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Acute pain management: information for general practitioners

NHMRC

National Health and Medical Research Council

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Introduction

Despite numerous advances in the field of medicine, the management of acute pain fails to be given appropriate priority and acute pain is often not properly treated in a variety of clinical situations. Acute pain is defined here as pain associated with actual or potential tissue damage, which is of recent onset and probable limited duration. Unlike chronic pain, which commonly persists beyond the time of healing, acute pain usually has an identifiable relationship to injury or disease.

The National Health and Medical Research Council (NHMRC) has produced *Acute Pain Management: Scientific Evidence*, which reviews the available scientific evidence and information on this subject. *Acute Pain Management: Information for General Practitioners* is a summary, designed to allow quick reference and revision of the main principles.

General Practitioners are advised to consult the main document for details on any section in this summary. *Acute Pain Management: Scientific Evidence* is available from Ausinfo or on the Internet at www.health.gov.au/nhmrc/publicat/public2.htm#clinical.

Statements of evidence (for which there is level I, II or III evidence as defined in Appendix A) are presented in each section of the full report. The key points are observations about management which are rated level IV (opinions based on clinical experience, descriptive studies or reports of expert committees). A summary of statements of evidence and key management points from the full report is given at Appendix D.

The role of general practitioners

Early and appropriate interventions by general practitioners (GPs) can have a major impact in improving the assessment and treatment of pain, and preventing the development of chronic pain. Areas where there are opportunities for improved assessment and treatment strategies in general practice include:

- acute back pain;
- acute herpes zoster infection;
- acute abdominal pain;
- acute headache;
- acute orofacial pain;
- acute pain in patients with haemophilia/haemarthrosis; and
- acute pain in patients with cancer or with HIV/AIDS.

Options for managing patients with these conditions will be covered in this booklet. Information is also provided for those GPs involved in more specialised areas of acute pain management such as post-surgical patients, obstetric patients, paediatric patients and burns and trauma patients.

General principles of pain management

- Unrelieved severe pain has adverse physiological and psychological effects.
- Proper assessment and control of pain require patient involvement.
- Effective pain relief requires flexibility and tailoring of treatment to the individual.
- Pain is best treated early, because established, severe pain is more difficult to treat.
- While it is not always possible to completely alleviate pain, it should be possible to reduce pain to a tolerable or comfortable level.

1 Assessment of pain and pain history

Pain rating methods

Because pain is an individual experience influenced by many factors including previous experiences, culture, prognosis, coping strategies and fear and anxiety, there is a poor correlation between patient and staff assessments of pain severity. Self reports are among the most reliable indicators of pain severity, with a number of simple self-reporting tools commonly used for adults.

- The approach commonly used for postoperative patients is to use verbal pain scoring methods such as the **categorical rating scale**. Different descriptors can be used to rate the patient's pain, eg no pain, mild pain, moderate pain, severe pain, worst possible pain.
- The **visual analogue scale** (VAS) employs a 10 cm line rated from 'no pain' at the left to 'worst pain possible' on the right and requires the patient to mark their pain on this continuum. Numbers are avoided on this scale in order to prevent the patient receiving cues. The VAS 'score' is the distance from the 'no pain' point to the patient's estimate.



- The **verbal numerical rating scale** (VNRS) also asks the patient to rate their pain from 'no pain' (0) to 'worst pain possible' (10).

There is good correlation from pooled data between the VAS and the VNRS of pain scoring. However, for an individual, once an appropriate scale has been selected it should continue to be used for monitoring pain.

While it is not always possible to relieve pain entirely, the aim should be to achieve comfort. Patients should be assessed during movement and activity as well as at rest, and incident pain (pain during movement) reduced as much as possible.

Patients with special needs

Patients who have difficulty communicating their pain (eg children, hearing and cognitively impaired patients) require special attention. There are a number of pain rating scales designed for use in children. The needs of patients whose educational or cultural background differs significantly from that of their health care team should be taken into account, with scales modified to suit the individual needs of patients. Patients who do not speak English should be given the opportunity to communicate in their chosen language through an interpreter.

Continuing assessment

A patient's pain and response to treatment should be assessed regularly, at least every two hours for the first 24 to 48 hours following major surgery. It is important to monitor pain and response to therapy, and to tailor the frequency of monitoring to the individual patient's needs. If pain is poorly controlled or therapy is being altered, assessment may need to be more frequent. Pain assessment should be recorded in a readily available and visible form, such as on the bedside chart with other vital observations.

It should be remembered that an unexpected increase in pain, especially when associated with changes in other vital signs, may signal the development of a new diagnosis or postoperative complication (eg peritonitis, compartment syndrome or neuropathic pain).

Patients should be actively involved in the continuing assessment of their pain. Any factors which reduce the efficacy of the treatment will alter their confidence in the pain management plan. Patients may also experience a change in the character and severity of pain in association with a complication. A careful history and examination of the patient is essential when pain severity increases unexpectedly.

Key points

- Careful assessment of pain should occur initially and then regularly throughout treatment, using self-reporting techniques. As pain varies so markedly between individuals, patient involvement in the initial and continuing assessment of their pain is essential.
- Pain should be assessed both at rest and during activity and pain relief assessed as to its adequacy, to allow appropriate function.
- Unexpected levels of pain or pain that suddenly increases, especially when associated with changes in other vital signs, may signal the development of a new surgical or medical diagnosis (eg postoperative complication, neuropathic pain).

Pain history

In addition to a thorough general medical history and physical examination, patients with any form of pain should be evaluated with a specific 'pain history' as in the following table. A useful method for assessing the extent of pain is for patients to chart the primary area of pain and areas of radiation on a pain diagram (a sample chart is given on page 10).

Taking a pain history

- Circumstances associated with pain onset
- Primary site of pain
- Radiation of pain
- Character of pain (eg is pain throbbing, sharp, aching etc)
- Intensity of pain (eg on visual analogue scale)
 - at rest
 - on movement
 - at present
 - during last week
 - highest level
- Factors altering pain
 - what makes it worse?
 - what makes it better?
- Associated symptoms (eg nausea)
- Temporal factors
 - is pain present continuously or otherwise?
- Effect of pain on activities
- Effect of pain on sleep
- Medications taken for pain
- Other treatments used for pain
- Health professionals consulted for pain treatment

Pain history information of significance for symptomatic treatment of pain

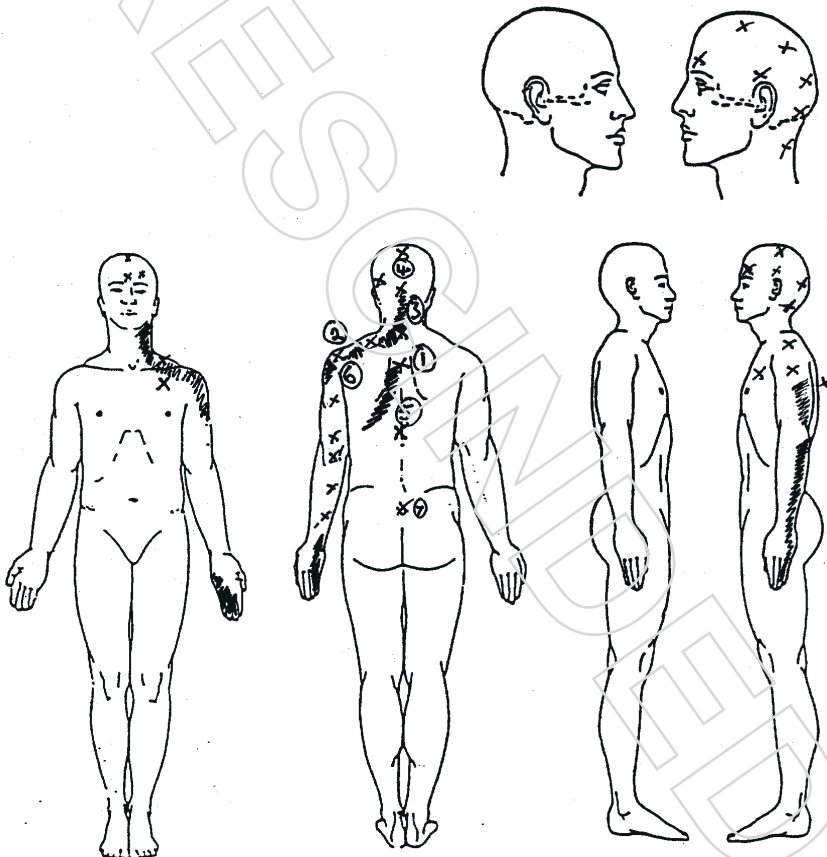
- Expectations of outcome of pain treatment
- Patient's belief concerning the causes of pain
- Reduction in pain required to resume 'reasonable activities'
- Patient's typical coping response for stress or pain, including presence of anxiety or psychiatric disorders (eg depression or psychosis)
- Family expectations and beliefs about pain, stress and postoperative course
- Ways the patient describes or shows pain
- Patient's knowledge, expectations and preferences for pain management

PAIN HISTORY

Please describe the pain problem that brings you to the clinic:

I get chronic stabbing pain from the middle of my back to my head neck also along my arm to my fingers also my chest, LEFT SIDE.

2. Please indicate with an X on these figures where your main pain is. Shade any area where your pain spreads. Please number (2,3,4, etc.) any other areas where you have pain.



Pain diagram

Diagnosing neuropathic pain

Neuropathic pain is under-diagnosed in patients with acute pain in many different settings eg postoperative, post-trauma and acute pain in patients with cancer. A useful definition is *pain associated with injury, disease or surgical section of the peripheral or central nervous system*. A wide range of neuropathic pain syndromes is described in the IASP taxonomy of chronic pain syndromes. Neuropathic pain frequently involves both peripheral and central sensitisation.

