Acute pain management in patients receiving opioids for chronic and cancer pain

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The number of patients receiving large doses of opioids presenting for surgery is increasing as opioids gain a wider utilization in the treatment of chronic pain. These patients need to be identified before surgery because they may be tolerant to the effects of opioids prescribed according to standard postoperative analgesic regimens designed for the opioid naive patient. Additionally, these patients may have developed a physical dependence on opioids that needs to be satisfied postoperatively. An insufficient dose may result in unrelieved pain and/or an opioid withdrawal reaction. In general, opioid tolerance, physical dependence and withdrawal may be a significant problem in patients who have been on high doses of weak opioids (e.g. codeine >120 mg or tramadol >400 mg daily) or strong opioids (e.g. morphine or oxycodone) for >2 weeks preoperatively.

Preoperative preparation

A multidisciplinary approach, involving the chronic pain and/or palliative care team and the acute pain team should be used to devise a perioperative analgesic plan. Efficacy of analgesia should be assessed preoperatively and any unrelieved pain treated if possible.[1]

Daily opioid intake should be established. Patients will present for surgery taking a variety of strong opioids in either modified (e.g. morphine sulphate continus, transdermal fentanyl, transdermal buprenorphine) or immediate release preparations (e.g. oral morphine). The route of delivery may be oral, subcutaneous (syringe pump), transdermal or spinal (implanted infusion device). Patients taking oral opioid preparations (immediate and modified release) should continue taking these preoperatively. Patients using transdermal opioid patches should remove the patch before surgery to avoid postoperative problems cause by delayed opioid absorption and inflexible dose delivery (recommendation from manufacturer); immediate release oral opioid preparations at equianalgesic doses should be used postoperatively.[2] Table 1 shows the equianalgesic dosages of transdermal fentanyl and oral morphine. Patients receiving intraspinal opioids via implantable pump systems should continue this mode of therapy throughout the perioperative period rather than upsetting a finely balanced analgesic regimen (recommendation from manufacturer).

Intraoperative and postoperative management

Patients who have been taking opioids for >2 weeks may develop tolerance. This is defined as 'a phenomenon in which exposure to a drug results in the diminution of an effect or the need for a higher dose to maintain an effect'. Standard postoperative opioid doses are based on the requirements of the opioid-naive patient. Opioid-tolerant patients will need larger dose of opioid to achieve satisfactory pain relief.[3]

Physical dependence on preoperative opioids necessitates a baseline opioid administration in the postoperative period in order to prevent a withdrawal reaction characterised by adrenergic hyperactivity, generalized malaise, abdominal cramps, yawning, and perspiration. The postoperative baseline opioid requirement is calculated from the preoperative opioid consumption (see conversion in Table 2). This provides an approximation of opioid requirements only; actual requirements may be more or less than this. Current evidence suggests that only a relatively small dose of opioid (<50% of the preoperative dose) is needed to prevent withdrawal symptoms. The effect of surgery may be to increase or decrease opioid requirements. Increases of 20% or more above the baseline opioid requirement have been reported, depending on the surgical procedure. In cancer patients, surgery may alleviate pain because of removal local effects of the tumour on local

Key points

Preoperative assessment and formulation of a perioperative plan is essential.

Tolerance to the effects of postoperative opioids, resulting in unrelieved pain or opioid withdrawal reaction, may be a problem in patients who have been taking opioids for more than 2 weeks before surgery.

Physical dependence means that a postoperative baseline opioid requirement is necessary to prevent withdrawal reactions.

Postoperative opioid requirements may be more or less than preoperative levels, depending on the effect of surgery.

Use of adjuvant analgesic drugs and regional techniques will result in 'opioid-sparing' effects and a reduction in the postoperative baseline opioid requirement.

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Table 1 Transdermal fentanyl dose calculation

Fentanyl patch size	24 h oral morphine equivalent dose	Immediate release morphine dose (e.g. Oramorph)
25 μg h^{-1}	<135 mg	<20 mg per 4 h
50 μg h^{-1}	135–224 mg	25–30 mg per 4 h
75 μg h^{-1}	225–314 mg	40–50 mg per 4 h
100 μg h^{-1}	315–404 mg	55–60 mg per 4 h

Table 2 Conversion of oral to parenteral morphine or diamorphine. From *Management of Cancer Pain, Agency for Health Care Policy and Research.* AHCPR publication no. 94–0592, p. 54, March 1994

Drug	Dose equivalent to 10 mg oral morphine
Intramuscular morphine	5 mg
Intravenous morphine	3.3 mg
Subcutaneous morphine	5 mg
Subcutaneous diamorphine	2.5 mg
Epidural morphine	1 mg
Intrathecal morphine	0.1 mg

structures. Surgery may change the nature of the pain, for example neuropathic pain may be reduced and nociceptive pain may increase.

