

# Postoperative analgesia and discharge criteria for day surgery

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## Abstract

Day surgery is expanding as a specialty, with a drive to perform an increasing number of procedures as day case. Economic benefits, patient preference and modern minimally invasive surgical techniques are responsible for this. Effective, long-lasting postoperative analgesia and stringent discharge criteria are essential in order to run a successful day-surgery facility. A multi-modal approach to analgesia is most effective, incorporating paracetamol, non-steroidal anti-inflammatory drugs, local anaesthesia and opioids if necessary. In patients with opioid-tolerance, gabapentinoids are useful as protective analgesics. Dexamethasone, in addition to anti-emetic properties, has analgesic effects in certain procedures. Spinal anaesthesia may be used in the day-surgery setting, although the dose of local anaesthetic agent should be reduced and the addition of spinal opioids such as fentanyl prolong analgesia and reduce failure rate. Protocols should be in place to manage analgesia in the recovery room. Discharge from day surgery should be done in a safe manner with the emphasis on patient quality of care. Discharge scoring systems are available, which can assist staff to assess whether a patient is fit for discharge. These systems do have limitations and local guidelines are encouraged. Designated lead clinicians incorporating anaesthetists, surgeons and nursing staff should work together in the development of local guidelines and the safe running of a day-surgery facility. Patients and their carers, upon discharge, should be issued with a set of procedure-specific written instructions containing useful information and an emergency helpline. Regular audit is mandatory for the effective running of a day-surgery facility.

**Keywords** Acute pain; adjuvants; day surgery; discharge guidelines; postoperative analgesia; protective analgesia

## Introduction

The definition of day surgery is variable but, for the purposes of this article, relates to a situation whereby a patient undergoes an elective surgical procedure within one working day (8–12 hours). This incorporates admission, operation, recovery and discharge.

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## Learning objectives

After reading this article, you should:

- be able to list the analgesic options available in a day-surgery service
- have knowledge of an effective analgesic rescue regimen
- be familiar with principles of discharge criteria after general or regional anaesthesia in a day-surgery facility.

Day surgery is on the increase in the UK, with the Audit Commission recommending that 75% of all surgical procedures to be performed as a day case.<sup>1</sup> Their ‘basket of 25’ and the British Association of Day Surgery (BADS) ‘trolley’ detail the range of procedures that should fall under the day-surgery umbrella.<sup>2</sup> The lists span readily achievable procedures such as myringotomy to more challenging ones such as partial thyroidectomy. Factors that have pushed this day-surgery drive include the advent of minimally invasive surgical procedures and a shortage of in-patient hospital beds. In addition, day surgery confers several advantages both to patients and to hospital trusts:

- patient preference
- timely treatment
- reduced risk of contracting nosocomial infection
- earlier return to normal activity
- possible reduction of postoperative complications
- value for money to hospital trusts
- reduced surgery waiting times and cost.

To run a successful day-surgery service, several issues must be addressed. Designated lead clinicians from within anaesthesia, surgery and nursing need to work together to spearhead the service. Robust guidelines should be in place and adhered to. Patients should be carefully and appropriately selected via consultant-led, nurse-run pre-assessment clinics. Patients should also have been appropriately investigated prior to admission to avoid any unnecessary cancellations. Factors that contribute to overnight admissions must be minimized; namely, postoperative pain and postoperative nausea and vomiting (PONV). Analgesia is of paramount importance in day surgery, not only should it be effective but also long lasting. Here, we focus on postoperative analgesic options in day surgery and discharge criteria from a day-surgery unit.

## Postoperative analgesia in day-case surgery

Acute pain has been defined as “pain of recent onset and probable limited duration. It usually has an identifiable temporal and causal relationship to injury or disease”.<sup>3</sup> The provision of analgesia in day-case surgery is of utmost importance because it is imperative to the effective functioning of such a facility. The role of clinical leads is to establish effective and consistent methods of acute pain management within a day-surgery service. Inadequate pain control and side effects of analgesics are common reasons for delayed discharge.

## Basic principles of good postoperative analgesia

The responsibility of analgesia lies with *all* staff working in a day-surgery facility. Analgesia should aim to restore patient function. Time should be taken to discuss and assess a patient’s ‘comfort

zone'. Patients who are likely to present difficult analgesic problems should be flagged up early via pre-assessment clinics, and plans should be *in situ* to manage such patients. Examples of such patients include those with chronic pain, opioid-dependent patients and those with high pre-operative anxiety.

A balanced approach to analgesia is optimal, incorporating a combination of analgesics, a regional technique or an amalgam of both (see Table 1). Multi-modal analgesia targets different areas within the pain pathways, thus providing optimal pain control with minimal side-effects (see Table 2).

### Paracetamol

Paracetamol is an effective, safe, cheap and reliable mild analgesic. The mode of action remains unclear. It should be routinely given as it has few side-effects and contraindications. Patients should be warned to be mindful of taking other paracetamol-containing drugs, such as those available as proprietary over-the-counter medications, which increase the risk of overdose.

