Management of acute pain

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Abstract

Acute pain relief remains suboptimal for many patients. Effective postoperative analgesic strategies require a holistic approach, promoting timely recovery and integration with other pathways like physiotherapy and nutrition. Poor acute postoperative pain management can limit mobility, leading to complications that increase morbidity and mortality. Thus, timely and effective acute pain management is essential. Acute Pain Service (APSs) play a role in managing complex cases and specific invasive analgesic methods. However, initial pain management usually falls to the admitting surgical doctor. This article reviews key considerations for safe, effective acute pain management and highlights recent updates in consensus guidelines and evidence from the past three years.

Keywords Acute pain; analgesia; nociceptive; pain management; postoperative pain

Introduction

Definition of pain

The International Association for the Study of Pain (IASP) defines pain as 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage'.[1] Acute pain can serve a protective role by warning of injury, with muscle spasms limiting movement to prevent further harm.

Classification of pain

Pain is typically classified as nociceptive or neuropathic. Nociceptive pain, often described as sharp, aching, or throbbing, is well localized and linked to injury or inflammation. Neuropathic pain, described as burning, stabbing, or shooting, may be diffuse and radiate beyond the primary pain site. It can result from nervous system lesions or dysfunctional pain pathways without a clear noxious stimulus. Differentiating these types is crucial, as treatment depends on their underlying causes.

Chronicity of pain

Acute pain differs from chronic pain by serving a biological purpose and being self-limiting. It is of short duration, often severe, and arises quickly. Chronic pain, persisting for over three months, often exhibits neuropathic features.[2]

Pathophysiology of pain

The sensory experience of pain is highly complex, involving both the peripheral and central nervous systems, with numerous neurotransmitter and receptor-mediated events. Emotional and psychological factors significantly influence the perception of acute pain.

Peripheral nervous system

Pain sensation begins at specialized nerve endings called nociceptors in the skin and visceral tissues. These receptors convert chemical and physical signals into action potentials, transmitted through myelinated A-delta fibres (fast-conducting) and unmyelinated C fibres (slow-conducting). Prolonged stimulation from tissue injury leads to peripheral sensitization, involving inflammatory mediators like prostaglandins and histamine, which lower the pain threshold and amplify pain signals.

Central nervous system

Pain signals travel from the spinal cord to the cerebral cortex via a complex pathway. In the dorsal horn, nociceptor fibres synapse in specific layers called Rexed laminae, releasing neurotransmitters like glutamate and substance P. Signal transmission is modulated by descending inhibitory pathways using neurotransmitters such as GABA, serotonin, and noradrenaline. Central sensitization increases neuron responsiveness, often through NMDA receptor activation and reduced inhibition. Pain signals then travel via the spinothalamic and spinoreticular tracts to the thalamus, hypothalamus, and cortex, where they integrate emotional and physiological responses, collectively termed 'pain processing'.[2]

The importance of effective pain management

Recent studies have illustrated the significant burden of unrelieved acute pain in the USA surgical population, with surveys finding more than 80% of patients reporting moderate to severe postoperative pain.[3] The consequences of unrelieved acute pain included:

- increased patient morbidity
- increased healthcare costs and utilization
- worsened patient short-term experience
- poor longer-term outcomes through delayed recovery
- development of chronic pain syndromes.

The physiological complications of poorly managed acute pain can be found in Table 1.

Assessment of pain

Accurate pain assessment is vital for effective management but often poorly executed.[3,4] Pain is subjective, influenced by emotional and psychological factors, requiring a detailed history,

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Complications of poorly controlled postoperative pain

Timing	System	Mechanism	Complication
Immediate	Respiratory	Impaired cough, reduced functional residual capacity	Atelectasis Pneumonia
	Cardiovascular	Increased sympathetic activity	Myocardial ischaemia
Early	Gastrointestinal	Increased sympathetic activity	Ileus Malnutrition
	Metabolic	Inflammation Protein catabolism Reduced blood flow to skin	Poor wound healing
	Other	Venous stasis	Thromboembolism
Delayed	Neurological	Central pain sensitization	Chronic pain syndromes
	Musculoskeletal	Decreased mobility	Muscle wasting

Table 1

simplified using the SOCRATES mnemonic: site, onset, character, radiation, associated symptoms, time course, exacerbating/relieving factors, and severity. Analgesia history is also crucial, especially for long-term opioid users who may need higher doses in acute settings.

