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There is a fundamental difference between day surgery anaesthesia and office-based anaesthesia/monitored anaesthesia care/conscious sedation practice. Day surgery anaesthesia can be defined as anaesthesia performed within a hospital by staff from the anaesthesia department with equipment used in daily anaesthesia practice. The fact that this type of anaesthesia is for day surgery patients does not change anything: day surgery anaesthesia should comply with all rules and guidelines for anaesthesia and postoperative care. There must not be any compromise with safety in the performance of day surgery anaesthesia. The same test procedures, checklists, leak tests used for anaesthesia for non-day surgery patients must be applied to office-based practice. Monitoring must be maintained at the same level including, as standard, pulse oximetry, capnography, ECG, oxygen concentration measurement in the breathing circuit and non-invasive blood pressure. If inhalation anaesthesia is used monitoring of inspired and end-tidal gas concentration should be used, including the calculation of age-related MAC value. Day surgery anaesthesia is now being undertaken in sicker and older patients and for longer procedures than only a decade ago. It is important to realise that what the surgeon believes is a trivial, medium sized procedure may be performed in a patient with health impaired to such a degree that it may demand a very skilful anaesthetic not to impose an unnecessary risk on the patient. The pre-operative evaluation of the patient is important and a note in the record by the surgeon stating that the patient is 'otherwise healthy' is certainly no guarantee of the patient's wellbeing.

**OFFICE-BASED ANAESTHESIA**

In the 'twilight anaesthesia zone' of office-based anaesthesia, monitored anaesthesia care (MAC) or conscious sedation there are many pitfalls to circumvent. A typical situation is where a very sick patient is undergoing a procedure in almost darkness, by a surgeon or an interventional radiologist totally focused on the procedure, with limited knowledge of the effects of anaesthetic drugs such as midazolam, propofol or opioids alone or, even worse, in combinations of two or all three of them. Monitoring is at best by pulse oximetry. In cases where oxygen is supplied pulse oximetry will not warn of respiratory depression until very late, and then unskilled staff will, perhaps, not be able to cope with the problem. Even if there is equipment available for mechanical ventilation, there is no guarantee that there will be anyone present who can secure the airway.

The demand for monitored anaesthesia care has grown exponentially and it may be difficult for anaesthesia departments to supply an anaesthetic service in all locations in the hospital. One problem is that the physician in charge of the procedure may not have a budget for anaesthesia, as he/she has not foreseen the need for anaesthesia care. This leads to suboptimal care where a staff member without anaesthesia training will give the sedation drugs on the orders of the surgeon, who normally just wants 'the patient not to move'. However, it may be quite a short step between a patient not moving for a short time and never moving more at all, and it is difficult for the person in charge of the procedure to also monitor the depth of anaesthesia. The demand for a compromise solution has led to some anaesthesia departments starting to give lectures in monitored anaesthesia care. This is probably not the best way to go, as an ordinary nurse with a 'crash course' in sedation cannot be regarded as having the qualifications of a nurse anaesthetist. However, such a nurse anaesthetist *might* improve the monitoring of the anaesthesia and, thereby, prevent the most common risk of MAC - respiratory depression. If a serious complication occurs it is very important that guidelines on obtaining support from the anaesthesia department are available. For out-of-hospital MAC this presents an obvious problem.

It must be emphasized that MAC is generally very safe and, in Sweden, for example, no serious complications have been reported to the authorities. There may, however, have been serious incidents that have been resolved by anaesthesiologists called to the scene. In the USA there are reports [1-3] of both death and permanent brain damage following MAC. The common factor seems to be the use of more than one drug, such as the combination of propofol or midazolam with an opioid. Advancing age and poor ASA status are also important factors. In the US reports it seems that the level of monitoring is low - in 12% there was no monitoring at all, and pulse oximetry only was used in 58% of patients. As a large number of MAC cases are performed in semi-darkness, it is obvious that it is very difficult to diagnose apnoea without assistance from monitoring. The pulse oximeter provides a late sign of respiratory depression, but capnography may be helpful especially when combined with respiratory impedance monitoring via the ECG electrodes.

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## KEY LEARNING POINTS

- Day care anaesthesia in a hospital should adhere to all normal anaesthesia standards regarding monitoring, staff qualifications, test procedures and checklists.
- Ideally MAC (monitored anaesthesia care) should be performed at the same level of quality and safety as day surgery anaesthesia, but there seems to be a greater demand for qualified anaesthesia service than can be provided by most anaesthesia departments. The education of non-anaesthesia personnel in MAC may be an improvement in comparison with unmonitored anaesthesia care in the hands of the physician in charge of the procedure.
- Using propofol or midazolam in combination with an opioid increases significantly the risk of respiratory depression. Single agent sedation should be used.
- Oxygen should always be available.
- Besides pulse oximetry, monitoring should include capnography and respiratory impedance via the ECG electrodes to aid detection of apnoea.
- Equipment for securing the airway and providing mechanical ventilation must be available. A suctioning device must also be available.

## REFERENCES

1. Bhananker SM, Posner KL, Cheney FW, Caplan RA, Lee LA, Domino KB. Injury and liability associated with monitored anesthesia care. *Anesthesiology* 2006; 104: 228-34.
2. Pino RM. The nature of anesthesia and procedural sedation outside of the operating room. *Curr Opin Anesthesiol* 2007; 20: 347-51.
3. Robbertze R, Posner KL, Domino KB. Closed claims review of anesthesia for procedures outside the operating room. *Curr Opin Anesthesiol* 2006; 19: 436-42.