

ABSTRACT

The Ultimate PCA Recipe

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Patient Controlled Analgesia (PCA) involves the administration of an analgesic agent, either intravenously or into an anatomical area where the administration is controlled by the patient receiving treatment. Patient controlled analgesia can involve either systemic or regional analgesia.

Achieving optimum analgesia with minimal complications from PCA requires a sound knowledge of pharmacology, pain medicine and physiological effects of neural blockade.

Each systemic analgesic has typical dose response characteristics and achieves a therapeutic level in the bloodstream. Ideal analgesics also cause toxic effects at blood concentrations which are far in excess of those producing analgesic action, meaning that they have a high therapeutic index.

Local anaesthetic agents achieve therapeutic tissue levels adjacent to nerves and are variably absorbed into the bloodstream. Patient controlled techniques for regional anaesthesia are theoretically suited to epidural and paravertebral techniques where more effective blockade may be achieved through bolusing patterns which produce cephalad and caudad spread from the tip of the catheter. This contrasts with continuous infusion techniques which may not spread as widely from the catheter tip.

The challenge with both systemic and regional approaches to PCA is to rapidly achieve and easily maintain therapeutic analgesic levels. Rapid achievement of therapeutic serum concentrations involves knowledge of the importance of an effective loading dose which can be achieved intraoperatively or at the commencement of analgesia management on the ward. Easy maintenance of analgesic levels depends on pharmacokinetic characteristics allowing for prolonged duration of analgesic effects.

Newer challenges involve facilitating multimodal analgesic techniques in the one infusion. While no two analgesic agents share exactly the same dose response behaviours and therapeutic index, certain agents are sufficiently similar to allow for combination use. Moreover it is possible to also combine analgesics and anti-emetics which enable patients to achieve therapeutic levels of analgesia without the occurrence of troublesome side effects such as nausea and vomiting.