Pain levels are typically measured using validated self-report scales, like the Numerical Rating Scale (NRS), where patients rate pain from 0 (no pain) to 10 (severe pain).[5] However, these scales depend on the patient's ability to understand and communicate. For groups like children or cognitively impaired elderly, alternative methods may be necessary. Tools like the Wong-Baker Faces Pain Scale aid self-reporting in children, while observational scales like FLACC (Face, Legs, Activity, Cry, Consolability) are better suited for infants[5] (Figure 1). Similarly, the Abbey Pain Scale helps assess pain in older adults with severe cognitive impairment by combining behavioural and physiological observations.[6,7] Dynamic pain assessment (functional pain scoring systems), beyond rest-based evaluation, is essential in enhanced recovery protocols to ensure effective pain relief supports early mobility and rehabilitation.

Functional pain scale (0–10)

1. **Pain intensity (0–10 scale)**:
   - **0**: No pain
   - **1–3**: Mild pain (no interference with activities)
   - **4–6**: Moderate pain (some interference with activities)
   - **7–9**: Severe pain (limits activities)
   - **10**: Worst pain (unable to perform activities)
2. **Functional impact:**
   - **0**: No limitation (pain doesn't affect tasks or activities)
   - **1–3**: Mild limitation (mild interference with tasks)
   - **4–6**: Moderate limitation (difficulty in tasks but manageable)
   - **7–9**: Severe limitation (significant interference with tasks)
   - **10**: Complete limitation (unable to perform activities)

How to use:

- **Step 1**: Rate pain intensity (0–10).
- **Step 2**: Assess functional impact (0–10).
- **Step 3**: Record both scores to understand pain and its effect on daily life.

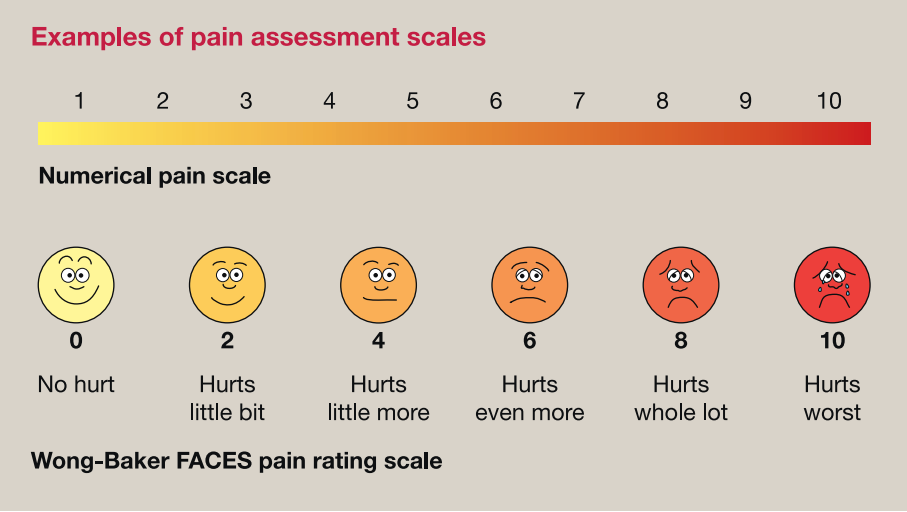

Figure 1

Patient education

Surgical patients should understand the importance of proper analgesia for both their comfort and recovery. They should be informed about the benefits of physiotherapy and early mobilization, emphasizing that effective pain management during movement is crucial. Patients need reassurance that while complete pain elimination is unlikely, the goal is to provide sufficient relief to support physical function recovery. Some discomfort may persist, but adequate analgesia will help them achieve functional milestones.[8]

Management of acute pain

A recent consensus statement from the Association of Anaesthetists and the British Pain Society outlines key recommendations for perioperative pain management:

1. **Hospital pain teams**: Every hospital should have a pain team to promote optimal pain management, educate staff, create guidelines, and provide patient information.
2. **Pain assessment**: Pain assessment should guide analgesic management, focusing on functional measures rather than solely pain scores.
3. **Multimodal analgesia**: A multimodal approach, including paracetamol, NSAIDs, alpha-2 adrenergic agonists, NMDA antagonists, corticosteroids, and regional analgesia, should be used unless contraindicated.
4. **Risk screening**: Preoperative screening for modifiable risk factors, such as opioid use, frailty, mental health issues, and lifestyle factors, is essential.
5. **Shared decision making**: Preoperative discussions should cover risks and benefits of pain management strategies, including regional techniques.
6. **Extended analgesia**: Analgesia should be multimodal and long-lasting, covering the postoperative period.
7. **Personalized pain management**: Intraoperative pain strategies should be personalized and based on evidence for specific procedures.
8. **Opioid use**: When opioids are necessary, use the lowest effective dose via oral routes, tailored to age.
9. **Avoid certain formulations**: Avoid routine use of modified-release or compound opioid preparations for acute postoperative pain.
10. **Discharge protocols:** Establish protocols for discharge medications, limiting prescriptions to seven days, with guidance for ongoing pain management beyond that period.[9]