Diagnosis of neuropathic pain can usually be made on the basis of history and physical examination. There is often a history of an event which may have resulted in nerve damage associated with the onset of neuralgia, or complex regional pain syndrome after surgery. There may be considerable delay between the event and the onset of pain. Pain is often described as paroxysmal, burning, stabbing, pulsing, electric shock-like or dysaesthetic. Hyperalgesia may be present in the area of injury (primary) or in the surrounding area (secondary) which is indicative of central sensitisation. Allodynia (pain in response to a non-painful stimulus such as a light touch) also indicates central sensitisation. Hyperpathia may be present, where there is a lowered pain threshold and repetitive stimulation results in summation of pain.

Early diagnosis and treatment of neuropathic pain are preferable as chronic neuropathic pain is extremely difficult to treat.

Key point

- Although not specific, an important indicator of neuropathic pain is the inability to relieve pain with opioids, or no apparent relief of pain with a rapidly increasing opioid dose. Other indicators can be obtained from the history and physical examination.

Features that suggest neuropathic pain

- Pain in the absence of ongoing tissue damage
- Pain in an area of sensory loss
- Paroxysmal or spontaneous pain
- Allodynia (pain in response to non-painful stimuli)
- Hyperalgesia (increased pain in response to painful stimuli)
- Dysaesthesias (unpleasant abnormal sensations; 'ants crawling on the skin' etc)
- Characteristic of pain different from nociception: burning, pulsing, stabbing pain
- Sometimes a delay in onset of pain after nerve injury (NB some neuropathic pain has immediate onset)
- Hyperpathia: increasing pain with repetitive stimulation; 'after response' (continued exacerbation of pain after stimulation); radiation of pain to adjacent areas after stimulation
- Tapping of neuromas (spontaneously firing growth buds from damaged peripheral nerves) produces a radiating electric shock sensation in the distribution of the nerve (Tinel's sign)
- Poor response (not unresponsiveness) to opioids
- Presence of a major neurological deficit (eg brachial plexus avulsion, spinal cord injury etc)

2 Agents used to manage acute pain

A summary of pharmacological agents is given in Appendix B.

Opioids

Opioid analgesics produce analgesia by binding to opioid receptors both within and outside the central nervous system. The most important receptor type for clinical analgesia is named 'mu' because of its affinity for morphine.

Examples of other commonly used mu opioid agonists include codeine, pethidine, oxycodone, methadone and fentanyl. Tramadol, a recently introduced mu opioid agonist, also has important non-opioid spinal and central nervous system effects.

Side effects — All mu opioids have the potential to cause constipation, urinary retention, sedation, respiratory depression, nausea and vomiting. Titration of opioids should be based on the patient's analgesic response and side effects.

Key points

- A true allergy to opioids is very uncommon. As with any drug, the term 'allergy' is often mistakenly applied to an intolerance to the drug, a common side effect, or a dose-related effect.
- There is no evidence that the use of opioids for treatment of severe pain leads to opioid dependence or addiction.
- Different methods of opioid administration each have advantages and disadvantages in different groups of patients, but are more likely to be effective when the dosage regimen is tailored to the individual. The patient's need for pain relief should be seen as more important than strict adherence to a dose interval.

Non-steroidal anti-inflammatory drugs

Non-steroidal anti-inflammatory drugs (NSAIDs) are effective in the management of mild to moderate pain and may be of particular use for pain relief after outpatient, ambulatory surgery. The concurrent use of opioids and NSAIDs often provides more effective analgesia than either of the drug classes alone. NSAIDs have a significant opioid dose-sparing effect and can be useful in reducing opioid side effects.

Commonly used NSAIDs include aspirin, ibuprofen, naproxen and ketorolac. All NSAIDs except ketorolac are given orally.

Side effects — NSAIDs produce a risk of platelet dysfunction that may impair blood clotting, a risk of gastro-intestinal bleeding and renal dysfunction (particularly in the older age group), and a risk of NSAID induced asthma. The adverse effects of NSAIDs are potentially serious and they cannot be used in all patients.

Statements of evidence

- While the currently available NSAIDs do not relieve severe pain when used alone, their efficacy as components of multimodal analgesia has been confirmed by clinical trials.
- The adverse effects of NSAIDs are potentially serious and it is imperative that contraindications are respected.

Paracetamol

Paracetamol is effective for mild to moderate pain, and as an adjunct to opioids in more severe pain. It is available in both oral (various doses) and rectal forms (500 mg suppository). In adult patients with normal renal and hepatic function, the recommended dose is 500 to 1,000 mg oral or rectal, every 3 to 6 hours when necessary, with a maximum daily dose of 6 g a day in divided doses for acute use and 4 g a day for chronic use.

In general, paracetamol has fewer side effects than NSAIDs, and can be used when the latter are contraindicated (eg asthma, peptic ulcers). However it should not be used in patients with liver dysfunction and patients should be warned of the risk of liver damage with the combination of alcohol and paracetamol.

Local anaesthetics

Local anaesthetics for acute pain relief can be used in several ways including topical application (eutectic mixture of local anaesthetic [EMLA]); local infiltration; nerve and plexus block. Local anaesthetics can be used with opioids in continuous epidural administration.

Key point

- Regional methods of pain relief using local anaesthetic, either alone or in combination with systemic analgesia, can be effective after a number of localised procedures.

Adjuvant agents

A number of adjuvant agents, including antidepressants, anticonvulsants and corticosteroids, have been shown to be effective in the treatment of certain pain syndromes.

Statement of evidence

- Anticonvulsants and antidepressants have been shown by meta-analysis to be effective in the treatment of neuropathic pain.

Key point

- The effectiveness of anticonvulsants and antidepressants in the treatment of pain needs to be balanced against their potential adverse effects.

Non-pharmacological interventions

Non-pharmacological interventions are appropriate for patients who wish to use them, who may benefit from reducing drug therapy, or who are likely to experience a prolonged interval of pain.

Cognitive-behavioural approaches include preparatory information, simple relaxation, imagery, hypnosis and biofeedback.

Physical therapeutic agents and modalities include spinal manual therapy, mobilisation, application of superficial heat or cold, massage, exercise, transcutaneous electrical nerve stimulation (TENS) therapy and acupuncture.

3 Specific areas of pain management

Acute musculoskeletal pain

Prompt assessment and treatment of acute musculoskeletal conditions is important in the prevention of ongoing trauma. Delaying treatment, or treating only with rest and immobilisation, can precipitate the transition of acute injury to chronic injury and subsequent chronic pain.

Back and neck pain

The most common acute musculoskeletal pain is 'non-specific' back pain associated with decreased spinal movement, which is labelled 'mechanical'. Acute neck pain is also commonly non-specific mechanical pain. Non-specific back and neck pain can occur in any age group and are usually self-limiting. However, acute lower back pain may be caused by trauma (especially in an osteoporotic spine), infection, neoplasm or metabolic bone disease.

Pharmacological treatment

Paracetamol 1 g qid regularly, or other simple analgesia, is often effective first line treatment.

An *NSAID* may be used where paracetamol provides insufficient pain relief, taking into consideration contraindications and side effects.

Oral opioids may be required in the acute stage, using regular rather than pain-contingent dosing with a short-acting agent such as oxycodone or codeine. Opioids may be more appropriate when the clinical diagnosis points to a physical cause for the pain. Any patient apparently requiring prolonged use of opioids for acute spinal pain should be re-assessed regularly. Referral to a multidisciplinary pain unit might assist management.

Non-pharmacological treatment

Rehabilitation

Strategies that assist rehabilitation, include the need to avoid prolonged bed rest, avoid hospitalisation, avoid the use of prolonged spinal traction, resume activity as soon as possible, and limit lifting.

Patients should be informed that discomfort during activity is not necessarily a sign of additional damage to the spine.

In neck pain, initial immobilisation of the neck is less effective than allowing a return to normal cervical movements, provided serious pathology is excluded.

Structured exercise programs

In *acute back pain* (less than six weeks duration), there is no evidence that a structured exercise program provides any benefit in terms of reduced pain, decreased time off work or other relevant measures. Advising patients to

return to normal activity is more effective than a structured exercise program and does improve outcome.

In *subacute spinal pain* (duration longer than six weeks but less than three months), a program of individualised graded exercises has been shown to be effective. Measures to discourage fear of activity and to decrease illness behaviour are also effective.

Spinal manual therapy

Spinal manual therapy describes a range of manual treatments applied to the spine. It includes gentle oscillatory pressures or mobilisations applied to the vertebrae, the high velocity thrust known as a manipulation, and spinal movements passively applied by the health professional, such as rotation of the spine.

Spinal manual therapy is widely used in the treatment of back pain, by a range of health professionals. The scientific evidence for its efficacy remains to be established, as it has been difficult to obtain definitive evidence of the benefits and risks.

The little evidence available about the use of spinal manual therapy for *acute cervical spine pain* suggests some benefit in mechanical neck pain, although subgroups of patients need to be better identified. As there are potentially serious risks associated with the technique, spinal manual therapy for acute cervical spine pain should be performed only by appropriately trained personnel.

Statements of evidence

- Treatment for acute lower back pain based on bed rest and immobilisation is ineffective.
- A return to a normal range of activities as soon as possible leads to more rapid recovery from acute lower back pain than do either bed rest or back-mobilising exercises.
- Spinal manual therapy is used for the treatment of acute lower back pain in the first six weeks following onset of pain. The scientific evidence for its efficacy remains to be established.
- The little evidence available about the use of spinal manual therapy for acute cervical spine pain suggests some benefit in mechanical neck pain, although subgroups of patients need to be better identified.
- As there are potentially serious risks associated with the technique, spinal manual therapy for acute cervical spine pain should be performed only by appropriately trained personnel.

