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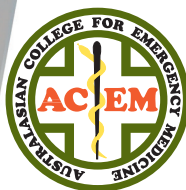
N H M R C

Emergency Care Acute Pain Management Manual

NATIONAL EMERGENCY CARE

PAIN MANAGEMENT INITIATIVE

NATIONAL INSTITUTE OF CLINICAL STUDIES



Printed document

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The following Emergency Departments were involved in the piloting of this resource:

- Redland Hospital Emergency Department, Southside Health Service District, Queensland
- Werribee Mercy Hospital Emergency Department, Victoria
- Coffs Harbour Base Hospital Emergency Department, New South Wales

Endorsement

This resource has been endorsed by the following agencies:

- Australasian College for Emergency Medicine (ACEM)
- Australian College of Emergency Nursing (ACEN)
- College of Emergency Nursing Australasia (CENA)

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■ From the NHMRC CEO

The National Health and Medical Research Council is committed to bring the benefits of research to improve patient care. The Acute Pain Manual shows the value of research findings being translated to provide practical evidence-based health advice.

The National Health and Medical Research Council is pleased to have worked with the Australasian College for Emergency Medicine, the Australian College of Emergency Nursing and the College of Emergency Nurses Australasia to develop and gain endorsement of this implementation resource.

This manual will be a useful resource to support consistent evidence-based approaches to the management of pain in emergency departments.

A handwritten signature in black ink, consisting of two distinct, fluid strokes. The first stroke starts with a large loop and ends with a horizontal line. The second stroke starts with a vertical line and ends with a long, sweeping curve.

Professor Warwick Anderson AM
CEO NHMRC

■ Preface

Using evidence in our daily clinical practice is a relatively simple concept. The evidence exists and our intention is to do our best for patients. Despite this, we know that best available care is not always provided and evidence-based recommendations are not always followed.

There are a myriad of reasons why best available evidence is not always used. The level and quality of evidence may not be persuasive enough to change practice, there may be barriers to applying the evidence in a complex setting such as an emergency department, the evidence may not be known or the evidence may not be readily available when needed at the bedside.

There is abundant evidence surrounding the management of acute pain and numerous excellent clinical guidelines exist. However guidelines do not implement themselves and in many cases are too comprehensive for bedside use.

The NHMRC Pain Management Initiative is seeking to implement evidence-based care and optimise pain management in the emergency department. The implementation strategy is multi-faceted, and one aspect of it involves providing a clinical tool to make it easier for clinicians in emergency departments to access and use evidence-based recommendations. The Emergency Care Acute Pain Management manual is that tool.

It is hoped this manual will be readily available on bench spaces and computers in emergency departments to provide rapid and easy access to current recommendations of best practice pain management. The manual is tailored specifically for the emergency department setting and has been reviewed by emergency department clinicians on the NHMRC Emergency Care Pain Management Initiative Advisory Committee, for whom I now offer my grateful thanks.



Associate Professor Steven Doherty
NHMRC Pain Management Initiative Committee Chair

■ Background

There are over 7 million reported emergency presentations to emergency departments across Australia each year.¹ Local and international studies report that for 78%² – 86%³ of patients who present to emergency departments, pain is the main complaint. The literature also indicates that management of patient pain within the emergency department setting is poor.

This resource has been developed as a part of the National Emergency Care Pain Management Initiative.

The initiative aims to:

1. Improve pain management in emergency care based on best available evidence.
2. Formulate recommendations to achieve spread across all Australian EDs.
3. Rigorously evaluate the intervention to inform future emergency care improvement activities.

The *Emergency Care Acute Pain Management Manual* is a resource that outlines evidence-based clinical assessment and management of some of the more common paediatric and adult pain-associated conditions that present to the emergency department. The manual also includes principles of quality pain management, pain assessment methods, and key considerations related to the indications for pharmaceutical analgesia.

The manual is designed to be a clinical reference guide which is brief and to the point. The content assumes that the reader is an experienced clinician who is aware of the drug contraindications, precautions, side-effects, administration methods and monitoring requirements. While a number of key prescribing considerations are discussed, this is not an exhaustive list.

Due to the brief nature of this resource, it was not possible to include the complex pain care associated with severe chronic pain management. It is recommended that care of these patients be carried out in consultation with a pain specialist.

This resource has been written by a team of clinical experts and has been reviewed by senior emergency doctors, nurses, pharmacists, emergency care researchers, and the Australasian College for Emergency Medicine (ACEM) scientific committee. The manual has been piloted in three Australian emergency departments and has been endorsed by ACEM, the College of Emergency Nursing Australasia (CENA), and the Australian College Emergency Nursing (ACEN). A detailed description of the development methodology can be viewed at www.nhmrc.gov.au/NICS.