Pharmacological analgesia

The World Health Organization (WHO) analgesic ladder (Figure 2) provides a simple, structured starting point for the pharmacological management of pain. This system provides a useful guide for acute nociceptive pain. If patients are experiencing neuropathic pain, then an adjunct medication is usually necessary and it is important to take advice from the Acute Pain Service (APS).

WHO step 1: simple analgesia

Paracetamol is a widely used first-line analgesic and antipyretic for mild to moderate pain and an essential component of multimodal therapy for severe acute pain. Its mechanisms include inhibiting prostaglandin synthesis (Central COX-3), potentiating GABA receptors, and activating descending serotonin pathways.

Orally administered paracetamol provides analgesia within 40 minutes, peaking at 1 hour, with an average bioavailability of 80%, making the oral route preferable. While the rectal route is an alternative, it has unpredictable bioavailability. Intravenous paracetamol works within 5 minutes, peaking at 30–40 minutes, with effects lasting 4–6 hours, but offers no significant benefit over oral administration for patients able to take oral medication.

Paracetamol's efficacy matches standard NSAIDs and weak opioids and has synergistic effects when combined with other analgesics, making it an effective opioid-sparing agent. It is safe at recommended doses but can cause hepatotoxicity and acute liver failure in overdose situations.[10]

NSAIDs are commonly used analgesics and anti-inflammatory agents that inhibit COX-1 and COX-2 enzymes, disrupting prostaglandin and thromboxane synthesis, which are key to peripheral pain sensitization. COX-1 is widely present, while COX-2 is primarily upregulated during inflammation. Traditional NSAIDs like ibuprofen and diclofenac are non-selective, targeting both COX-1 and COX-2, whereas newer drugs like parecoxib and celecoxib selectively inhibit COX-2, potentially offering safer side-effect profiles.[11]

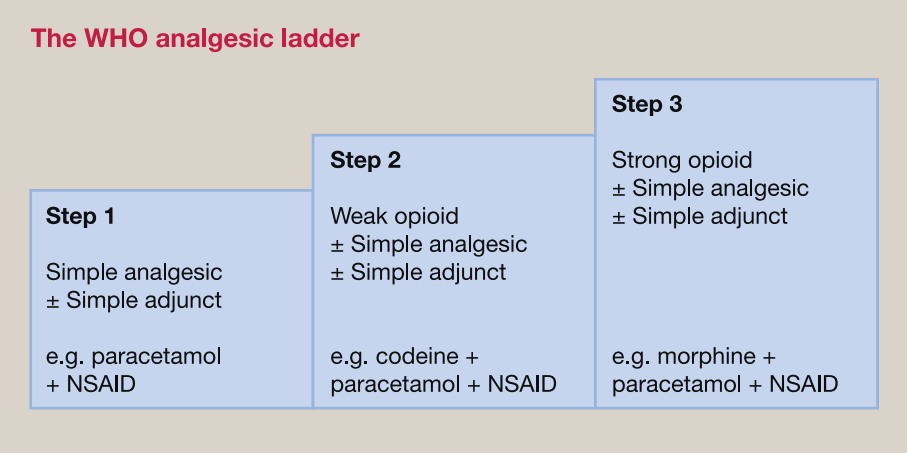

Figure 2

Properties of simple analgesics

Drug	Routes of administration	Dosage	Mechanism	Adverse effects
Paracetamol	PO, IV, rectal	1G QDS	Uncertain	Hepatotoxicity in overdose
Ibuprofen	PO	400 mg TDS	Non-selective COX inhibitor	Gastric ulceration Renal impairment Exacerbation asthma Platelet dysfunction
Diclofenac	PO, IV, rectal	75–150 mg daily in divided doses	Non-selective COX inhibitor	
Parecoxib	IV	40 mg Max 80 mg day	COX-2 inhibitor	Reduced risk upper GI complications Possible increased risk of MI

Table 2

Short-term COX-2 inhibitors (e.g. parecoxib) are less likely to cause gastritis or affect platelet function, but long-term use may still lead to gastritis and cardiovascular risks (Table 2).[9] Since NSAIDs are highly protein-bound, they should be used cautiously with other protein-bound drugs like phenytoin and warfarin to avoid enhanced effects.