Key points

- The treatment of serious spinal pathology requires urgent referral to specialist services.
- Having excluded serious spinal pathology, non-specific backache is best managed using a simple approach aimed at pain relief, active rehabilitation and return to normal activity.
- Appropriate education and advice is important in managing acute lower back and neck pain. Stressing the non-serious nature of the condition and advising patients not to be 'afraid' of their back has been found to promote a better overall outcome.

Peripheral musculoskeletal presentations

Some musculoskeletal conditions present as 'emergencies' (eg septic arthritis, osteomyelitis, and the peripheral features of infective endocarditis).

Three main mechanisms may be responsible for musculoskeletal pain:

- inflammation;
- altered biomechanics; and
- somatic referred phenomena.

The hallmark of joint disease is swelling. Aspiration of joint effusions allows instant diagnostic distinction between inflammation (including infection) and other mechanisms, but should only be performed with full sterile technique including gown and gloves by a clinician with training in the technique of joint aspiration.

The medical history should address the character of the pain, with a particular search for symptoms that suggest conditions requiring urgent evaluation and treatment. A diagnosis is usually possible in the periphery and is highly desirable, because in the periphery, unlike in the spine, management is frequently contingent upon diagnosis.

Symptoms suggesting the need for urgent evaluation and management include:

- history of significant trauma;
- hot, swollen joints;
- features of systemic illness;
- weakness;
- pain of neuropathic origin; and
- claudication pain — gradually increasing lower limb pain on walking, relieved by resting.

History and examination will determine which investigations to pursue. Once inflammation has been excluded, management should address symptom control and functional problems with painful parts. Local physical therapy of painful musculoskeletal structures with either heat (for stiff joints) or cold (for swollen parts) is common and may have a useful placebo effect. Other forms of physiotherapy play a substantial role in the management of peripheral musculoskeletal conditions.

Anti-inflammatory therapy is indicated where inflammation has been demonstrated to be the relevant mechanism but not where the pain is due to biomechanical or neuropathic mechanisms. No advantage of NSAIDs over paracetamol has been shown in symptomatic osteoarthritis. Nonetheless, there are individual patients with symptomatic osteoarthritis whose symptoms respond better to NSAIDs than to paracetamol alone.

Acute exacerbations of the pain of chronic inflammatory rheumatic diseases, such as rheumatoid arthritis, the rheumatoid-factor-negative spondyloarthropathies and polymyalgia rheumatica may be inflammatory or mechanical. This distinction is often difficult, as it relies more on clinical assessment, may not be reflected in laboratory indices, and is important as it has implications especially for the patient already taking glucocorticoid therapy. After consideration of the risk factors, a short-term (less than two weeks) clinical trial of increasing anti-inflammatory drug dosage (non-steroidal or steroidal) could be initiated, although evidence here is lacking. If possible, specialist advice should be obtained in this situation; one exception might be in the context of polymyalgia rheumatica where there is the clinical suspicion that vision is threatened by giant-cell arteritis, a situation in which high doses of prednisolone (~60 mg/day) should be used pending specialist assessment.

Sporting injuries

The acute treatment of sporting injuries generally follows the principles of:

- Rest/Ice/Compression/Elevation (RICE) which needs to be applied for sufficient time (approximately 48 hours);
- simple analgesics; and
- early rehabilitation and mobilisation.

Very few injuries require the level of immobilisation provided by a plaster cast. When true immobilisation is required, limited range of motion braces are preferable. 'Rest' can mean simply avoiding aggravating activities, performing graded exercise regimens, not bearing weight, or, occasionally, complete rest.

Chronic injuries may present as bone pain (non-union of fractures), muscle pain (myositis ossificans), ligamentous pain (dystrophic calcification) and soft tissue pain which may result from poorly organised fibrotic tissue.

Clinicians should be fully aware of the list of banned and restricted substances when treating athletes involved in high level competition. Simple analgesics (aspirin and paracetamol) and all NSAIDs are permissible. Opioids other than codeine are banned. Corticosteroid use is restricted, although corticosteroid injections may be used with notification to the drug-testing or sporting body (see p xxiv *Australian Medicines Handbook* or RACP *Drugs in Sport* position paper). While athletes are highly motivated to return to training early, emphasis needs to be placed on maximising rehabilitation. Early mobilisation is required once serious injury is excluded.

Complications from soft tissue injuries due to sporting trauma include reflex sympathetic dystrophy, muscle wasting, joint stiffness and adhesions. The incidence and severity of complications due to sporting trauma may be reduced by early rehabilitation, mobilisation and effective pain relief.

Statement of evidence

- Corticosteroids are effective anti-inflammatory agents, but are not suitable treatment for acute sporting injuries for up to six weeks after the incident. Experimental studies have shown that corticosteroids may adversely affect normal tissue healing and repair.

Key point

- While they do have a role in treatment of myositis ossificans following intramuscular haematoma, and in management of chronic sporting injuries, NSAIDs have not been shown to be effective in the treatment of ligament sprains.

Pointers to serious sporting injury

- Joint swelling (rapid joint swelling following injury usually indicates bone or ligament trauma)
- Neurological symptoms
- Bony tenderness
- Loss of joint motion
- Inability to bear weight

Acute herpes zoster infection (shingles)

Acute herpes zoster is common. Post-herpetic neuralgia, as a complication of herpes zoster, is a chronic condition, particularly in elderly and immunocompromised patients. It is resistant to therapy and is a prime example of neuropathic pain.

Antiviral agents (eg guanine analogues: Acyclovir, Famciclovir, Valaciclovir) are useful in shortening the period of viral shedding and hastening the healing of the vesicular rash. Debate continues about the usefulness of antiviral agents in reducing the degree and duration of post-herpetic neuralgia. A number of randomised controlled trials have found that antiviral agents significantly reduce the duration of post-herpetic neuralgia in older patients.

Corticosteroids are sometimes given in acute herpes zoster. Corticosteroids have little analgesic effect and evidence for the reduction in the incidence and severity of post-herpetic neuralgia is conflicting. Steroid therapy does reduce the time to vesicular rash healing. The risk of dissemination is minimised by concurrent antiviral treatment.

Antidepressants and anticonvulsants — there is evidence from a meta-analysis of studies on the treatment of neuropathic pain that these agents are effective for this general category of pain. The practice of combining these two classes of agents is quite common. A recent systematic review does not support previous claims for a difference between anticonvulsants and antidepressants in the treatment of neuropathic pain.

Statements of evidence

- Antiviral agents used early for the treatment of acute herpes zoster infection have been shown to accelerate lesion healing and result in faster resolution of pain.
- Antidepressants and anticonvulsants are effective in the treatment of neuropathic pain such as post-herpetic neuralgia.

Acute abdominal pain

Acute abdominal pain has many causes, not all of which are treated by surgery. Treatment of acute abdominal pain is critically dependent on diagnosis of a potential underlying physical cause, and an accurate pain history is of great importance.

Visceral pain is typically poorly localised, midline and associated with autonomic features such as sweating, restlessness, nausea, vomiting and pallor. Somatic or parietal pain is generally sharp and well localised. Inflammation of the peritoneum can usually be accurately localised. Referred pain, neuropathic pain and psychological/environmental factors should also be considered.

Treating the primary cause is often a priority, particularly with surgical conditions such as appendicitis. There is no need to withhold analgesia during the diagnostic process — analgesia does not interfere with diagnosis but may actually facilitate it.

In some patients a physical cause is difficult to define. Further exploration of psychological/environmental factors may be necessary, possibly in a multidisciplinary pain unit setting. For example, patients with chronic pancreatitis may present with acute episodes of abdominal pain, with a background of chronic opioid use. Rather than requiring long-term opioids, some patients with recurrent attacks of acute abdominal pain may benefit from a cognitive/behavioural pain program.

Acute headache

There are many causes of acute headache, some of which involve structures other than the head (eg cervical spine). Before initiating a course of analgesic treatment, it is vital to rule out serious intracranial or other pathology. (See NHMRC document *Acute Pain Management: Scientific Evidence*.)

Acute migraine

Despite the fact that acute migraine is a well known and common pain condition that affects about 20 per cent of the population, there are no clear guidelines for its management. While a number of agents have been recognised as being effective in treating migraine, their success in individual patients is difficult to predict.

Pharmacological treatment

Mild or occasional attacks may be treated with simple analgesics, either alone or in combination. A combination of aspirin (1000 mg) and metoclopramide is frequently effective.

For more severe or frequent migraine, a stepwise approach to the use of pharmacological agents is recommended. Moderate to severe migraine requires the use of specific antimigraine medications such as *ergotamine* or *sumatriptan*, unless contraindicated. Anti-emetics and benzodiazepines have also been shown to have value.

Ergotamine derivatives are appropriate in patients with frequent, moderately severe or severe infrequent migraine headaches. Wide variations in the effectiveness of ergotamine results from its erratic gastrointestinal absorption. The use of dihydroergotamine 1.0 mg delivered by intramuscular or subcutaneous injection is an option when nausea is prominent.

Sumatriptan has been a major advance in the management of migraine headaches, although a recent randomised controlled trial has found that the combination of aspirin (900 mg) and metoclopramide is as effective as

sumatriptan in the treatment of migraine, is better tolerated and also considerably cheaper. Cardiac adverse effects are the major concern with sumatriptan. Subcutaneous administration is contraindicated in patients with a history of ischaemic heart disease, Prinzmetal angina or hypertension. Intravenous administration should be avoided due to the risk of coronary artery spasm. A number of case reports have attributed sumatriptan with a causal role in myocardial infarction.

