translate into rapid recovery and earlier discharge after day-case anaesthesia and in this hypothesis if they are cost-effective.

To summarize briefly this controversial issue, it seems that time to early recovery and PACU discharge is smaller when newer inhaled anaesthetics (sevoflurane and desflurane) are used as compared to propofol. There is no significant difference between propofol and isoflurane regarding this endpoint. Among the volatile anaesthetics, sevoflurane and desflurane allow faster phase 1 recovery than isoflurane.

Clinical differences between desflurane and sevoflurane are small, desflurane allowing faster emergence from anaesthesia particularly in obese and elderly patients.

Concerning the incidence of side effects, propofol induces less PONV than inhaled anaesthetics. Propofol is more expensive than inhaled agents but generates a very high percentage of satisfaction among patients. Shivering is more frequent with inhalation agents than with propofol.

Nitrous oxide is widely used for ambulatory anaesthesia. It provides analgesia, decreases requirement of expensive intravenous or inhaled anaesthetics and shortens recovery time after equi-MAC anaesthesia. Its role in increasing the incidence of PONV has recently been challenged. Therefore there is no convincing reason to avoid its use. Moreover it inhibits NMDA receptors, reduces opioid tolerance or opioid induced hyperalgesia and might improve postoperative pain control.

A meta-analysis found a minor difference in home-readiness between sevoflurane and isoflurane (5 min.) and no difference was found between the other anaesthetics (5-8). Remifentanyl has short duration of action which is independent of the length of infusion. It provides improved preoperative analgesia and hemodynamic stability without detrimental effect on awakening times or even shortening them by reducing other anaesthetic concentrations. It does not increase PONV as opposed to other longer-acting opioids, but anticipation of postoperative analgesia is required given its lack of residual analgesic effect (9, 10).

In paediatric day-case surgery, sevoflurane provides more rapid induction than halothane and induces less hypotension and bradycardia. Emergence from anaesthesia is faster with sevoflurane than with halothane or propofol. However

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delirium occurs more frequently following sevoflurane than following halothane or propofol. The same phenomenon occurs with desflurane which is not suitable for induction. Regarding PONV, propofol compares favourably with halothane and sevoflurane.

Despite earlier discharge from PACU, neither sevoflurane nor desflurane allow earlier home readiness than halothane in paediatric anaesthesia (11, 12).

In conclusion, the newer agents are particularly able to improve the early stage of recovery and shorten PACU stay. Consequently, a growing number of authors promote "fast-tracking" ambulatory anaesthesia that's to say a complete bypass of the cost and time consuming PACU, provided that pre-defined criteria of adequate recovery are met in the OR (13).

Unfortunately, this initial advantage seems to be lost thereafter as time required to achieve subsequent recovery endpoints, especially hospital discharge, appears to be similar with all agents.

This is probably not only the result of the properties of the anaesthetics themselves but also the consequence of inherent delays within the day-care process.

It seems unlikely that any agent will ever provide all the properties required for ideal day-case anaesthesia. However that is not to say that newer agents do not provide advantages : they do (12).

Nevertheless, the choice of anaesthetic should be guided by the experience of the physician as well as the routines and equipment available in the hospital. The choice of a specific anaesthetic appears to play a minor role in outcome after ambulatory surgery (5).

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