Paracetamol and NSAIDs have complementary mechanisms, and studies suggest that combining them can provide superior pain relief compared to using either alone, though the benefits may vary depending on the surgical procedure.[12]

WHO step 2: weak opioids

Opioids have been used for centuries and remain central to acute pain management. These drugs vary in potency, onset, duration, and receptor affinity, necessitating regular updates on new formulations for safe and effective use.

Definition: opioids act on G-protein-coupled opioid receptors (MOP, KOP, DOP, and NOP), reducing neuronal excitability and nociceptive transmission. Most opioid effects, including analgesia and adverse reactions, occur through the MOP receptor. Common side effects include respiratory depression, sedation, nausea, constipation, and urinary retention. An overview of the pharmacology of the opioids can be found in Table 3.

Codeine: a weak opioid prodrug metabolized to morphine by CYP2D6. Genetic variability in CYP2D6 can result in non-metabolizers (ineffective drug) or ultra-rapid metabolizers (higher risk of respiratory depression). Codeine is contraindicated in children under 12, breastfeeding mothers, and those with sleep apnoea. Its use is limited by common side effects like constipation, especially in elderly and bowel surgery patients, and it is not recommended as a first-line multimodal analgesic.

Tramadol: a weak opioid receptor agonist, it also inhibits noradrenaline and serotonin reuptake, activating descending pain pathways. Tramadol has fewer respiratory and gastrointestinal side effects than morphine but may cause dysphoria and hallucinations in the elderly. It should be avoided in patients on serotonin reuptake inhibitors or tricyclic antidepressants due to the risk of serotonin syndrome.

WHO step 3: strong opioids

Morphine: widely used in acute pain management, morphine is available in various forms for oral, intravenous, and other routes. Oral morphine has a bioavailability of 30%, an onset of 15–60 minutes, and a duration of 3–6 hours. Slow-release oral preparations offer extended analgesia. Due to its low lipid solubility, morphine is less commonly used epidurally or intrathecally in the UK, as it carries a higher risk of delayed respiratory depression. Morphine is metabolized into morphine-3-glucuronide (non-analgesic, may cause seizures) and morphine-6-glucuronide (analgesic). Both metabolites are renally excreted, making morphine unsuitable for severe renal impairment (CrCl <30 mL/minutes).

Diamorphine: a synthetic prodrug metabolized into morphine and 6-mono-acetyl-morphine. It is more lipid-soluble than morphine, offering rapid onset, especially via intramuscular routes. Diamorphine is often used intravenously, intramuscularly, or intranasally for acute pain. Its lipid solubility reduces the risk of delayed respiratory depression in neuraxial anaesthesia.

Fentanyl: approximately 100 times more potent than morphine, fentanyl is used for perioperative analgesia and as an adjunct in epidural or intrathecal anaesthesia. It is also available in sublingual and transdermal forms, though its low oral bioavailability limits this route. Fentanyl's hepatic metabolism and urinary excretion make it suitable for patients with renal impairment, particularly when delivered via patient-controlled analgesia (PCA).

Alfentanil and remifentanil: these fentanyl derivatives have rapid onset and short duration, making them ideal for intraoperative use. However, their heightened risk of respiratory depression confines their use to anaesthesia settings.

Oxycodone: a synthetic opioid with high MOP receptor selectivity, oxycodone is available in immediate and extended-release oral forms, as well as intravenous formulations. It is frequently used in PCA and can be adjusted for use in patients with chronic kidney disease.[13]

Buprenorphine: a partial mu-opioid receptor agonist with high receptor affinity but low intrinsic activity. It is commonly used in

