Managing postoperative pain

Malvena Stuart Taylor

The postoperative course of a patient can be complicated by events such as pain, nausea and vomiting. These in themselves can have a significant impact upon morbidity and even survival. This article outlines key points to minimize such adverse outcomes.

Despite reports such as that issued by the Royal Colleges of Surgeons and Anaesthetists (1990) where guidance was given with regard to improving pain after surgery, studies continue to show an embarrassing lack of progress in this direction. This is, in part, because of an increased surgical workload coupled with a paucity of support services. Nevertheless anaesthetists are in the challenging position of being able to have a positive impact on the successful recovery of their patients by considering their practice in different stages of their care of the patient, that is to say in the preoperative visit, premedicant used, anaesthetic delivered and postoperative analgesic plan. This review considers each of these phases in turn.

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PREOPERATIVE VISIT

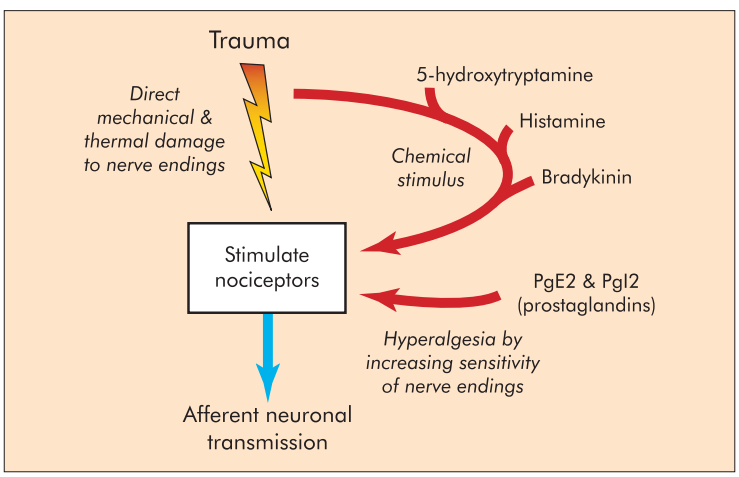
This is the prime opportunity for the anaesthetist to prepare the patient for what they can expect when they wake up. Details such as having a drip in their arm, a nasogastric tube up their nose and an oxygen mask on their face are important factors they need to be prepared for. It is not unknown for a patient to wake up in recovery thinking that they have had a cardiac arrest and were in intensive care postoperatively, merely because they had an oxygen mask on their face.

In addition, the options for postoperative analgesia are growing in number and complexity. It is important, therefore, that verbal information about these options is reinforced with, for example, information leaflets. To this end the Royal College of Anaesthetists and the Pain Society are both producing template information leaflets on which one can model local packs.

PREMEDICANT

The practice of prescribing an omnopon and scopolamine premedication currently tends to be restricted to cardiac anaesthesia, and an increasing number of anaesthetists do not even use temazepam premedications because of the unpredictable timing of surgery. However, this is a useful opportunity to take advantage of the pre-emptive effect of analgesics, in particular non-steroidal anti-inflammatory drugs (NSAIDs). There is much debate surrounding the concept of pre-emptive analgesia. To date the best evidence of a pre-emptive effect for analgesia rests with opioids (Richmond et al, 1993). Notwithstanding this statement it makes empirical sense borne out by clinical experience that if one uses NSAIDs as part of the premedication, then the tissue inflammatory response and resulting pain will be reduced.

Figure 1. Tissue damage.



ANAESTHETIC TECHNIQUE

Pain, whether acute or chronic, involves many mechanisms within the central nervous system. The first stages of this are represented in *Figure 1*. This demonstrates three processes:

1. Direct mechanical stimulation of raw nerve endings

2. Chemical stimulation of nerve endings by inflammatory substances
3. Hypersensitivity of nerve endings from locally produced prostaglandins.

NSAIDs play a vital role in downregulating process (3) above. This may help to explain why the presence of NSAIDs before surgical injury has a more profound effect on modulating the tissue inflammatory response than administering such analgesics during or after surgery. Following this logic through it makes sense, therefore, to use a drug that has a short onset of action so that effective anti-inflammatory plasma levels of the drug are achieved by the time of the first incision.

Opioids and local anaesthetic nerve blocks can also act in a pre-emptive manner if given early by modulating process (1) and (2) from the above list in *Figure 1*. By using all three modes of analgesia one is taking advantage of the multimodal approach to pain management (*Figure 2*) as discussed by Souter et al (1994) and Kehlet et al (1997). This is expanded on later in this article.