Glossary

- ‘Red flags’: refers to clinical features that may be associated with serious underlying disease processes that may require urgent evaluation.
- The manual frequently recommends alternative treatments for ‘severe’ and ‘less severe’ pain. While severe pain is frequently rated as 7 or more out of 10 (using a numerical rating score), and ‘less severe’ pain can be considered as pain rated 6 or less out of 10, it is recommended that clinical judgement be the greatest guide as to appropriate pharmacological management.

Pain management for emergency departments

Effective management of acute pain in the ED requires:

1. **Assessment** of the pain. All clinical assessment of pain should be based on the patient's perception of pain and their subjective experience. The use of a validated pain scale is indicated. See section 1.
2. Provision of **appropriate analgesia** in an appropriate time frame via an appropriate route. See section 2.
3. **Reassessment** of pain to determine the effect of treatment and assess for adverse effects. Regularly reassess and document the patient's pain every 5–15 minutes if severe*, or every 30–60 minutes if less severe.

* severe pain is defined as a pain score of 7 or more or significant distress.

It is important to remember non-pharmacological analgesic techniques such as:

1. immobilisation of injured limbs or body parts
2. ice and elevation
3. explanation of the cause of pain and likely outcomes to allay anxiety
4. keeping the patient in as calm an environment as possible
5. psychological techniques such as distraction.

■ Principles of quality analgesia

1. Effective analgesia in the ED requires appropriate assessment and re-assessment, use of the appropriate drug(s) in appropriate doses, via the appropriate route within an acceptable time frame.
2. Pain is subjective and an individual's perception of pain may be influenced by culture, previous painful experiences, beliefs, mood and ability to cope. Clinical assessment of pain should include self-assessment by the patient.⁴

3. Pain management may be improved with regular reassessment of a patient's pain.⁴
4. The use of pain scales is recommended.⁴
5. The use of pethidine should be discouraged in favour of other opioids.⁴
6. For acute, severe pain, titrated doses of IV opioids provides effective analgesia.⁴
7. Paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs) provide effective analgesia for acute pain. If used together, the quality of analgesia improves.⁴
8. For acute pain not requiring IV opioids, the oral route is the preferred route of administration. Parenteral or rectal NSAIDs have no advantage over oral NSAIDs.⁴ Non-oral routes of administration are useful if patients are nauseated, vomiting or the oral route is not available.
9. Side-effects, adverse effects and contraindications of analgesics should always be considered. Dose adjustments may be required in the elderly or for those with diminished drug clearance (e.g. renal or liver dysfunction).
10. Effective pain management should be a key component in managing patients with substance abuse disorders, just as it is for patients without such disorders.
11. Subcutaneous morphine is not appropriate for initial acute pain management; however the subcutaneous route may be an option as a comfort maintenance strategy once IV opioids have controlled the initial intense episode.
12. When IV morphine is administered for acute pain, the overall incidence of nausea and vomiting is low, regardless of whether these patients are given prophylactic metoclopramide or not.⁵
13. If opioids are required for home management of severe pain, patients should preferably be medically reviewed the next business day post discharge from the ED, or as soon as is otherwise possible. The quantity of discharge opioid medication should not exceed this period. Maximum Pharmaceutical Benefit Scheme quantities and pack sizes should not be prescribed if unlikely to be needed.

Practice point...

Fasting patients (nil by mouth) may be administered oral analgesia unless they have (or are suspected of having) one of the following conditions:

- bowel obstruction
- perforated viscus
- compromised swallow e.g. stroke
- compromised airway.

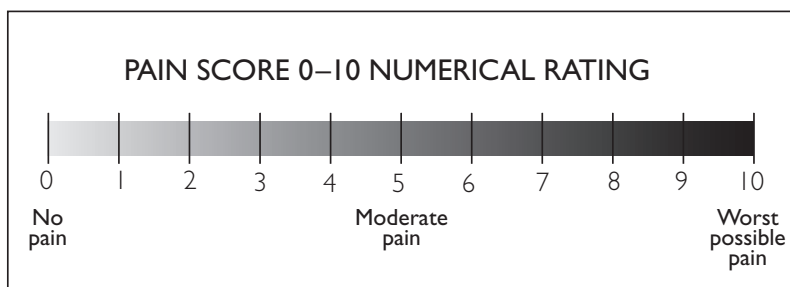
Section 1

Pain Scales

Assessment and reassessment of pain should be made to determine the ongoing effect of analgesia. Frequency of reassessment is determined by the severity of the pain, patient needs and response, and the medication used. Reassessment should also consider the potential adverse effects of analgesia.

Numerical rating score (NRS)

This may be used for adults and for children over the age of 6 to 8 years. Instruct the patient to rate their pain intensity on a scale of 0 ('no pain') to 10 ('the worst pain imaginable'). Some patients may find this difficult with only verbal instructions but may be able to point to the number on the scale that describes the intensity of their pain.



Verbal Descriptor Scale (VDS)

VDS scales have been shown to be sensitive and reliable, and are considered to be the best choice for elderly patients, including those with mild to moderate cognitive impairment.⁴

This type of scale uses descriptor terms such as: 'none', 'mild', 'moderate', 'severe', 'excruciating'.