Properties of common opioid drugs used in acute pain management

Drug	Route	Typical starting dosage	Conversion factor (to oral morphine)	Characteristics	Adverse effects/cautions
Codeine	PO	30–60 mg QDS	0.13	Slow onset Weak opioid	Variation in metabolism Constipation
Tramadol	PO, IV	50–100 mg QDS	0.2	Additional pain modulation through inhibition of serotonin/noradrenaline reuptake	Dysphoria/hallucinations Risk of serotonin syndrome
Morphine	PO immediate Mod. release IV/IM	2.5–20 mg 10–20 mg Titrated to effect 2.5–10 mg PCA 1 mg bolus 5 min lockout	1 3	Onset 30–mins Onset 5–10 mins Duration approx. 4 hours	Metabolites accumulate in renal failure
Diamorphine	SC, IM, IV	2.5–5 mg	6	Rapid onset Highly fat soluble so useful neuraxial adjunct	
Oxycodone	PO immediate Mod. release IV	2.5–5 mg 10 mg BD 1–10 mg titrated PCA 1 mg bolus 5 min lockout	1.5 3	Onset 15 mins Rapid onset May be useful in patients intolerant of morphine	
Fentanyl	IV	25–100 microg PCA 15–25 microg bolus 5 min lockout	0.2 (micg)	Very rapid onset Short duration of action Better tolerated in renal disease	Potent respiratory depression

Table 3

opioid use disorder (OUD) maintenance and chronic pain but less frequently in acute pain. Buprenorphine is available in sublingual, buccal, transdermal, and implantable forms, making it suitable for patients who cannot take oral medication. However, guidelines like PROSPECT do not recommend its routine use for acute pain, such as after hip fracture surgeries, reflecting ongoing debate about its role in these settings.[14]

Adjuncts to opioids in multimodal analgesic strategies

Several medications are commonly used as adjuncts to opioids in multimodal analgesia protocols, typically administered intraoperatively by anaesthetists or prescribed by acute pain teams. Among the most frequently used adjuncts are **gabapentinoids** (gabapentin and pregabalin), which are effective in reducing phantom limb pain and are often included in multimodal protocols for major orthopaedic surgeries. These medications can help manage opioid tolerance by mitigating opioid-induced hyperalgesia. However, their perioperative use for postoperative acute pain has not shown significant clinical benefit, making their role controversial.[15] Gabapentinoids are usually prescribed for short courses post-surgery, with continued use after discharge being uncommon. Common side effects include sedation, dizziness, and postural hypotension.

Ketamine, an NMDA receptor antagonist, offers analgesic, amnesic, and sedative effects.[16] It is useful for patients with chronic pain, especially those on long-term opioid therapy who may experience intense postoperative pain, and for cases where regional blocks are not used. Ketamine has been shown to reduce the incidence of persistent postoperative pain and opioid-induced hyperalgesia. However, its use is limited by side effects such as agitation, dysphoria, and hallucinations. Low-dose intravenous ketamine can reduce these side effects, and when combined with clonidine or benzodiazepines, can also manage hypertension.

Magnesium, another NMDA receptor antagonist, is an effective opioid-sparing agent and enhances pain control when used with ketamine. However, it can cause hypotension and interacts with neuromuscular blocking agents, raising concerns about the risk of residual paralysis, necessitating careful monitoring.

Clonidine and **dexmedetomidine** are alpha-2 agonists with distinct roles in pain management. While clonidine may reduce opioid consumption without lowering pain scores, dexmedetomidine reduces both pain and opioid requirements. Their use is limited by sedation and hypotension.[9]

Corticosteroids, particularly **dexamethasone**, are becoming increasingly important for managing rebound pain after regional anaesthesia. They are also useful for preventing postoperative nausea and vomiting (PONV) and provide analgesic benefits. In patients without diabetes or those with well-controlled diabetes, dexamethasone has minimal impact on blood sugar levels.

Lidocaine, a sodium channel blocker, is widely used as a local anaesthetic. When administered intravenously, it can provide effective pain relief, especially in abdominal surgery. However, its use carries a risk of local anaesthetic toxicity, particularly in underweight patients, and should only be given with proper organizational support and informed consent.[9]

Timing of medications

Achieving a smooth analgesic profile relies on the regular, timed administration of medications. By maintaining consistent dosing, any peaks in pain can be managed effectively with PRN (as needed) medications. A daily assessment of pain is crucial, which involves reviewing the recorded pain scores, the analgesia administered in the past 24 hours, and the patient's perceived benefit, including any side effects. This information allows for the titration of analgesia according to the patient's experience and enables monitoring for side effects. For instance, if a patient is prescribed **codeine**, a PRN **laxative** should also be prescribed to address the constipation caused by codeine, which could lead to severe abdominal pain if not managed.