### Non-steroidal anti-inflammatory drugs (NSAIDs)

NSAIDs are very effective analgesics, especially in the day-case setting. They are appropriate for many day-case patients but their side-effects need to be considered. Risk of bronchospasm and bleeding in susceptible patients is potentially hazardous. Their mechanism of action is by inhibition of cyclo-oxygenase type 1 (COX-1) and cyclo-oxygenase type 2 (COX-2) enzymes involved in prostaglandin synthesis. In doing so, they modulate the local inflammatory response and reduce prostanoid synthesis both centrally and peripherally. They are versatile agents that can be administered orally, intravenously or rectally.

### Opioids

Simple analgesics (paracetamol and NSAIDs) should be the bedrock of an analgesic regimen, and this forms step 1 of the World Health Organization (WHO) analgesic ladder.<sup>4</sup> Steps 2 and 3 introduce the use of opioids. Opioids work within the brain and in the dorsal horn of the spinal cord by activating inhibitory pathways in descending spinal segments via opioid receptors. Step 2 incorporates weak opioids e.g. codeine and tramadol. Codeine in combination with paracetamol has a strong additive effect. Codeine is metabolized by hepatic enzyme CYP 2D6 to its active metabolite morphine and it should be noted that 5–15% of the population are poor metabolizers. Tramadol can be administered intravenously for rapid control of moderate to severe pain. It is an atypical racemic opioid, which inhibits the reuptake of noradrenaline and 5-hydroxytryptamine (5-HT) in the central nervous system (CNS) and is also a weak opioid receptor ( $\mu$ ) agonist.

### Options for postoperative analgesia

- Paracetamol
- Non-steroidal anti-inflammatory drugs (NSAIDs)
- Opioids (strong and weak)
- Analgesic adjuvants (gabapentin, dexamethasone)
- Local anaesthetic agents (local infiltration, peripheral nerve block, central neuraxial block)

Table 1

### Oxford league table of analgesic efficacy 2007<sup>5</sup>

Analgesics	Dose (oral unless stated)	NNT <sup>a</sup>
Paracetamol	1 g	3.8
Diclofenac	100 mg	1.8
Ibuprofen	400 mg	2.5
Codeine	60 mg	16.7
Paracetamol and codeine	1 g/60 mg	2.2
Tramadol	150 mg	2.9
Morphine	10 mg intramuscularly	2.9

<sup>a</sup> NNT is the number of patients that need to be treated for one to benefit compared with a control in a clinical trial. NNTs are calculated for the proportion of patients with at least 50% pain relief over 4–6 hours compared with placebo in randomized, double-blind, single-dose studies in patients with moderate-to-severe pain. (See further reading for more information and a worked example.)

Table 2

Step 3 adds in the use of strong opioids e.g. morphine. The drawback of the use of long-acting opioids in day surgery is the risk of unacceptable side-effects. Specifically, the proclivity for opioids to cause nausea and vomiting could potentially delay discharge and increase rate of overnight stay. For this reason, it is important to adhere to a multi-modal analgesic regimen, whereby the use of opioids is protocol-based and limited to use where necessary.

### Gabapentin

In laboratory studies, analgesia given prior to a nociceptive stimulus is better than analgesia given after the stimulus, so called pre-emptive analgesia. It received support in the past, but has been refuted by a lack of clinical evidence.<sup>6</sup> An area that has shown promise is that of 'protective analgesia' that incorporates the use of adjuvant drugs such as the gabapentinoids (e.g. gabapentin) to modify nociceptive pathways within the central nervous system prior to a noxious stimulus. The principle is not pre-emptive but 'anti-hyperalgesic' and thereby to protect the CNS from pathological afferent information processing and sensitization. Useful drugs with this action work by binding to the  $\alpha_2\delta$  subunit of voltage-dependent calcium ion channels to inhibit the release of nociceptive neurotransmitters. A single pre-operative dose of 600 mg gabapentin has been shown to produce a significant reduction in pain for 24 hours. A recent review has highlighted the potential benefit of gabapentinoids in acute pain and procedures that can be performed as day cases.<sup>7</sup> This included a reduction in opioid requirements, anxiety, and nausea and vomiting. The prospect of an opioid-sparing drug is attractive in the day-case setting, especially with those patients anticipated to have difficult postoperative analgesic problems. However, a study looking at gabapentin in day-case ENT procedures identified gabapentin-related drowsiness as a cautionary factor.<sup>8</sup>

### Dexamethasone

Dexamethasone is a steroid-based preparation that has a dual advantage in day cases: in addition to its anti-emetic properties, it has been shown to have analgesic efficacy in a number of procedures (4–8 mg iv) such as laparoscopic cholecystectomy, haemorrhoidectomy, dental surgery and correction of hallux

valgus deformity.<sup>9</sup> Its onset of action is 1–2 hours and it acts by peripheral inhibition of the phospholipase enzyme, which decreases the products of cyclo-oxygenase and lipo-oxygenase pathways in the inflammatory response. Its mode of action against PONV is unknown.