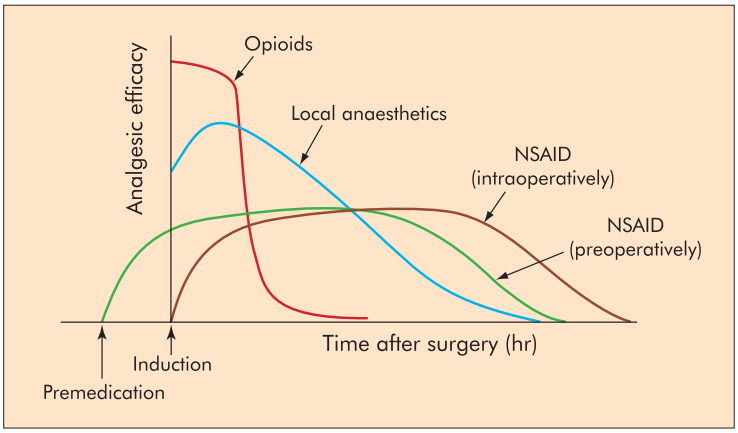


Figure 2. Multimodal pain control. Modified with permission from Souter et al (1994). NSAIDs = non-steroidal anti-inflammatory drug.

POSTOPERATIVE ANALGESIC PLAN

Hourly morphine algorithm

A major fear in using opioids in the early post-operative period is that of inducing respiratory depression. Because of this, doctors tend to be conservative in their prescriptions and nurses economic in their administration of analgesia. The result is swinging levels of pain relief afforded by 4-hourly regimens. Gould et al (1992) demonstrated very clearly that an algorithm which allows administration of hourly morphine is safe and effective, providing the nurse checks vital signs before giving the injection. This is based on the premise that 95% of the population will have peak plasma levels of morphine-6-glucuronide (the active metabolite of morphine) after 1 hour. This can be effectively given through an indwelling intramuscular cannula (*Figure 3*) to reduce pinprick pain. The aim in any treatment regimen is to provide steady effective plasma levels of the drug. This can be visualized quite easily with antibiotics. What is not often appreciated is that the same concept and need applies to analgesics.

Analgesic ladder

Analgesic strategies for chronic and cancer pain are based on the World Health Organization analgesic ladder (1990) (*Figure 4*). It is possible, with modification, to apply similar principles for management of acute pain both in the day-case and inpatient setting.

First, it is worth looking at the league table of analgesics (Bandolier, 2001). The numbers needed to treat (NNT) is an expression of how many patients need to be treated in order to get a pre-defined end point compared with placebo; in this case at least 50% pain relief over 4–6 hours. Therefore the lower the number, the

Figure 3. Intramuscular Y-can cannula.

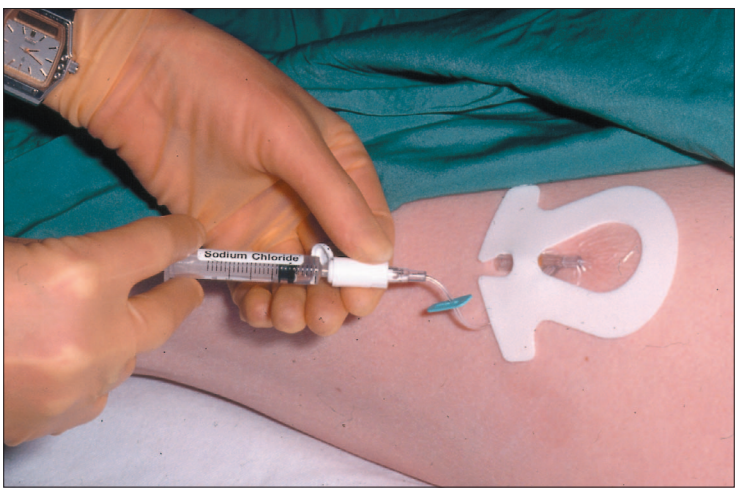
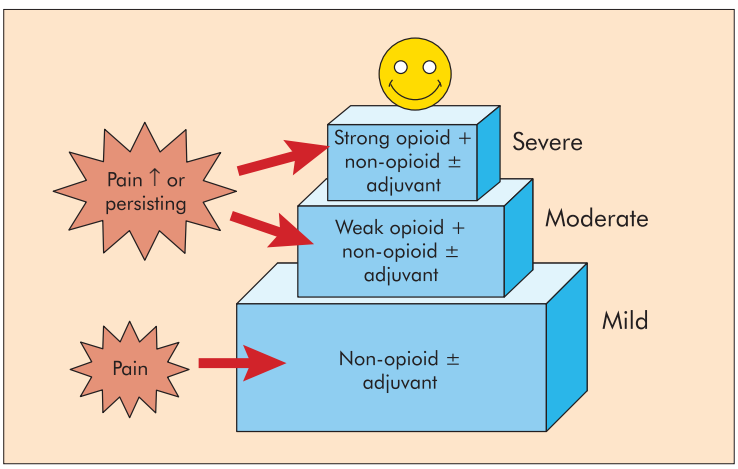


Figure 4. World Health Organization analgesic ladder.