Routes of administration for analgesic drugs

Analgesic drugs can be administered through various routes to manage pain effectively, depending on the severity and nature of the pain.

- **Oral:** For mild to moderate pain, oral analgesics following the WHO pain ladder are typically effective. However, for severe pain or patients who are nil by mouth, alternative strategies must be considered.
- **Intramuscular/subcutaneous:** These routes are commonly used for postoperative opioid administration. The onset of action and peak effect time are slightly delayed when using intramuscular (IM) morphine compared to intravenous (IV) administration.
- **Intravenous:** The IV route is used for rapid relief of severe acute pain, often involving opioids. Techniques like patient-controlled analgesia (PCA) allow patients to self-administer bolus doses of opioids with or without continuous infusion.[17] Common analgesics used in PCA include morphine, oxycodone, and fentanyl. While PCA is associated with better pain control and higher patient satisfaction, it carries risks such as periods of inadequate pain relief during sleep and potential misuse. Close monitoring of respiratory rate and blood pressure is essential, and naloxone (an opioid antagonist) is often prescribed alongside PCA to counteract opioid overdose.[17]
- **Intrathecal:** Intrathecal opioids (e.g. diamorphine or fentanyl) are used for surgeries involving the abdomen, pelvis, or lower limbs, providing high-quality analgesia. This route is increasingly employed for postoperative pain management. The opioids work through presynaptic and postsynaptic opioid receptors in the spinal cord. Adverse effects are similar to those of systemically administered opioids, so caution is necessary when administering additional opioids to a patient who has received intrathecal analgesia.

Other routes

The intranasal route is sometimes used for rapid acute pain relief, especially when intravenous access is difficult, such as in pediatrics. Intranasal diamorphine and fentanyl are available. Transdermal opioids like fentanyl and buprenorphine may be used as part of pre-existing analgesia or postoperative protocols. Pain service advice should be sought when adjusting or adding opioids delivered through these routes.

Specialist local anaesthetic techniques

Local anaesthetics are drugs that temporarily block nerve impulse transmission in the area where they are applied. They work by **reversibly blocking voltage-gated sodium channels** in neuronal cells, preventing the propagation of nerve impulses. These drugs can be used alone for pain relief during surgical procedures or as part of a **multimodal analgesia strategy**.

Local anaesthetics are classified into two categories based on their chemical structure:

- **Amides**: More commonly used in clinical practice, examples include **lignocaine**, **bupivacaine**, **levobupivacaine**, and **ropivacaine.**
- **Esters**: Less frequently used, with examples like **cocaine** and **amethocaine.**

There are various techniques for administering local anaesthetics, including:

- **Local wound infiltration**
- **Peripheral nerve blockade**
- **Neuraxial blockade** (e.g. epidurals)
- **Systemic intravenous infusion**

These techniques offer different levels of pain relief depending on the type of surgery and the areas needing anaesthesia.

Peripheral nerve blockade

Peripheral nerve blockade involves the administration of a local anaesthetic around specific nerves to induce regional anaesthesia. This technique is typically guided by ultrasound to accurately locate nerves, nerve plexi, or fascial compartments where the nerves run. Single-shot blocks are commonly used for a variety of surgeries across different parts of the body, providing effective analgesia.

However, a limitation of single-shot nerve blocks is that they may wear off at an inconvenient time during the postoperative period, leading to inadequate pain relief. To address this, continuous infusion or intermittent bolus nerve catheters are increasingly used. These include:

- Fascia iliaca catheters for hip surgery
- Interscalene catheters for shoulder surgery
- Paravertebral and Erector Spinae Plane (ESP) catheters for major beast surgeries and rib fractures
- Rectus sheath catheters for laparotomies
- Femoral and sciatic nerve catheters for lower limb amputations

These catheters can be used for several days post-surgery and are typically managed by anaesthetists and the APS. However, all clinicians should be aware of potential complications, including:

- Local anaesthetic toxicity
- Motor block

- Masking of surgical complications, such as compartment syndrome or thromboembolism

Given their extended use, nerve catheters are often encountered on surgical wards and require careful management to avoid these risks.

Neuraxial blockade

Neuraxial blockade refers to the technique of delivering analgesia through the epidural or spinal space, most commonly through **epidural analgesia**, which involves placing a continuous infusion catheter into the **epidural space**. This method is frequently used for surgeries on the trunk and abdomen, where prolonged analgesia is needed, including:

- Major abdominal surgery
- Major vascular surgery, such as aortic aneurysm repair
- Major orthopaedic surgery, such as hip revision
- Thoracic surgery

Epidural analgesia is particularly beneficial for patients with respiratory concerns, such as those with pre-existing respiratory disease, as it can provide effective pain relief while minimizing the risk of respiratory compromise.