NSAIDs — short acting therapy with naproxen and ketoprofen can be as effective as ergotamine for acute migraine.

Opioids — While opioids are commonly used to treat patients with migraines, opioid receptors have not been shown to have any specific mechanism in migraine. Most studies note that the dosage of opioid necessary for clinical effect in acute migraine may be higher than for other types of pain.

The use of short-acting opioids in young migraine patients may contribute to long-term pain management problems. Management of severe recurrent migraine requires detailed evaluation, especially if long-term use of opioids has arisen.

The Australian Association of Neurologists recommends that pethidine should not be considered as the treatment of choice for acute migraine, unless patients are unresponsive to other measures and the frequency of use is closely monitored.

Corticosteroid therapy and *anti-emetic treatment* (used in the absence of other medication) can be effective in reducing pain in refractory migraine.

Acupuncture— several randomised controlled studies support the effectiveness of acupuncture in the treatment of migraine. However, these studies examine the effects over the long term or for prophylaxis and do not examine effectiveness during acute migraine. While acupuncture may be useful as a preventive treatment, thereby reducing the incidence or severity of acute migraine, the analgesic effect during an acute episode appears to be unknown.

Statements of evidence

- A stepwise approach to the use of pharmacological agents in the treatment of migraine is effective. Moderate to severe migraine may require the use of specific antimigraine medications such as ergotamine or sumatriptan, unless contraindicated.
- The combination of soluble aspirin (1000 mg) and metoclopramide is as effective as sumatriptan in the treatment of migraine, is better tolerated and is also considerably cheaper.

- Pethidine has been found to be no more effective than dihydroergotamine, chlorpromazine or NSAIDs in the treatment of migraine. Chlorpromazine has the potential disadvantages of hypotension and liver dysfunction.

Key point

- There are very few situations in which pethidine is useful in acute migraine, although it may be considered during pregnancy when the use of ergotamine preparations and dihydroergotamine is contraindicated.

Analgesic rebound headache

Intractable daily or near daily headaches may result from analgesic use required to abort each episode. The headache may be described as severe and throbbing, making these attacks resemble migraine. Symptomatic treatment may be offered for each attack but long-term management requires the cautious reduction of analgesic medication and the addition of prophylactic antimigraine treatment. This has been shown to improve headache control in nearly 80 per cent of individuals. In order to cope without opioids, such patients may benefit from early entry to a cognitive behavioural program.

Tension headache

Tension headaches can be extremely debilitating, with acute episodes varying in intensity from mild to very severe. A broad assessment of contributing factors including an assessment of physical, psychological and environmental factors may identify a number of non-pharmacological strategies that greatly reduce the number of severe attacks and may also provide a more rational contingency plan for severe attacks. Musculoskeletal problems in the cervical spine may cause severe headache. An appropriately designed program of active physical therapy (eg stretching), relaxation techniques and cognitive behavioural techniques (eg 'pacing') may be helpful.

Cervicogenic headache

This type of headache usually involves recurrent, acute attacks of moderate to moderately severe unilateral head pain (without change of side), generally involving the whole hemicranium. This is a very common, difficult to manage presentation of headache in general practice.

Cervicogenic headache usually starts in the neck or occipital area, eventually involving the forehead and temporal areas, where the maximal pain is frequently located. The headache often appears in acute episodes of varying duration in the early phase but with time may become more continuous, with exacerbations and remissions. Symptoms and signs such as mechanical precipitation of attacks imply involvement of the neck. There may be a reduced range of motion in the neck, in one or more directions; neck movements or neck position during sleep may elicit headache; and external pressure over the greater occipital protuberance on the symptomatic side may precipitate headache.

Local anaesthetic blockade of the greater occipital nerve (GON) may provide temporary relief of the headache. Treatment should then focus on the neck in the first instance, with investigation of neck posture at work, during sleep etc. There is some evidence that exercises for cervical muscles and local spinal mobilisation may be helpful. This treatment is currently under investigation.

Post lumbar puncture headache

Headaches of this type often improve spontaneously with simple measures such as bed rest, hydration and analgesics. In some cases the headache may persist for many days or even weeks. Such headaches are often severe and associated with meningism, auditory and visual symptoms, and nausea and vomiting. There is evidence for the use of 'epidural blood patches' for persisting severe postural headache.

Acute pain in patients with cancer

Common acute cancer pain syndromes are becoming better recognised. As with most causes of acute pain, the specific aetiology of acute pain in patients with cancer is usually obvious, such as cancer per se, diagnostic procedures, surgery, other therapeutic interventions, delivery of pain relief, anticancer therapy, infection (eg acute herpetic neuralgia), and pain on activity (eg on moving, dressing etc).

The most common barriers to adequate pain relief in patients with cancer include:

- failure of the health professional to appreciate the severity of pain and to assess/re-assess it — this can be improved by the use of pain measurement tools;
- failure to administer adequate doses of opioid analgesics due to concerns about tolerance, addiction and side effects; and
- failure to identify the aetiology of the pain and consider the most appropriate therapeutic options.

Assessing acute pain in cancer patients

It is important to establish what has triggered the episode, as acute pain syndromes often signal disease progression. However, not all acute pain in cancer is related to the tumour and there are numerous treatable conditions, such as acute musculoskeletal pain and pain associated with hypercalcaemia.

A detailed assessment involving history, physical examination and investigations should be undertaken to determine the exact nature of any new or acute pain episode. Due to the different potential causes, pain can be either general, focal or referred, which includes radicular pain arising from damage to a nerve root. Acute pain in cancer is commonly acute in onset but occurs over a background of chronic pain eg spinal metastases followed by a crush fracture.

Acute exacerbations of chronic cancer pain

Chronic cancer pain syndromes can be exacerbated by a range of phenomena. These include movement in patients with bony metastases, liver capsule pain when lying on the right (with hepatic distension or tumour infiltration), pelvic pain on defecation (from constipation or tenesmus), and oesophageal pain on swallowing. Corticosteroids can be helpful adjunct drugs in the treatment of pain associated with spinal cord compression, infiltration of major nerve plexuses, and tumours producing stretching of the capsule of a viscus (eg liver). Pain associated with bowel obstruction may also be palliated by steroids, in appropriate situations. Acute episodes may also be paroxysms of neuropathic pain; acute radiculopathy due to tumour invasion of the brachial plexus is an example of this.

When acute exacerbations of chronic pain develop, a supply of rapid-acting opioids needs to be available. However, alternative routes, particularly via subcutaneous injections, are useful in establishing control over pain when dosages can be titrated to response. A recent consensus statement from the European Association for Palliative Care recommends that the breakthrough dose of morphine should be the same as the four-hourly immediate-release morphine dose for chronic pain, given as frequently as necessary. If repeated doses of breakthrough morphine are required, an adjustment to the regular baseline opioid requirement should be made.

Pharmacological treatment

Management of acute episodes of pain in patients with cancer requires an organised approach similar to that used in the management of chronic cancer pain. It is based on identifying the cause, removing or modifying it and utilising multimodal analgesic techniques including pharmacotherapy, anti-neoplastic therapies, physical and psychosocial modalities, and the interruption of pain pathways.

In managing acute pain in patients with cancer the following principles need to be kept in mind.

- Not all acute pain in patients with cancer is due to the cancer getting worse. Other possibilities include osteoporotic fracture, pressure sores, constipation, side effects of treatment, procedural pain, deep venous thrombosis and pulmonary emboli, infections (eg herpes zoster).

- Even when the pain is due to the cancer progressing, it is important to consider the anatomic aetiology (eg spinal cord compression, bony fractures, obstruction of a viscus, brain metastases etc), as this may be amenable to specific therapy. Review of the patient by an oncologist is recommended.
- The best therapy is likely to be that which addresses the aetiology of the pain, and can include radiotherapy (including radiopharmaceuticals), chemotherapy, hormonal therapy, surgery, interventional radiology and pharmacological agents.
- While waiting for definitive therapy to work, analgesic medications will be required, including opioid analgesics, simple analgesics and adjuvant analgesic drugs.
- Physical therapies and psychosocial therapy will be important in some cases.
- As analgesic needs will change when definitive measures begin to work, frequent re-assessment and gradual weaning off medication may be appropriate.
- Invasive procedures (spinal opioids, nerve blocks, neurosurgical techniques) will be required in cases that are difficult to manage. Involvement of a comprehensive pain service is recommended.

Other treatments

NSAIDs have a place in the treatment of acute episodes of pain in patients with cancer given their potential opioid-sparing effects, thus reducing side effects such as excessive sedation. They have been shown to be effective in the treatment of symptomatic bone secondaries and in treatment of pain associated with movement.

Tricyclic antidepressants are helpful in the treatment of particular acute cancer pain episodes. These agents modify the neuropathic response to nerve injury and alter pain perception through mood-elevating effects.

Anticonvulsant medication is sometimes effective in the treatment of neuropathic pain. Drugs likely to be of benefit include carbamazepine, sodium valproate and more recent GABA-ergic and NMDA active agents such as vigabatrin and gabapentin.

Gabapentin is better tolerated by most patients, compared to carbamazepine or sodium valproate, however it relies entirely on renal excretion for clearance and must be used carefully in the presence of renal dysfunction. It is currently an expensive drug.

Bone pain secondary to metastases often responds well to *radiotherapy*. Bone pain from metastatic prostate or breast cancer may also be treated with *radiopharmaceuticals* such as strontium-89 or with bisphosphonates.

Hypercalcaemia-associated pain should be suspected if pain suddenly increases in patients with multiple bone metastases. The patient may have associated confusion. If serum calcium is elevated, treatment options include 'saline diuresis' and intravenous administration of the bisphosphonate calcium-lowering drugs such as pamidronate. Such measures frequently result in a rapid decrease in both pain and confusion.

