Providing effective pain management

Introduction

Pain is a common presenting symptom, both in primary and secondary care. For over 30 years, studies of adult patients have consistently demonstrated inadequacies in the treatment of acute pain in the postoperative period. However, acute pain is not confined to surgical wards. Many patients on medical wards also experience moderate or severe pain on movement or at rest, commonly of musculoskeletal or visceral origin (Johnson et al, 2003).

Patients with chronic pain may present to any medical specialty. Effective pain management is fundamental to high quality patient care and may be considered a human right (Cousins et al, 2004). Some describe pain as the fifth vital sign for routine patient monitoring, along with respiratory rate, heart rate, blood pressure and temperature.

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Management of pain

Pain assessment

Pain assessment should be part of routine patient clerking. As there are numerous influences on the pain experience, no pain history is complete without an assessment of not only the physical aspects of the pain, but also relevant psychological and social factors.

Strategies for managing pain

The neurobiology of pain is complex, involving sensory, affective, cognitive, behavioural and social components. A wide variety of strategies are available for pain management (*Figure 1*). Acute pain is largely controlled by pharmacological management using drugs that may interfere with pain transmission in the periphery, through the dorsal horn in the spinal cord, in the brain or some combination of these mechanisms. Chronic pain is most effectively managed using a combination of pharmacological and non-pharmacological approaches.

World Health Organization analgesic ladder

In order to try and improve access to opioid analgesics in cancer pain, the World Health Organization developed an analgesic ladder (World Health Organization, 1996). The first step of the ladder (*Figure 2*) is the use of non-opioid analgesics, such as paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs). Weak opioids (e.g. dihydrocodeine or codeine) may be added (step 2) if this is insufficient. According to the ladder, adjuvant drugs for specific types of pain (e.g. tricyclic antidepressants or antiepileptics) may be added at any point. While the ladder was intended solely for cancer pain it may be of use in other situations as well. For chronic non-cancer pain conditions, the ladder may be used in a similar way as for cancer pain. Acute pain, whether medical or surgical in origin, is usually managed using the principles of the analgesic ladder but in reverse.

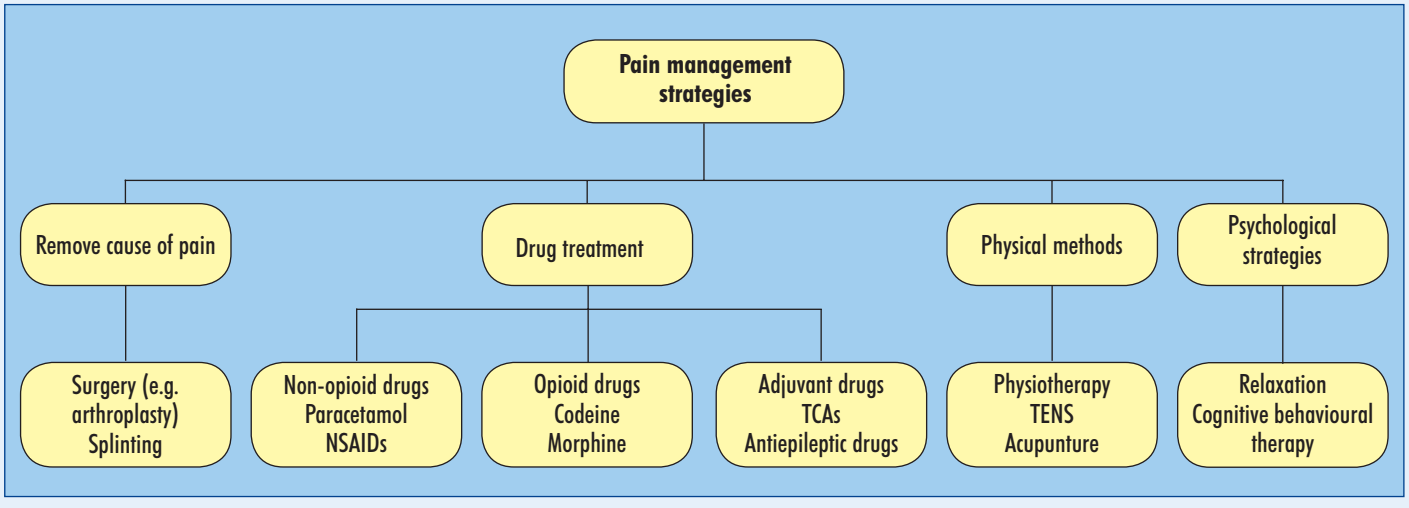
Drugs for pain management

Non-opioid drugs

Non-opioid analgesics exert their analgesic action by both peripheral and central mechanisms. Although it has been used for many years, the precise mechanism of action for paracetamol remains uncertain but it probably inhibits the cyclo-oxygenase and nitric oxide synthase enzymes in the brain. In therapeutic doses, paracetamol is very safe but at toxic doses there is dose-dependent acute toxicity leading to hepatic impairment and failure.