### Regional anaesthesia

Peripheral nerve blocks and local anaesthetic wound infiltration are very safe and form an effective part of a multi-modal analgesic regimen. Local anaesthetic can also be instilled into joints for arthroscopy and peritoneum for laparoscopy. Peripheral nerve blocks, in particular, provide excellent analgesia. The increasing availability of ultrasound to aid local anaesthetic placement is beneficial. Clearly, some forms of surgery can be performed solely under a regional technique e.g. phacoemulsification. Patients can be discharged with residual sensory deficit or even motor deficit if the limb in question is protected and assistance is available for the patient at home. It has been shown that patients can be safely discharged home with self-administered local anaesthetic wound-catheters *in situ*.<sup>10</sup> Provision should be made for the availability of oral analgesia to take at home before the block wears off.

The use of spinal anaesthesia in day surgery has been advocated for some time now. BADS provided guidelines on the use of spinal and caudal anaesthesia in 2004.<sup>11</sup> The safety of spinal anaesthesia was recently underlined in the publication of the Third National Audit Project of the Royal College of Anaesthetists looking at complications after central neuraxial blockade.<sup>12</sup> For day surgery, the doses of local anaesthetic used should be lower, or agents used that have shorter duration of action (i.e. lidocaine, though this is an unlicensed use in the UK). Short-acting spinal opioids, such as fentanyl, not only have a sparing action on amount of local anaesthetic administered but also contribute to postoperative analgesia and significantly reduce block failure rate.<sup>13</sup> This results in fewer problems associated with a prolonged motor block which would cause discharge delays in a day-surgery facility. An additional benefit is that regional anaesthesia is associated with less PONV than general anaesthesia. The risk of post-dural puncture headache (PDPH) following spinal anaesthesia can be minimized by use of smaller gauge (<25 G), pencil-point needles. However, on discharge, patients should be given detailed information about the symptoms of PDPH and have a point of contact should a problem occur at home.

### Postoperative recovery

In the recovery room, pain levels should be assessed by trained nursing staff. Pain, being a complex sensory and emotional phenomenon, is difficult to measure objectively. Pain assessment tools in day surgery are simple, validated unidimensional devices, which allow rapid assessment of analgesic requirements. Examples include verbal pain rating scales and numerical rating systems. In conjunction with corresponding protocols for rescue analgesia (see Table 3), the aim is to assess and respond to pain in a rapid and safe manner. Once the patient is fully awake, has control of protective reflexes and is pain-free, then they can be transferred to a designated day-surgery ward area. The use of inhalational anaesthetic agents with low blood:gas solubility coefficients such as sevoflurane and desflurane lend themselves to faster recovery from anaesthesia, and therefore

### Rescue analgesia

- Small iv increments of fentanyl (25 µg)
- Paracetamol/codeine mixture
- Tramadol
- Morphine – last resort

**Table 3**

discharge from recovery area. In addition, short-acting opioids such as fentanyl, alfentanil, and remifentanil are ideal for day surgery when used as part of a multi-modal analgesic regimen.

### Discharge from hospital

Discharging a day-surgery patient from hospital must not be done in a hurried manner. A minimum length of stay should be stipulated. However, by the same token, discharge should not be unnecessarily delayed as in the case of waiting for a low-risk patient to void or take oral fluids (which may itself provoke PONV). Discharge should be a smooth and careful process, whereby communication between staff and patient is good and patient safety paramount. Patients and staff should be confident about discharge. Any doubts about a patient discharge should be directed to a senior anaesthetist. Several scoring systems exist that aim to assist in making the decision of when a patient is fit for discharge. The Post-Anaesthetic Discharge Scoring System (PADSS) assesses fitness for discharge based upon standard parameters that include vital signs, activity levels, nausea and vomiting, pain and surgical bleeding.<sup>14</sup> None of these measures are perfect, however, as they do not cover the full social, psychological (patient anxiety and information provision) and physical assessments necessary in order to deem a patient fit for discharge. BADS have published guidelines for discharge and fitness for discharge in 2002.<sup>15</sup> Day-case units can adapt these guidelines for their own specific needs, which should be based upon a consensus from lead clinicians.

In the case of spinal anaesthesia, certain conditions should be met before a patient can be deemed fit for discharge:<sup>16</sup>

- return of sensation S4–S5 (perianal sensation)
- plantar flexion of foot at pre-operative levels
- proprioception of big toe
- patient not sedated or hypovolaemic.

Once the decision to discharge a patient has been made, the patient and carer should be issued with procedure-specific, postoperative written information. This should contain:

- A list of 'normal' and 'abnormal' symptoms they might experience
- Wound care and when to bathe/shower
- Information not to consume alcohol or operate machinery for 24 hours, and when to resume normal activity
- Details of drugs that are incompatible
- Point of contact for patients in case of problems. There should be a telephone helpline for further information or an emergency
- Arrangements for dressing/suture removal
- Follow-up arrangements (telephone or out-patients)

Upon discharge, patients should be issued with a supply of analgesics, which should be taken on a regular basis as opposed to an ad-hoc basis.

## Audit

Regular audit is essential for the proper functioning of a day-surgery unit, to assess performance and identify areas for improvement. Factors that should be audited include rates of delayed discharge, admission and re-admission. Pain and PONV are the common reasons, which should be quantified as should patient satisfaction with the day-surgery service. ◆

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