Statements of evidence

- Oral analgesics are the mainstay of pain relief in patients with cancer. Strong opioids are safe and effective for moderate to severe pain.
- Radiotherapy plays a major role in the management of acute pain due to cancer.
- Bisphosphonates have a general role in the treatment of bone pain related to breast cancer and myeloma (and possibly prostate cancer).
- Epidural, intrathecal and intracerebroventricular opioids are often effective in treating acute pain in patients with cancer that is not controlled with conventional treatment.

Key points

- Not all acute pain in patients with cancer is due to the cancer progressing.
- Even when the cancer is progressing, it is important to consider the anatomic aetiology, as this may be amenable to disease-specific therapy (radiotherapy, chemotherapy, surgery etc).
- While waiting for specific therapy to work, adequate analgesia must be provided. Invasive procedures (spinal opioids, nerve blocks etc) are occasionally required.
- Acute pain in cancer patients often takes place against a background of chronic pain and therefore existing analgesic use. An integral part of management is the recognition and treatment of 'procedural pain' and 'breakthrough pain'.
- The barriers to cancer pain management must be recognised and overcome if possible.

Acute pain in haemophilia/haemarthrosis

Acute pain in haemophilia usually results when uncontrolled bleeding occurs into confined spaces such as joints or muscles. Bleeding also occurs into soft tissues and the central nervous system but this is less often associated with pain. Bleeding follows minor surgery or trauma, but in the case of severely affected individuals may occur spontaneously.

Many haemophilic patients became HIV and hepatitis C positive in the 1980s due to transfusion with infected blood products, but this is now a rare problem in newly diagnosed cases. This is relevant because a haemarthrosis with an unusual pain pattern, fever and HIV seropositivity raises the diagnosis of a pyoarthrosis.

Pharmacological treatment

The mainstay of treatment is prompt replacement of factor VIII with intravenous fresh frozen plasma or factor VIII concentrates such as cryoprecipitate for acute bleeding episodes, as well as prophylactic management of bleeding associated with anticipated trauma or surgery. Many haemophiliacs self treat in this way.

Pain management is a major problem. Analgesics are the cornerstone, but aspirin and NSAIDs are generally avoided because of their inhibitory effects on platelet function. Opioids may be required but should not be given intramuscularly because of the risk of producing a haematoma. Joint aspiration can be considered after factor VIII replacement and arthroscopy is being used for this purpose. Physical therapies such as cold packs may also have a role. Prolonged rest should be avoided as patients with haemophilia are at risk of chronic pain due to haemophilic arthropathy. Steroids may help acute synovitis pain associated with acute haemophilic arthropathy.

Acute pain in HIV and AIDS

Common pain syndromes in patients with HIV/AIDS include abdominal pain, peripheral neuropathy, throat pain, HIV-related headaches, HIV-unrelated headaches, AZT-induced headache, arthralgia, herpes zoster infection and back pain.

Acute pain episodes in patients with HIV/AIDS are often more readily treatable than those in cancer patients. Certain patients may experience a heightened sensitivity to drug side effects, chemical dependence, psychiatric comorbidity and polypharmacy.

Headache should alert the possibility of conditions such as HIV encephalitis and toxoplasmosis in patients with significant immunocompromise (T4 count < 200). AZT therapy is a relatively common cause of headache.

Arthropathies are seen in HIV/AIDS patients including Reiter's syndrome (often associated with diarrhoea), septic arthritis, vasculitis and polymyositis.

Neuropathic pain is common in HIV and AIDS and relates, in a large number of cases, to the development of peripheral neuropathy or myelopathy.

Acute abdominal pain in a patient with HIV/AIDS suggests a number of conditions not routinely considered in patients of the ages that tend to be afflicted with this illness. Malignancies and lymphoma can present as a bowel obstruction or perforation. Unusual infections may also cause abdominal pain. Hepatic and pancreatic disease due to cytotoxic drug effects is also possible.

AZT and paracetamol have the potential for interaction and this combination should be employed cautiously. The integration of opioids and other adjuvants is important in treating conditions such as neuropathic pain where antidepressant and anticonvulsant agents have an important role to play. Preventing or promptly treating opioid side effects (eg with anti-emetics and laxative agents) improves the patient's tolerance of stronger opioids when they do become necessary, but polypharmacy is a problem.

Key points

- Acute pain in HIV/AIDS patients often has more than one cause and location and tends to increase in severity with disease progression. Intervention requires a multidisciplinary approach.

Acute dental and orofacial pain

Orofacial pain of predominantly physical origin is generally acute and usually caused by dental and periodontal disease. Simple physical and pharmacological therapies after dental work generally control these acute pain episodes well.

Common orofacial pain syndromes include:

- jaw pain associated with an apical tooth abscess, which is a common presentation in general practice, often presenting out of hours and requiring immediate antibiotic treatment;
- neuropathic pain (trigeminal and glossopharyngeal neuralgia, post-herpetic neuralgia, deafferentation pain);
- temporomandibular disorders (including pain from soft tissues and anatomical disorders of the temporomandibular joint);
- vascular type pain (cluster headache, migraine, carotidynia); and
- oral dysaesthesia and atypical facial pain which includes the burning mouth syndrome, atypical odontalgia, phantom pain.

Recurrent acute and persisting acute/chronic dental and orofacial pain syndromes require a different therapeutic approach. Analgesic interventions used in routine acute pain management are destined to fail and may result in mutilation, drug toxicity and neuropathic pain syndromes that are difficult to treat.

Atypical odontalgia

Atypical odontalgia and atypical facial pain may present as a variety of pain patterns over time. There may also be a number of associated reports of swelling, ulceration and discharge which are often unsubstantiated. The term 'atypical facial pain' is poorly defined and may include atypical odontalgia, glossodynia and burning mouth syndrome. Patients given this label are commonly middle-aged women with a history of longstanding orofacial pain, pain elsewhere and psychiatric disorders.

Surgical interventions such as extraction of teeth, removal of bone or sectioning of nerves are unnecessary in this setting and may produce severe, intractable neuropathic pain syndromes that are difficult and costly to treat.

4 Other areas of pain management

GPs are also likely to have a role in the management of obstetric patients, paediatric patients and patients suffering from burns or trauma, and the continuing management of postoperative patients.

Obstetric analgesia

Non-pharmacological treatment

Non-drug options available to women in labour, include prepared childbirth training, TENS therapy and physical therapy. Women should be given a realistic assessment of the severity of labour pain and the relative efficacy of non-pharmacological methods; for example, prepared childbirth training reduces labour pain by only about 10 per cent.

Pharmacological treatment

Pain in childbirth is frequently severe, being rated by many women as the most painful experience of their lives. Options for effective analgesia should be made available to all women in labour. Most women request pharmacological analgesia and there is a variety of agents and methods of administration. These include:

- *Inhalation of nitrous oxide and oxygen.* The analgesic effect is limited, but can be helpful. Nitrous oxide combined with oxygen alone has no effects on neonatal neuro-adaptive capacity or Apgar scores. A combination of opioids such as pethidine and nitrous oxide combined with oxygen can produce maternal (and thereby foetal) hypoxaemia. Such episodes appear to be of doubtful clinical importance as they are transient and are followed immediately by periods of hyperoxaemia.
- *Pethidine and other opioids administered by injection.* Fentanyl, morphine and pethidine are suitable, with fentanyl producing less nausea and sedation and a faster effect. Pethidine (and other opioids) administered via the intramuscular route are very commonly used but their analgesic effect varies widely among patients.
- *Epidural administration of opioid and local anaesthetic.* Epidural analgesia is a highly effective method of relieving labour pain, allowing titration and individualisation of dose to pain intensity and usually avoiding motor block. Most epidural techniques today use a combination of low doses of opioid and local anaesthetic (eg lignocaine with or without adrenaline as a test dose followed by bupivacaine or ropivacaine). The dose may be increased to allow instrumental vaginal delivery and other procedures to be carried out. Intravenous fluids should be given as required during epidural analgesia, after routine 'pre-loading'.

Women should be informed of the potential adverse effects of analgesia.

Adverse effects of epidural analgesia include:

- motor blockade leading to diminished mobility and ability to push during the second stage;
- bladder distension;
- diminished awareness of uterine contractions;
- postural hypotension;
- side effects related to epidural opioids (eg respiratory depression, pruritus, nausea);
- 'dural tap' and subsequent postpartum headache; and
- superficial infections at the site of epidural placement.

Many of the unwanted side effects associated with traditional lumbar epidural analgesia are dose related and can be overcome by using low-dose local anaesthetic/opioid combinations.

Statements of evidence

- Lumbar epidural analgesia is the most effective form of pain relief during childbirth. Using low-dose local anaesthetic/opioid mixtures can significantly reduce the severity of side effects.
- Recent studies appear to indicate that there is no increase in caesarean delivery rate associated with epidural analgesia.

Key points

- All options for pain relief, and their efficacy, should be discussed with the woman so that she can make an informed decision. Pain relief planned during the antenatal period and implemented during labour should be monitored and appropriately modified during the course of the labour. The wishes of the woman and the well-being of the baby are paramount.
- Pain in childbirth is frequently severe, being rated by many women as the most painful experience of their lives. For many women the best possible birth experience will not necessarily be pain free.
- Maternal-foetal factors and obstetric management, not epidural analgesia, are the main determinants of caesarean section rates.