Postoperative opioids can be given parenterally, epidurally or orally depending on a number of factors including the patient's physical condition, the nature and extent of surgical intervention, postoperative gastrointestinal function and possible postoperative sequelae such as vomiting or ileus. Provision will need to be made for 'as required' dosing for breakthrough pain.

Throughout the perioperative period it is necessary to assess and record signs and symptoms of inadequate (unrelieved pain, withdrawal phenomena) or excessive (sedation, respiratory depression) opioid administration. Ideally, the patient should be nursed in an HDU or similar facility.

Non-opioid drugs such as non-steroidal anti-inflammatory drugs and clonidine have significant opioid-sparing effects. Clonidine can be given concurrently with an opioid/local anaesthetic epidural infusion, either as an i.v. or epidural bolus or added to the epidural infusion. Maintenance of an adequate intravascular volume is essential to avoid significant hypotension; careful monitoring is required. As soon as the patient is able to resume an oral analgesic regimen, the parenteral opioid dosage can be converted back to the equianalgesic oral dose (see Table 2). Again, each analgesic regimen will need to be individualized according to patient requirements.

There are a number of similarities in the principles of perioperative management between patients with chronic or cancer pain and those with problem drug use (drug addiction). The overall aim in both groups is to control pain while avoiding overdose and withdrawal symptoms; no attempt should be made to withdraw opioids during the perioperative period. The problem drug user may exhibit drug-seeking behaviour (psychological dependence), which is unlikely in patients with chronic or cancer pain. A patient with cancer pain is likely to have a more accurate appreciation of preoperative opioid requirements and there should not be concerns about patient controlled analgesia (PCA) misuse or security.

Table 3 Summary of factors affecting postoperative opioid requirements in patients with chronic/cancer pain on high doses of opioids preoperatively

Preoperative	• Unrelieved pain • Opioid drug, dose, route of delivery, immediate or modified release preparations, duration of administration
Intraoperative	• Type and location of surgery • Regional anaesthesia • Adjuvants and nerve blocks
Postoperative	• Pain score • Tolerance • Physical dependence • Level of sedation • Medical condition

Table 3 summarizes the factors affecting postoperative opioid requirements in patients with chronic or cancer pain on high doses of opioids preoperatively.

Clinical example

A patient presents for surgery on high dose oral long acting morphine (e.g. morphine sulphate continus 100 mg twice daily). Actual opioid requirements may be greater or less than predicted depending on individual patient and surgical circumstances.

Postoperatively there will be a calculated baseline opioid requirement of oral morphine 200 mg equivalent per 24 h. If the patient is able to take oral opioids in the postoperative period (e.g. after minor orthopaedic surgery), oral morphine 30 mg every 4 h is appropriate, with extra doses (30 mg) as required for breakthrough pain.

If the patient is unable to take oral medication postoperatively, i.v. morphine or subcutaneous diamorphine could be used. Oral to i.v. morphine conversion is 3:1 (i.e. i.v. morphine 66 mg per 24 h), oral morphine to subcutaneous diamorphine conversion is approximately 4:1 (i.e. subcutaneous diamorphine 50 mg per 24 h) (Table 2).[4] Many practitioners start at 50–100% of these calculated dosages depending on the individual patient/ surgical circumstances. As-required doses of one-sixth of the total daily doses could be given for breakthrough pain. Once the oral route becomes available again, oral morphine could be restarted either at the preoperative dose or at an increased or decreased dose according to the patients' individual requirement.

Another option would be to use morphine i.v. PCA. PCA dosage must be calculated to ensure that the basal opioid requirement is met and that the bolus dose is sufficient for opioid tolerant patients. The calculated background dose (baseline opioid requirement) would be 66 mg per 24 h or 2.75 mg h^{-1} (one-third of the daily oral dose). Again, many practitioners would start at 50–100% of this calculated dosage. A typical bolus dose in an opioid-naive patient is 1.0 mg with a 5 min lock-out period. In this patient, the bolus dose could be increased to 1.5–2.0 mg.

Alternatively, depending on patient and surgical factors, an epidural infusion may be appropriate. Standard epidural opioid and local anaesthetic solutions (e.g. 0.1% bupivacaine plus 0.1 mg ml^{-1} morphine or 2 μg ml^{-1} fentanyl) have been successfully used in large numbers of patients on high dose opioids before surgery. Additional epidural bolus doses of local anaesthetic/opioid mixtures could be given as required. Another alternative is to use a plain bupivacaine epidural infusion (e.g. 0.1% at 10–15 ml h^{-1}) and satisfy the baseline opioid requirement with the use of i.v. or subcutaneous opioid infusions as described previously.[5 6]

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See multiple choice questions 96–98.