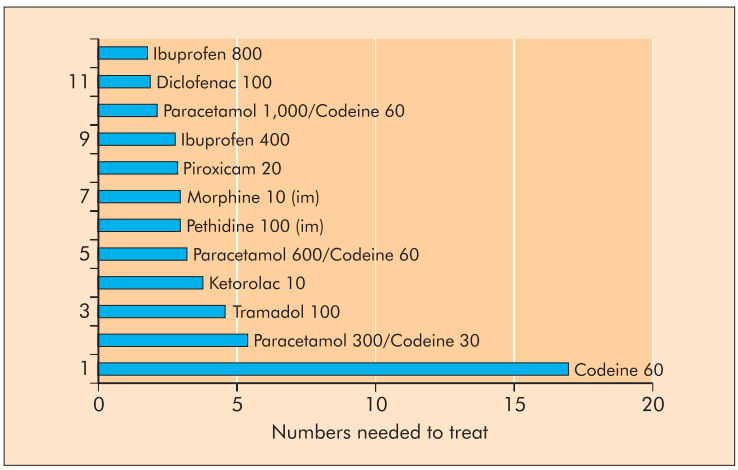
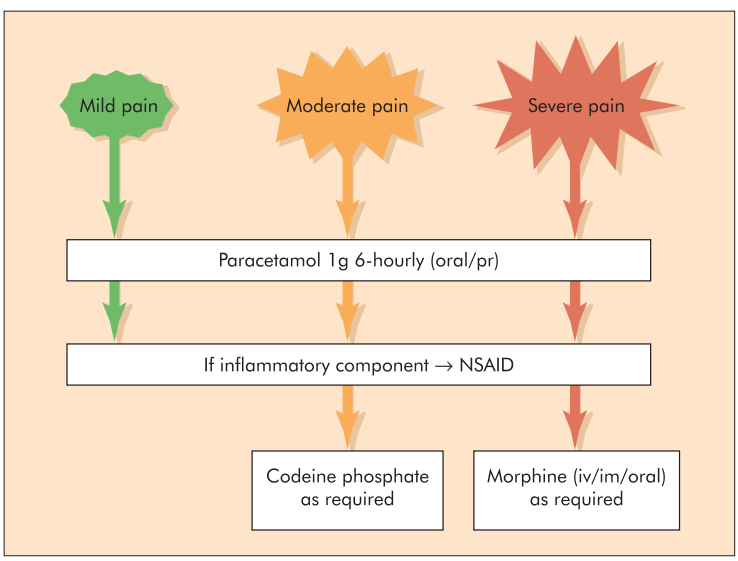


Figure 5. League table of analgesics. im = intramuscularly.

more effective the drug. An NNT of 2 means that 50 out of 100 patients will get at least the 50% pain relief described above. This league table is based on single-dose postoperative comparison and *Figure 5* represents an abridged version of this. NSAIDs do very well in this comparison. However, caution must be exercised in extrapolating information from this chart into clinical practice. It must be remembered that most of these are small trials, and that the low NNT for ibuprofen relates to the higher dose of 800 mg, whereas many safety studies on this NSAID relate to the lower dose of 400 mg. Therefore it is important to look at dosage when assessing safety and efficacy factors with this class of analgesic.

Second, it is useful to take advantage of the fact that paracetamol acts centrally, whereas other NSAIDs work peripherally. Therefore using both at regular intervals (*Figure 6*) has a significant opioid-sparing effect. This in turn reduces the often debilitating side-effects of opioids, principally respiratory depression and nausea and/or vomiting. It also reduces gut dysmotility and constipation which can often impair recovery of the general surgical patient. Based on this information one can use an analgesic ladder for acute pain as represented in *Figure 7*.

Figure 7. Analgesic guide for acute pain. im = intramuscularly; iv = intravenously; NSAIDs = non-steroidal anti-inflammatory drugs; pr = per rectum.