NSAIDs desensitize peripheral pain fibres (nociceptors) to the effects of prostaglandins, inflammatory mediators produced from arachidonate by action of COX. The analgesic activity of NSAIDs is not related to the potency of any NSAID as an in-vitro COX inhibitor. There are

Figure 1. Pain management strategies. NSAIDs = non-steroidal anti-inflammatory drugs; TCAs = tricyclic antidepressants; TENS = transcutaneous electrical nerve stimulation. Adapted from McQuay et al (1997).



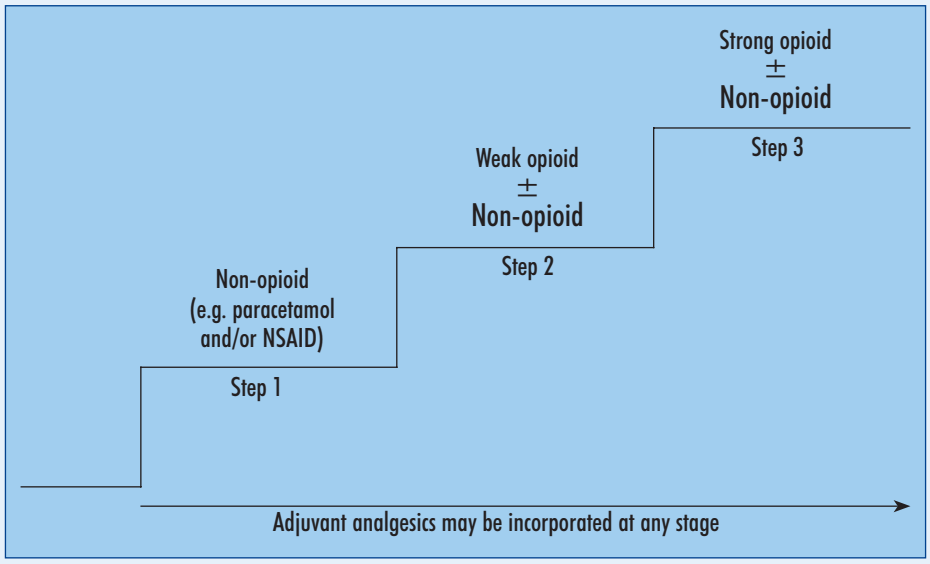


Figure 2. World Health Organization analgesic ladder. NSAID = non-steroidal anti-inflammatory drug. From World Health Organization (1996).

many side effects of (*Table 1*) and cautions to the use of NSAIDs.

The newer COX-2 selective drugs, or coxibs (e.g. rofecoxib and celecoxib), were hoped to have increased analgesic efficacy and reduced gastrointestinal adverse effects. In practice, analgesic efficacy is similar to full dose non-selective NSAID comparators. However, use of coxibs has declined significantly after concerns over cardiovascular morbidity (Jüni et al, 2004), although more recent epidemiological data suggest that high doses of non-selective NSAIDs are not immune to these concerns (Hippisley-Cox and Coupland, 2005).

Table 1. Side effects of non-steroidal anti-inflammatory drugs

System	Effect
Gastrointestinal	Dyspepsia
	Symptomless gastroduodenal erosions
	Gastroduodenal ulceration
	Gastroduodenal perforation
	Gastroduodenal haemorrhage
Renal system	Interference with Na+/ K+/ water elimination
	Acute renal failure
Haematological	Reduced platelet aggregation
Respiratory	Bronchospasm
Central nervous	Headache
	Confusion

Opioids

Opioids are all agonists at the μ-opioid receptor and may be classified by analgesic potency as 'weak' or 'strong' opioids. Use of weak opioids (e.g. codeine or dihydrocodeine) is limited by side effects, primarily nausea and constipation, and there is a ceiling to their analgesic effect. There is no flattening of the dose response curve for strong opioids (e.g. morphine, oxycodone or fentanyl) and doses may be more readily titrated to pain. Opioid-related side effects (*Table 2*) are predictable and precautions should be taken to ensure that they are managed appropriately. Only a small proportion of the analgesic effect of tramadol is the result of a μ-opioid agonist effect; the remainder is a result of enhancement of serotonin signalling in descending pathways from the brainstem to the spinal cord.