Pain in children

The expression and assessment of pain in children is a complex issue that is dependent on individual factors for each child. These include age, developmental level, previous pain experiences, medical, social and racial factors. Treatment should consider these factors and include combined pharmacological and non-pharmacological approaches. The following myths about children and pain should also be taken into account:

- children experience less pain than adults;
- pain is character building for children;
- respiratory depression occurs frequently in children after opioid administration (this may lead to inadequate doses and dosage intervals);
- neonates don't experience or remember pain;
- children cannot localise or describe their pain;
- opioids are addictive or otherwise too dangerous to use in children; and
- there is little variation in pain intensity following the same procedure in different children or even in the same child on different occasions.

Pain relief in children poses particular challenges because:

- children's pain can be masked and they often do not report pain;
- there are difficulties in assessing pain character and intensity in infants and very young children;
- there are complicating additional factors eg developmental delay;
- children prefer continuing pain to having an intramuscular injection; and
- the pharmacokinetics of local anaesthetics and opioids are altered in neonates.

Assessment of pain in children

Assessment of pain in children should always involve a careful history and examination. Self reporting of pain is reliable in children over four years of age. Other useful tools for assessing acute pain in children include:

- observation of non-verbal cues — a quiet, withdrawn child may be in severe pain;
- observation of other behaviour over time which may suggest an increase in pain intensity;
- use of pain rating scales suitable to the age and development of the child by one of the following methods — physiological, behavioural/observational and self reporting;

- physiological signs, such as tachycardia, need to be interpreted in the clinical context;
- pain ratings provided by parents or regular carers can be accurate; and
- the ability to console children may help to distinguish pain from other causes of distress such as parental separation, an unfamiliar environment, and hunger and thirst with fasting.

Key points

- Regular assessment of pain and monitoring of treatment in children present particular challenges to health carers. Close observation of non-verbal cues and behaviour is important. The use of pain rating scales suitable for the age and developmental stage of the child is essential for the accurate treatment of pain. The child should be respected as an authority on their own pain.

Procedures and pain

General principles for the management of procedural pain and distress can be applied to all painful procedures.

- Most hospitalised children undergo minor invasive procedures, and careful consideration should be given to either spreading procedures over time, or alternatively, deliberately clustering them and covering with an appropriate general anaesthetic.
- Painful routes of administration should be avoided where possible.
- During any procedure, parents and care givers (other than the person undertaking the procedure) have a vital role in comforting the child.

Non-pharmacological treatment

Non-pharmacological strategies can be effective for pain and anxiety associated with minor procedures, especially if repeated on a regular basis. They are less useful in the acute situation. Non-pharmacological interventions include psychological, cognitive-behavioural and complementary techniques such as relaxation, guided imagery, visualisation, and massage.

Pharmacological strategies for procedural pain in children

Treatment of anxiety complements analgesia and decreases overall distress but can blunt the child's behavioural responses and thereby mask pain.

Agents that can be given to children over six months of age include the following.

- Simple analgesics such as paracetamol (dose 20 mg/kg orally or 30 mg/kg rectally).
- Local anaesthetics whether administered by local infiltration or topically (EMLA or equivalents).
- Intravenous opioids, given in increments (eg morphine at 0.03–0.05 mg/kg every five minutes) and titrated to analgesic effect. Oral opioids can be used when close and rapid titration to effect is not required.
- Benzodiazepines, which provide sedation and amnesia, not analgesia, given either orally (midazolam 0.5 mg/kg), intranasally (midazolam 0.3 mg/kg) or intravenously (midazolam 0.1 mg/kg). Like opioids, intravenous benzodiazepines are given in increments and titrated to sedative effect. Unlike diazepam, midazolam does not cause pain and local sclerosis when given intravenously and titrated to sedative effect and anxiolysis. If the *combination* of an opioid plus a benzodiazepine is used, the risk of respiratory depression is increased. Pulse oximetry monitoring is essential in this situation.
- Nitrous oxide is a potent gaseous analgesic with very rapid onset and offset of action, making it very useful for procedural pain in children. It is used in varying concentrations of 30 to 70 per cent with oxygen by trained personnel. It can also provide significant anxiolysis for procedures and, when given at 50 per cent concentration without adjuvant agents, has minimal effect on protective laryngeal reflexes.
- Ketamine should only be given by trained personnel as it is a general anaesthetic and its use requires close monitoring in areas with appropriate resuscitation equipment.
- Supplementation with opioids is helpful in some cases, especially when there may be difficulty in performing the procedure.

Children over five years of age who can effectively use cognitive and behavioural coping skills may prefer not to use sedatives or opioids.

Pain relief for burn dressing changes

Changing burn dressings in children may require both drug and non-drug strategies. Unrelieved pain can escalate anxiety and therefore optimal pain control is necessary. Oral sustained release morphine preparations may provide basal analgesia. An opioid may be administered alone or combined

with a benzodiazepine, although nitrous oxide given by trained personnel has been extensively used for this purpose with good effect, depending on the child and the level of anxiety. Tolerance to opioids and benzodiazepines can develop, necessitating higher doses with repeated dressing changes. Extensive debridement procedures may require general anaesthesia. Children as young as 18 months deal better with burn dressing changes if their participation and control are maximised. Helpful information can be obtained by contacting the burns unit of major children's hospitals.

Key point

- Procedural pain in children should be managed systematically, using a combination of analgesia and non-drug strategies and avoiding painful routes of administration where possible. General anaesthesia may be required, especially for frequent painful interventions where other strategies have failed.

Burns and trauma pain

Pain secondary to either burns or trauma presents in three distinct phases:

- *Emergency phase* — systemic pharmacological techniques are the mainstay of therapy during the emergency phase. Intravenous titration of small doses of opioid allows adjustment for individual variation. Intramuscular or subcutaneous injection of opioids will generally not be as effective, and absorption will be delayed and inadequate in the presence of hypovolaemia. Long-acting opioids such as MS Contin and Kapanol usually have no place in this phase.
- *Healing phase* — as background analgesic requirements become more stable and the patient is tolerating oral fluids and diet, orally administered longer acting opioids may be useful. Regular paracetamol (orally or rectally) can be used in conjunction with opioids or alone to control less severe background pain. NSAIDs may be relatively contraindicated in the early phases due to the risk of gastro-intestinal complications and increased bleeding during extensive debridement; but can be used in appropriate doses as supplemental analgesics in the recovery phase.
- *Rehabilitation phase* — pain management is best accomplished with NSAIDs, paracetamol, or if necessary an opioid. Pain associated with procedures during this phase can be treated as it would be during the healing phase.

Temporal characteristics of the pain need to be considered in each phase, and treatment directed at both background pain which is present at rest or during normal activities, and procedure-associated or 'incident' pain. Pain may be poorly localised, as it is when there are extensive burns or trauma to multiple organ systems in many anatomical locations, or it may be regionalised in one extremity, body cavity or system. A combination of nociceptive and neuropathic pain is common and psychological/ environmental factors play an important role.

Multiple pain generating mechanisms may be involved:

- Direct, massive and prolonged nociceptive stimulation which originates in damaged tissue.
- Inflammatory response contributes to the development of primary hyperalgesia, and ongoing primary afferent input results in secondary hyperalgesia.
- Trauma to some part of the nervous system may also result in neuropathic pain. Occasionally it presents immediately after injury but often develops days or weeks later, and may persist as a chronic pain state. It must be distinguished from nociceptive pain and treated differently.
- Beliefs that third degree burns are not painful are inaccurate, as damaged nerve endings may result in neuropathic pain. Inadequate pain management may lead to detrimental effects due to further exacerbation of the hypermetabolic state, and may increase the likelihood of psychological disturbances (depression and post-traumatic stress disorder) in the recovery phase.
- Establishment of treatment protocols for both background and incident pain are required, with continuing assessment of pain severity and response to analgesic treatment.

Pharmacological treatment of burns and trauma pain includes systemic opioids, paracetamol, NSAIDs (aspirin may be used alone or in conjunction with opioids), ketamine, nitrous oxide, general anaesthesia (for extensive procedures), regional anaesthesia (peripheral nerve block or epidural analgesia in selected patients) and anxiolytics. Non-pharmacological treatment could include distraction or guided imagery, hypnosis, relaxation or TENS.

Key points

- Patients with burn or trauma pain need a range of strategies which may differ during the emergency, healing and rehabilitation phases.
- A combination of nociceptive and neuropathic pain is common and psychological/environmental factors play an important role (eg anxiety, fear of permanent disability or death).
- Severe pain may persist in the healing and rehabilitation phases — pain treatment is an essential ingredient of an active rehabilitation plan.
- The use of long-acting oral opioids is appropriate while there is obvious evidence of trauma-associated persisting nociception.
- Treatment of neuropathy may need to continue well after the healing phase.
- Unexpectedly prolonged requirement for opioids should prompt referral for multidisciplinary pain unit assessment.

Appendix A: Levels of clinical evidence

This guide has been written in a way that enables readers to judge the strength of the evidence on which statements of evidence are based. In relation to issues of effectiveness of health care, the report uses the four-point rating system given below to identify the evidence base for key decision points. The rating system has been adapted from the system developed by the United States Preventive Services Task Force and is recommended by the NHMRC.

Levels of evidence ratings

Level I	Evidence obtained from systematic review of relevant randomised controlled trials (with meta-analysis where possible).
Level II	Evidence obtained from one or more well-designed randomised controlled trials.
Level III	Evidence obtained from well-designed non-randomised controlled trials; OR from well-designed cohort or case-control analytical studies, preferably multicentre or conducted at different times.
Level IV	The opinions of respected authorities based on clinical experience, descriptive studies or reports of expert committees.

While level I evidence represents the desired standard on which to base clinical decision making, treatment based on other levels of evidence can be used in appropriate circumstances.