Like peripheral nerve catheters, **epidurals** are generally managed by anaesthetists and the APS. However, all clinicians should be aware of several important considerations:

- **Management of anticoagulation**: It is crucial to follow local protocols for anticoagulation, especially when removing the epidural catheter.
- **Dense motor block**: If a patient develops a dense motor block, it should be treated as an emergency, as it could indicate complications such as an **epidural haematoma** or abscess, both of which require urgent imaging and treatment.

Awareness of these potential complications and protocols is essential for safe management of neuraxial blockade.

Wound infiltration

Wound infiltration is commonly used in surgeries, even those with small incisions, where anesthetics are injected directly at the incision site for short-term pain relief, with minimal risks for most patients. While it reduces somatic pain, it doesn't address visceral pain. Research on its effectiveness shows mixed results: some studies report a reduction in postoperative pain and analgesic needs, while others find no significant benefit. Comparisons between pre-incision infiltration and injections at the end of surgery also show conflicting outcomes, indicating that the efficacy may vary based on factors such as surgery type and patient characteristics.[18]

Periarticular injection (PAI)/local infiltration analgesia (LIA)

Local anaesthetic infiltration around the joint is commonly used in pain management for hip and knee replacement surgeries and is often part of multimodal postoperative analgesia plans. Periarticular injection (PAI) involves the surgeon administering targeted injections into areas of the joint with concentrated pain fibres. The formulation of the injection solution may vary, with additives like ketorolac shown to enhance analgesic effects. However, the choice of long-acting anaesthetics (e.g. bupivacaine, ropivacaine) doesn't significantly affect efficacy. When combined with nerve blocks, careful calculation of the total anaesthetic dose is essential to prevent local anaesthetic systemic toxicity (LAST).[19,20]

Adjuvant therapies

In addition to pharmacological analgesia there is evidence for many adjuvant or non-pharmacological therapies, including:

1. **Psychological interventions**
   - **Preoperative education**: Providing information about procedures and pain management before surgery can improve pain control and accelerate recovery.
   - **Postoperative education**: Teaching patients about proper analgesic use post-surgery helps reduce pain and lowers opioid consumption.
   - **Empathetic discussions**: Humanistic, patient-centred communication before surgery may reduce postoperative pain, recovery time, and hospital stays.
   - **Avoiding the nocebo effect**: Steering clear of negative language during communication can prevent heightened pain perception linked to negative suggestions.
   - **Mindfulness and meditation**: These practices have been linked to reduced pain scores and may help decrease opioid use.
   - **Cognitive behavioural therapy (CBT)**: While CBT can lower postoperative pain and aid recovery, it does not seem to reduce opioid requirements.
2. **Physical therapy**
   - **Preoperative physiotherapy**: Engaging in physiotherapy before surgery may alleviate pain, reduce avoidance behaviours, and enhance physical activity and quality of life.
   - **Postoperative physiotherapy, activity, and exercise**: Promotes recovery after surgery; however, evidence of significant effects on pain relief or opioid use remains modest.
3. **Passive physical approaches**
   - **Cryotherapy**: May be effective for knee surgery pain but offers no advantage over compression therapy in joint replacements.
   - **Acupuncture and acupressure**: Shown to have some analgesic benefits in specific contexts.
   - **Transcutaneous electrical nerve stimulation (TENS)**: Proven to reduce acute pain compared to no TENS in various surgical procedures.

These non-pharmacological strategies complement pharmacologic methods in multimodal pain management, aiming to improve patient outcomes while minimizing opioid reliance.[9]

Practical aspects of pain management – location

The location of the patient influences the choice and administration of analgesia. Inpatients' options depend on the ward's observation capabilities and nursing staff training. Complex interventions, such as PCAs or epidurals, may require high-dependency care if staff lack the expertise. Day-case and emergency department patients should receive strong opioids like morphine with caution, including clear instructions on dosage, frequency, and side effects due to serious risks and lack of monitoring. If strong opioids are needed in a dose >40 mg oral morphine or equivalent in 24 hours post-surgery, overnight observation may be necessary. In addition, duration of strong opioids postoperatively should not exceed 5–7 days unless reviewed by a pain specialist team.