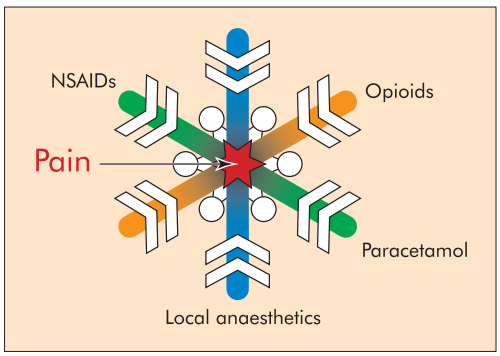


Figure 6. Multimodal therapy. NSAIDs = non-steroidal anti-inflammatory drug.

ALTERNATIVE OPIOIDS

There is an increasing incidence of patients in whom one cannot use analgesics such as NSAIDs and/or morphine derivatives (e.g. diamorphine, codeine) because of a previous gastrointestinal bleed or allergic problems. It is helpful, therefore, to have alternative analgesics available for use.

Nefopam

With regard to NSAIDs, nefopam is a very useful alternative (Heel et al, 1980). It is chemically and pharmacologically different from any other class of analgesic. Best described as an amitriptyline-like drug, it acts by inhibiting uptake of dopamine, noradrenaline and serotonin within the synapse, which enhances descending inhibition of pain. It also possesses anticholinergic properties and this may be manifest in the patient by producing a dry mouth or difficulty with micturition. It can induce confusion in the elderly, therefore it is worthwhile building up the dosage from 30 mg three times a day. In the fit individual one can start with 60 mg three times a day.

Alternative analgesics to morphine derivatives

Tramadol: Tramadol's effect is derived from the synergy between its amitriptyline-like and moderate opioid-like effect. It is particularly

TABLE 1.
Protocol for postoperative analgesia in day surgical unit

Pain category	Analgesia
No pain (e.g. cytoscopy)	Advice only
Mild pain (e.g. hydrocoele or varicose veins)	Paracetamol 1g four times a day (3 days)
Moderate pain (e.g. vasectomy, lumpectomy or dental extraction)	Paracetamol 1 g four times a day plus NSAID regularly (3 days)
Severe pain (e.g. examination under anaesthesia, inguinal hernia, epigastric hernia or circumcision)	Co-codamol (30/500) 1–2 tablets as required four times a day plus NSAID regularly (3 days)
Pilonidal sinus and haemorrhoids	Tramadol 20–100 mg as required four times a day plus NSAID regularly (3 days) plus $MgSO_4$

$MgSO_4$ = magnesium sulphate; NSAID = non-steroidal anti-inflammatory drug

useful in bony pain or for patients where there is concern about respiratory depression such as in the elderly or patients with fractured ribs. It also has less of a constipating effect than other morphine derivatives, and therefore is particularly useful following minor/intermediate rectal surgery. Caution must be exercised in restricting dosage to the manufacturer's recommended daily dose (400 mg orally, 600 mg parenterally), since there have been reports of epileptiform activity in doses exceeding 1.2 g per day.

Oxycodone: This is a pure opioid agonist with higher bioavailability than oral morphine and is therefore more predictable in the plasma levels achieved after dosing. It has approximately twice the potency of oral morphine, therefore 5–10 mg as required 4–6-hourly would equate to oral dosing of morphine 10–20 mg 2–4-hourly. The main constraint with oxycodone is that it does not have a parenteral form and therefore alternative analgesia would need to be considered until the patient can tolerate fluids.

ANALGESIA FOR DAY CASE SURGERY

Haynes et al (1995) published a study looking at pain scores once the patient had returned home (n=150). Twenty-six per cent of patients reported severe pain and 11% contacted their GP or were readmitted because of poor pain control. The audit was repeated a year later (n=200) after the introduction of a stratifying exercise whereby procedures were grouped into bands of anticipated pain. The incidence of severe pain fell to almost zero. In addition, no-one needed to contact the GP. A similar exercise has been carried out in the author's hospital recently and based on this paper patients have been stratified according to the procedure into expectation of mild, moderate or severe pain. They are often prescribed take-home analgesics as described in *Table 1*.

CONCLUSIONS

Despite advances in anaesthesia and analgesia, patients continue to suffer postoperative complications which may be avoidable. By incorporating simple changes in our approach to perioperative care, the quality of recovery from anaesthesia and surgery can be significantly improved. HM

Conflict of interest: none.

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KEY POINTS

- Effective preoperative information plays a bigger role in preparing the patient for surgery than is usually recognized.
- Pre-emptive analgesia has a significant opioid-sparing effect in the postoperative period.
- Multimodal therapy is very effective in both the intraoperative and postoperative stages for optimizing recovery.
- The use of alternative strong opioids should be considered if morphine cannot be used.
- Day-surgical units should have clear guidelines for take-home analgesics which can be tailored according to the type of surgery.