Appendix B: Summary of pharmacological interventions

Intervention (level of evidence ¹)	Comments
NSAIDs	
Oral (alone) (I)	Effective for mild to moderate pain. Relatively contraindicated in patients with renal disease and risk of or actual coagulopathy. Risk of coagulopathy, gastro-intestinal bleeding and other risk factors should be carefully sought.
Oral (adjunct to opioid) (I)	Potentiating effect resulting in opioid sparing. Cautions as above.
Parenteral (ketorolac) (I)	Effective for moderate to severe pain. Useful where opioids are contraindicated or to produce 'opioid sparing', and to minimise respiratory depression, sedation and gastro-intestinal stasis associated with opioid administration. Best used as part of a multi-modal analgesia regimen.
Rectal (IV)	Similar efficacy to oral preparations.
Paracetamol	
Oral (II) Rectal (IV)	Effective for mild to moderate pain, and as an adjunct to opioids in more severe pain.
Opioids	
Oral (IV)	As effective as parenteral in appropriate doses. Use as soon as oral medication tolerated. Route of choice.*
Intramuscular (I)	Has been the standard parenteral route, but injections painful and absorption unreliable. Hence, avoid this route when possible.*
Subcutaneous (I)	(Via indwelling subcutaneous needle/cannula.) Preferable to intramuscular because of patient comfort and a reduced risk of needlestick injury.*
Intravenous (I)	Parenteral route of choice after major surgery. Suitable for titrated bolus or continuous administration. Significant risk of respiratory depression with inappropriate dosing.*
PCA (systemic) (I)	Intravenous or subcutaneous routes recommended. Good steady level of analgesia. Popular with patients but requires special infusion pumps and staff education. See cautions about opioids above.*
Epidural & intrathecal (I)	When suitable, provides good analgesia. Risk of respiratory depression (as with opioids by other routes), but sometimes delayed in onset. Requires careful monitoring. Use of infusion pumps requires additional equipment and staff education. Expensive if infusion pumps are employed.*
Sublingual (IV)	Effective for mild to moderate pain.
Local anaesthetics	
Epidural & intrathecal (I)	Indications in particular settings. Effective regional analgesia. May blunt 'stress response' and aid recovery. Opioid sparing. Addition of opioid to local anaesthetic may improve analgesia. Risks of hypotension, weakness, numbness. Requires careful monitoring. Use of infusion pump requires additional equipment and staff education.
Peripheral nerve block (I)	Plexus block, peripheral nerve block and infiltration. Effective regional analgesia. Opioid sparing.

¹ See levels of evidence key in Appendix A.

*The administration of opioids by any route requires monitoring.

Appendix C: Table of adjuvant agents

Drug class	Examples	Level of evidence
Tricyclic antidepressants	Amitriptyline, doxepin, nortriptyline, dothiepin	I
Anticonvulsants	Carbamazepine, sodium valproate, phenytoin	I
New anticonvulsants	Gabapentin, lamotrigine, vigabatrin	III/IV
'Membrane stabilisers'	Lignocaine, mexilitine, flecainide	II
Corticosteroids	Dexamethasone (for spinal cord decompression or raised intracranial pressure)	II
CNS stimulants	Dexamphetamine (one study shows analgesic efficacy), cocaine	II
Anxiolytics	Hydroxyzine (analgesic/anxiolytic) Propofol (? for neuropathic pain), midazolam (GABA-ergic ? analgesic); diazepam (relief of muscle spasm and 'secondary' effects of pain)	II III
Alpha ₂ agonists	Clonidine (analgesic, also modifies opioid withdrawal)	II
NMDA blockers	Ketamine, dextromethorphan (both also modify opioid withdrawal)	II

CNS = central nervous system; GABA = gamma-aminobutyric acid;
NMDA = N-methyl-D-aspartate.

Appendix D: Summary of scientific evidence and key management points

General Practitioners are advised to consult the main document, *Acute Pain Management: Scientific Evidence*, for details on any section in this summary.

Statements of evidence (for which there is level I, II or III evidence as defined in Appendix A) are presented in each section of the full report. The key points are observations about management which are rated level IV (opinions based on clinical experience, descriptive studies or reports of expert committees).

Acute pain services

Key points

- A multidisciplinary approach to the management of acute pain, particularly in a formal acute pain service, leads to improved pain relief and better patient outcomes.
- Effective pain management is fundamental to the quality of care. The key to successful pain management is education and training of all staff.

Assessment of pain

Key points

- Careful assessment of pain should occur initially and then regularly throughout treatment, using self-reporting techniques. As pain varies so markedly between individuals, patient involvement in the initial and continuing assessment of their pain is essential.
- Pain should be assessed both at rest and during activity and pain relief assessed as to its adequacy to allow appropriate function.
- Unexpected levels of pain or pain that suddenly increases, especially when associated with changes in other vital signs, may signal the development of a new surgical or medical diagnosis (eg postoperative complication, neuropathic pain).
- Although not specific, an important indicator of neuropathic pain is the inability to relieve pain with opioids, or no apparent relief of pain with a rapidly increasing opioid dose.

Acute postoperative pain management in adults

General

Statements of evidence

- As significant background and/or intermittent hypoxaemia may occur for a number of days postoperatively, supplemental oxygen is recommended for at least the first 48 to 72 hours following major surgery and in elderly or high-risk patients, regardless of the analgesic method used. (Level of evidence III.)
- Multimodal analgesia (ie the combined use of different classes of analgesics) improves the effectiveness of pain relief after surgery. There may also be an associated reduction of the dose of each analgesic drug and the intensity of any side effects. (Level of evidence II.)
- Studies to date suggest that more aggressive, and possibly pre-emptive, approaches to the management of early postoperative pain may reduce the transition to chronic postoperative pain. (Level of evidence II.)

Opioid analgesia

Statements of evidence

- Patient-controlled analgesia (PCA) managed by an acute pain service (APS) or by 'non-pain specialist' health professionals is associated with similar pain scores; however the incidence of side effects is lower in patients whose PCA is managed by an APS. Further well designed studies are needed to evaluate how supervision of PCA by an APS affects cost, quality of care and patient satisfaction. (Level of evidence III.)
- PCA has been shown to provide greater patient satisfaction and improved ventilation compared to conventional routes of administration. (Level of evidence II.)

Key points

- Respiratory depression and hypoxia are often feared consequences of opioid administration but can generally be avoided with careful titration and individualisation of dose.
- A decrease in respiratory rate has been found to be a late and unreliable clinical indicator of respiratory depression. Sedation is a better indicator and all patients on opioids should be monitored using a sedation score.
- To attain therapeutic effects with minimal adverse effects, it is necessary to individualise and titrate doses of opioids. This relies on using age as the initial guide for dosage range (in adults), and the use of dose intervals appropriate to the route of administration, monitoring of pain and sedation scores, respiratory rate and other side effects.

Key points (continued)

- The aim of analgesia should be patient comfort with minimal sedation and impairment of respiratory function (eg sedation score of less than 2 and respiratory rate greater than 8/minute).
- A true allergy to opioids is very uncommon. As with any drug, the term 'allergy' is often mistakenly applied to an intolerance to the drug, a common side effect, or a dose-related effect.
- There is no evidence that the use of opioids for treatment of severe pain leads to opioid dependence or addiction.
- Traditional methods of opioid administration include oral, intramuscular, subcutaneous, intravenous and continuous intravenous routes. These methods each have advantages and disadvantages in different groups of patients, but are more likely to be effective when the dosage regimen is tailored to the individual. The patient's need for pain relief should be seen as more important than strict adherence to a dose interval.
- Patient-controlled analgesia (PCA) allows patients to adjust the degree of pain relief to their own desired level of comfort and tolerance of side effects.
- Adequate knowledge of patient-controlled analgesia (PCA) is essential to avoid documented serious outcomes.

Regional techniques

Key points

- Regional methods of pain relief using local anaesthetic, either alone or in combination with systemic analgesia, can be effective after a number of localised procedures.

Epidural analgesia

Statements of evidence

- Postoperative epidural analgesia can significantly reduce the incidence of pulmonary morbidity. (Level of evidence I.)
- Large audits of closely supervised epidural analgesia show the safety of the technique to be equivalent to that of traditional analgesic methods when coordinated by an acute pain service with appropriate patient observations and monitoring. (Level of evidence III.)
- Epidural opioids are more effective when used in combination with local anaesthetic to produce a synergistic analgesic action and reduce the required dose and side effects associated with either the local anaesthetic or opioid alone. (Level of evidence I.)

Non steroidal anti-inflammatory drugs (NSAIDs)

Statements of evidence

- While the currently available NSAIDs do not relieve severe pain when used alone, their efficacy as components of multimodal analgesia has been confirmed by clinical trials. (Levels of evidence I and II.)
- The adverse effects of NSAIDs are potentially serious and it is imperative that contraindications are respected. (Levels of evidence II and III.)

Non pharmacological methods

Statements of evidence

- In 15 of 17 randomised controlled trials of transcutaneous electrical nerve stimulation (TENS) in postoperative pain, there was no benefit compared with placebo. In excluded non-randomised studies there was an over-estimation of treatment effects of TENS. (Level of evidence I.)

Key point

- Although evidence for the efficacy of non-pharmacological modalities such as physical therapeutic agents and modalities such as spinal manual therapy, mobilisation, application of superficial heat or cold, massage, exercise, transcutaneous electrical nerve stimulation therapy and acupuncture in acute pain management is largely at the expert opinion level, certain patients derive benefit from these techniques.