Acute pain service (APS)

In the perioperative setting, multimodal analgesic approaches with APS involvement improve patient outcomes, including reduced pain, opioid use, and earlier mobilization. The APS typically reviews patients with severe pain, analgesic devices, or specialist techniques like epidurals. They may also assist with chronic pain flare-ups or acute issues, particularly in patients already on strong analgesia. Those with analgesic dependence often require APS advice.[21]

Special populations

1. **Patients with obesity and/or OSA**:
   These patients benefit from multimodal, opioid-sparing pain management like others, but special considerations apply:
   - **Obesity**: Regional anaesthesia can be more challenging, with a higher risk of infections for peripheral catheters (but not neuraxial ones).
   - **OSA**: Heightened pain sensitivity and increased opioid-induced respiratory depression risks, particularly in the first 24 hours post-op, demand careful monitoring.[22]
2. **Opioid-tolerant patients**:
   For chronic opioid users, continue their baseline opioid regimen, optimize non-opioid options, and use additional opioids judiciously when necessary.[23]
3. **Pregnant patients**:
   Pain management largely mirrors that of nonpregnant individuals, but avoid NSAIDs during early pregnancy and late third trimester due to fetal risks. A single mid-trimester dose may be acceptable for severe pain.
4. **Post-Caesarean delivery analgesia: key principles and strategies**
   a. **Opioid use and minimization**:
      - Efforts focus on reducing opioid use both in hospital and after discharge. Oral opioids are preferred for those who need them, as they are associated with fewer side effects compared to IV opioids.
      - Discharge prescriptions are tailored to individual needs, with many women requiring no opioids or using them for less than two weeks post-surgery.

   b. **Multimodal pain management**:
      - A combination of analgesics is used to minimize reliance on opioids. Paracetamol and NSAIDs are the backbone of this approach and are administered regularly.
      - Neuraxial opioids like Diamorphine and morphine provide 24-hour relief post-surgery and reduce the need for systemic opioids. Peripheral nerve blocks (e.g. QL or TAP blocks) offer additional pain control for those not receiving neuraxial opioids.

   c. **Analgesic techniques**:
      - For those under general anaesthesia or without neuraxial opioids, bilateral nerve blocks and IV patientcontrolled analgesia (PCA) are key strategies.
      - Severe pain can be managed with rescue techniques like TAP blocks, intermittent IV opioids, or adjuncts such as gabapentin.

   d. **Goals of pain management**:
      The primary aims are to promote mother–infant bonding, enable mobility and caregiving, reduce opioid exposure, and support safe breastfeeding.

   e. **Breastfeeding considerations**:
      Most analgesics are safe for breastfeeding mothers as long as high-risk drugs (e.g. tramadol, codeine, meperidine) are avoided. Oral morphine liquid can be used with caution for short periods while breastfeeding, but it's best to avoid it if possible. Dihydrocodeine can be safe to take while breastfeeding. Mothers must be alert and able to care for their infants while using these medications.

   f. **Post-discharge pain trajectory**:
      Pain typically resolves in about three weeks, with significant variation. Shared decision making and reduced-dose prescription protocols help align opioid use with patient needs. This structured approach ensures effective pain control while supporting recovery, minimizing opioid-related risks, and fostering maternal–infant care.[24]

Conclusion

Effective perioperative pain management is crucial for enhancing recovery, reducing complications, and improving outcomes. This involves tailored pharmacological and non-pharmacological strategies, guided by accurate pain assessment. Options include simple analgesics, multimodal analgesia, nerve blocks, and adjuvants like ketamine and gabapentinoids, balanced against their side effects. Non-pharmacological methods, such as education and physical therapy, complement these. Individualized care is emphasized for specific populations like opioid-tolerant or pregnant patients. Multidisciplinary collaboration, including acute pain service (APSs), and adherence to evidence-based guidelines, are essential to ensure safe, effective, and patient-centred pain relief. ◆

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Practice points

- Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage
- Successful acute pain management starts with appropriate assessment of patients' physical, psychological and functional status. Patient preparation and education is a key component of a pain management strategy
- Acute pain management usually involves pharmacological analgesia alongside mobilization and functional assessment
- Use of WHO analgesic ladder and multimodal analgesia is the mainstay of successful and safe pain control strategy
- Multidisciplinary planning with experienced anaesthesia, chronic pain and surgical teams is vital for acute pain management in patients with chronic pain issues
- The acute pain service has a key supporting role