Table 2. Opioid side effects

Symptom or sign	Management
Respiratory depression	Titrate dose against pain Pain is naturally respiratory stimulant
Sedation	Reduce opioid dose if possible Sedation is an earlier sign of opioid toxicity than respiratory depression Ensure adequate use on non-opioid analgesics
Nausea and vomiting	Antiemetics Choice will depend on individual circumstances
Constipation	Regular use of faecal softener and stimulant laxative
Hypotension	Reduce opioid dosing frequency if possible
Bronchoconstriction	Change to alternative opioid immediately
Pruritus	5-HT3 antagonist (e.g. ondansetron)
Urinary retention	More problematic with spinal opioids Patient may need to be catheterized

Specific pain syndromes

Many conditions have pain as a symptom, some as an acute presentation (e.g. myocardial infarction), others have a chronic presentation (e.g. back or neck pain, fibromyalgia) or acute exacerbations of a chronic disease (e.g. sickle cell disease, inflammatory arthritides). National or international professional bodies and interest groups are increasingly providing evidence-based recommendations as to best practice in the treatment of individual conditions.

Post-surgical pain

Over recent years the concept of 'balanced analgesia' has been promoted (Kehlet et al, 1999). Balanced analgesia uses the principles of the World Health Organization analgesia ladder to combine drugs that have differing mechanisms of action. By using this approach lower doses of individual drugs may be required to produce adequate analgesia.

Paracetamol is the mainstay of postoperative analgesia, and may be used in combination with NSAIDs, opioids and local anaesthetics depending on pain intensity. Opioids may be administered by many routes during the perioperative period, including intramuscular, subcutaneous, intravenous bolus, intravenous infusion, intravenous patient-controlled analgesia or spinal (i.e. epidural, intrathecal). Oral administration

should be reserved for patients when it is certain that gastrointestinal motility has returned to normal. There have been deaths associated with oral opioid use, particularly modified release formulations, in the early postoperative period (Smith and Power, 1998). The relative incidence of adverse effects with opioids is more dependent on the route of administration than the opioid chosen.

Neuropathic pain

Neuropathic pain is caused by dysfunction of a peripheral nerve, the spinal cord or the brain. Patients may describe their symptom as 'burning', 'stabbing', 'shooting', 'like an electric shock' or 'tingling'. The psychological and social burden of neuropathies must not be forgotten. Poor sleep patterns, depression, anxiety, reduced quality of life and social isolation are commonly reported in patients with neuropathic pain.

Neuropathic pain is notoriously difficult to treat. The most commonly used drugs are the tricyclic antidepressants (e.g. amitriptyline) and some of the antiepileptic drugs, particularly gabapentin and pregabalin.

Cancer pain

The underlying cause of cancer pain can be from several sources: the tumour itself, at primary or secondary sites or pain arising from the treatment, or may have a concurrent non-malignant cause. Where possible, the mechanism of the pain should be elucidated so that treatment may be directed at the cause. Opioids are used extensively in cancer pain although there are some cases in which, until the type of pain (e.g. neuropathic) is defined, patients may not benefit from opioid treatment. Many patients with the most complex pains have elements of psychological, social, spiritual and physical pains combined. To have maximum benefit all components need to be addressed.

Conclusions

Ensuring effective analgesia is important for all patients. In the postoperative setting, adequate analgesia reduces the development of complications following surgery, such as venous thromboembolic disease and pulmonary infections, and minimizes the development of chronic pain. The World Health Organization analgesic ladder gives a structured approach to providing analgesia according the intensity of pain a patient is currently experiencing. Use of both NSAIDs and opioids are associated with significant morbidity and the benefits must be weighed against the potential risks for individual patients. Consider the early involvement of a multidisciplinary pain management or palliative care service when experiencing problems in pain management. **BJHM**

Conflict of interest: Dr Shakur is a council member for the Royal Society of Medicine's Research and Pharmaceutical section.

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KEY POINTS

- Pain management is complex.
- To effectively treat pain a balance has to be struck between understanding the source of the pain and the patient's own subjective beliefs with regard to the pain.
- The World Health Organization's analgesic ladder provides a systematic means for the titration of pain relief.
- Clinicians should appreciate that patients have differing pain thresholds and tailor therapy accordingly.