Special postoperative patients

Day surgical patients

Statements of evidence

- A recent meta-analysis confirmed that paracetamol is an effective postoperative analgesic, and that codeine 60 mg added to paracetamol produces worthwhile additional pain relief even in single oral doses. (Level of evidence I.)
- Pain following discharge from day surgery influences the time taken to return to normal activity and may lead to further, unplanned hospitalisation. It is recommended that adequate plans are made for post-discharge analgesia. (Level of evidence III.)

Key points

- The ability to perform increasingly complex surgery on a day-case basis highlights the need for appropriate screening, selection, pre-operative preparation, treatment and discharge planning for these patients.
- Pharmacological options for day-case postoperative analgesia include oral opioids, non-steroidal anti-inflammatory drugs (NSAIDs) and local anaesthetics, or combinations of these treatments. Simple oral analgesics such as aspirin and paracetamol are more effective than placebo and should not be overlooked, particularly in cases of mild to moderate pain.

Neurosurgical patients

Key point

- Pain management in neurosurgical patients employs conventional analgesic agents plus adjuvant agents where appropriate. Extremely careful monitoring is required, including assessment for abnormal neurological signs and symptoms during the postoperative period. Pain and sedation scoring systems should be an integral part of this monitoring.

Obstetric analgesia

Statements of evidence

- Lumbar epidural analgesia is the most effective form of pain relief during childbirth. Using low-dose local anaesthetic/opioid mixtures can significantly reduce the severity of side effects. (Level of evidence I.)
- Recent studies appear to indicate that there is no increase in caesarean delivery rate associated with epidural analgesia. (Level of evidence II.)

Key points

- All options for pain relief, and their efficacy, should be discussed with the parturient so that she can make an informed decision. Pain relief planned during the antenatal period and implemented during labour should be monitored and appropriately modified during the course of the labour. The wishes of the woman and the well-being of the baby are paramount.
- Maternal-foetal factors and obstetric management, not epidural analgesia, are the main determinants of caesarean section rates.

Pain in children

Key points

- Regular assessment of pain and monitoring of treatment in children present particular challenges to health carers. Close observation of non-verbal cues and behaviour is important. The use of pain rating scales suitable for the age and developmental stage of the child is essential for the accurate treatment of pain. The child should be respected as an authority on their own pain.
- Procedural pain in children should be managed systematically, using a combination of analgesia and non-drug strategies and avoiding painful routes of administration where possible. General anaesthesia may be required, especially for frequent painful interventions where other strategies have failed.
- Drug therapy is the mainstay of postoperative analgesia in children, but non-drug modalities may also be useful.
- Analgesia should be given by the least painful route where possible.
- Regular re-evaluation of analgesic efficacy is required.
- There is no evidence that the use of opioids for treatment of severe pain in children leads to opioid dependence or addiction.
- PCA provides safe and effective analgesia in children as young as five to six years and offers superior analgesia to intermittent intramuscular injections in children.
- Regular assessment of vital signs and level of consciousness is necessary when parenteral opioids are used for managing postoperative pain.
- Regional techniques are almost always employed as an adjunct to general anaesthesia in children, while in adults they are frequently used as a primary technique.

Burns and trauma pain

Key points

- Patients with burn or trauma pain need a range of strategies which may differ during the emergency, healing and rehabilitation phases.
- A combination of nociceptive and neuropathic pain is common and psychological/ environmental factors usually play an important role (eg anxiety, fear of permanent disability or death).
- Severe pain may persist in the healing and rehabilitation phases; pain treatment is an essential ingredient of an active rehabilitation plan.
- The use of long-acting oral opioids is appropriate while there is obvious evidence of trauma-associated persisting nociception.
- Treatment of neuropathy may need to continue well after the healing phase.
- Unexpectedly prolonged requirement for opioids should prompt referral for multidisciplinary pain unit assessment.

Acute herpes zoster infection

Statements of evidence

- Antiviral agents used early for the treatment of acute herpes zoster infection have been shown to accelerate lesion healing and result in faster resolution of pain. (Level of evidence I.)
- Antidepressants and anticonvulsants are effective in the treatment of neuropathic pain such as post-herpetic neuralgia. (Level of evidence I.)

Acute headache

Statements of evidence

- A stepwise approach to the use of pharmacological agents in the treatment of migraine is effective. Moderate to severe migraine may require the use of specific antimigraine medications such as ergotamine or sumatriptan, unless contraindicated. (Level of evidence III.)
- The combination of aspirin (1000 mg) and metaclopramide is as effective as sumatriptan in the treatment of migraine, is better tolerated and is also considerably cheaper. (Level of evidence II.)
- Pethidine has been found to be no more effective than dihydroergotamine, chlorpromazine or NSAIDs in the treatment of migraine. (Level of evidence II.)

Key point

- There are very few situations in which pethidine is useful in acute migraine, although it may be considered during pregnancy when the use of ergotamine preparations, triptans and dihydroergotamine is contraindicated.

Acute musculoskeletal pain

Statements of evidence

- Treatment for acute lower back pain based on bed rest and immobilisation is ineffective. (Level of evidence I.)
- A return to a normal range of activities as soon as possible leads to more rapid recovery from acute lower back pain than do either bed rest or back-mobilising exercises. (Level of evidence II.)
- Spinal manual therapy is used for the treatment of acute lower back pain in the first six weeks following onset of pain. The scientific evidence for its efficacy has yet to be established. (Level of evidence I.)
- The little evidence available about the use of spinal manual therapy for acute neck pain suggests some benefit in mechanical neck pain, although subgroups of patients need to be better identified. (Level of evidence I.)
- Although rare, serious complications have been associated with neck manipulation and such procedures should therefore be performed only by appropriately trained personnel. (Level of evidence III.)
- Corticosteroids are effective anti-inflammatory agents, but are not suitable treatment for acute sporting injuries for up to six weeks after the incident. Experimental studies have shown that corticosteroids may adversely affect normal tissue healing and repair. (Level of evidence III.)

Key points

- The key to managing acute lower back pain is to clearly distinguish serious pathology from benign musculoskeletal causes.
- The treatment of serious spinal pathology requires urgent referral to specialist services.
- Non-specific backache is best managed using a simple multimodal approach aimed at pain relief, active rehabilitation and return to normal activity.
- While they do have a role in the treatment of myositis ossificans following intramuscular haematoma, and in the management of chronic sporting injuries, non-steroidal anti-inflammatory drugs (NSAIDs) have not been shown to be effective in the treatment of ligament sprains.

Acute pain in patients with cancer

Statements of evidence

- Oral analgesics are the mainstay of pain relief in patients with cancer. Strong opioids are safe and effective for moderate to severe pain. (Level of evidence I.)
- Radiotherapy plays a major role in the management of acute pain due to cancer. (Level of evidence I.)
- Bisphosphonates have a general role in the treatment of bone pain related to breast cancer and myeloma (and possibly prostate cancer). (Levels of evidence II and III.)
- Epidural, intrathecal and intracerebroventricular opioids are often effective in treating acute pain in patients with cancer that is not controlled with conventional treatment. (Level of evidence I.)

Key points

- Not all acute pain in patients with cancer is due to the cancer progressing.
- Optimal communication between oncological, surgical, anaesthetic, and palliative care teams is essential.
- Even when the cancer is progressing, it is important to consider the anatomic aetiology, as this may be amenable to disease-specific therapy (radiotherapy, chemotherapy, surgery etc).
- While waiting for specific anti-cancer therapy to work, adequate analgesia must be provided. Invasive procedures (spinal opioids, nerve blocks etc) are occasionally required.
- Acute pain in cancer patients often takes place against a background of chronic pain and therefore existing analgesic use. An integral part of management is the recognition and treatment of 'procedural pain' and 'breakthrough pain'.
- The barriers to management of pain in cancer patients must be recognised and overcome if possible.

Acute pain in patients with HIV/AIDS

Key points

- Acute pain in HIV/AIDS patients often has more than one cause and location and tends to increase in severity with disease progression. Intervention requires a multidisciplinary approach.
- A careful history and physical examination commonly identifies treatable pain syndromes seen in HIV/AIDS. Determination of the level of immunosuppression in patients presenting with pain is a critical diagnostic manoeuvre, as immunocompetent patients are more likely to have benign conditions than infections or malignancies.

Adjuvant agents and the treatment of neuropathic pain

Statement of evidence

- Anticonvulsants and antidepressants have been shown by meta-analysis to be effective in the treatment of neuropathic pain. (Level of evidence I.)

Key point

- The effectiveness of anticonvulsants and antidepressants in the treatment of pain needs to be balanced against their potential adverse effects.

Pain in the elderly

Statement of evidence

- Non-steroidal anti-inflammatory drugs (NSAIDs) should only be used with extreme caution in elderly people. For non-inflammatory complaints, paracetamol and/or low-dose opioids are recommended. Low-dose corticosteroids may be appropriate in inflammatory conditions. (Level of evidence III.)

Key point

- Effective pain management in elderly people needs to consider a number of factors which may complicate management, including co-existent pathologies, multiple medications, altered pain response and cognitive impairment.

Emergency department and critical care

Statements of evidence

- Early administration of opioids in patients with an 'acute abdomen' does not reduce the detection rate of serious pathology, but may actually facilitate it. (Level of evidence II.)
- Non-steroidals have been shown to be more effective than opioids in relieving the pain of renal colic. A comparative study of an intramuscular NSAID and intramuscular opioid has verified the efficacy of NSAIDs in this indication. Comparison of two NSAIDs, diclofenac and ketoprofen, in another study found them to be equally effective in relieving the pain of acute ureteral colic. (Level of evidence II.)

Key points

- In most acute care situations in the emergency department, the intravenous route of opioid delivery is by far the most efficacious and is therefore preferable.
- All of the techniques and drugs used to treat acute postoperative pain, including non-drug techniques, are potentially applicable in intensive care units.

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