FLACC behavioural pain assessment scale

The FLACC Scale⁶ is a behavioural scale for scoring pain in children between the ages of two months and seven years or in persons unable to verbally communicate. Each of the five categories (faces, legs, activity, cry, consolability) is scored from 0 to 2 and the scores are added to get a total score from 0 to 10.

Behavioural pain scores need to be used within the context of the child's psychological status, anxiety and other environmental factors.

	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn disinterested	Frequent to constant frown, clenched jaw, quivering chin
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking
Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or "talking to", distractible	Difficult to console or comfort

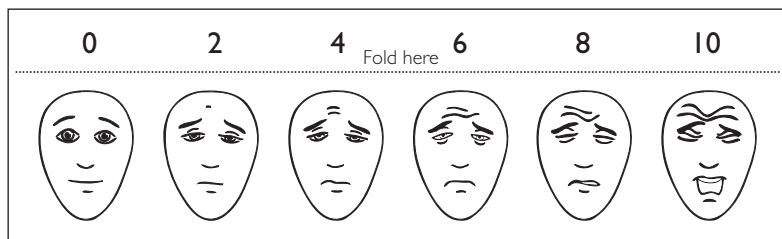
The FLACC behavioural pain assessment scale[®] University of Michigan Health System can be reproduced for clinical or research use.

Faces rating scale (FRS)

These scales can be used with young children (as young as 4 years of age). They also work well for older children and adults, including those who speak a different language.

Ask the patient to choose the face that best describes how they feel. The far left face indicates 'no hurt' and the far right face indicates 'hurts worst'.

The Faces Pain Scale – Revised (FPS-R)⁷ can be downloaded (including instructions in multiple languages) from:
www.usask.ca/childpain/fpsr.



Section 2

Adult Pain Scenarios

Painful presentations:

Abdominal pain	Gout
Back pain (acute)	Herpes zoster
Burns	Migraine/tension headache
Cardiac pain	Renal colic
Dental	Soft tissue injury
Fractures	

■ Abdominal pain

Key message:

1. Analgesia does not hinder the diagnostic process in abdominal pain.⁴

ANALGESIC TECHNIQUES

For severe pain use...

Morphine 2.5 to 5mg IV as an initial dose, then titrated to effect every 5 to 10 minutes with further incremental doses of 2.5 to 5mg IV⁸

In elderly patients or those with cardiorespiratory compromise, an initial morphine dose of less than 2.5mg IV and incremental doses of 0.5 to 1mg should be considered.

Patients should be reassessed to determine if the dose has been effective or if there are any adverse effects (especially sedation).

If morphine is contraindicated, consider fentanyl at 25 to 50 micrograms IV as initial equivalent dose.⁸

For less severe pain use...

Paracetamol 1g orally 4 hourly prn (to a maximum dose of 4g per 24 hour period)⁹

If the oral and rectal routes are contraindicated, paracetamol can be given IV 1g 6 hourly⁹

with or without

Oxycodone immediate release 5 to 10mg* orally 4 to 6 hourly prn⁹

**For moderate pain in patients who are opioid naïve, start with 5mg oxycodone. If this is tolerated, but there is an inadequate response, a further 5mg may be given after 30 to 60 minutes. Larger and more frequent doses may be necessary. Failure to respond to oxycodone may be an indication to prescribe titrated IV morphine.*

■ Back pain (acute)

Key messages:

1. Simple analgesics and physiotherapy referral should be considered for all patients with back pain of musculoskeletal origin.¹⁰
2. Postural advice, minimising bed rest, staying active and heat wrap therapy are effective in low back pain.¹⁰
3. Spinal pathology such as osteoarthritis, spondylosis, bulging discs and canal stenosis are often asymptomatic and may not be the cause of the pain.¹⁰

Red Flags are features of the presentation that suggest a potentially serious condition. In acute back pain these can include:¹⁰

- symptoms or signs of infection or risk factors for infection (fever, immunosuppression, steroid use and history of IV drug use)
- history of trauma (this includes minor trauma in the elderly, osteoporotic or those on corticosteroids)
- history of malignancy or recent unexplained weight loss
- neurological signs or Cauda equina syndrome
- age greater than 50 years.

ANALGESIC TECHNIQUES

For severe pain use...

Oxycodone immediate release 5 to 10mg* orally 4 to 6 hourly prn⁹
and

Paracetamol 1g orally 4 hourly prn (to a maximum dose of 4g per 24 hour period)⁹

and/or

Ibuprofen[†] 400mg orally 6 hourly prn⁹

For less severe pain use...

Paracetamol 1g orally 4 hourly prn (to a maximum dose of 4g per 24 hour period)⁹

and/or

Ibuprofen[†] 400mg orally 6 hourly prn⁹

**For moderate pain in patients who are opioid naïve, start with 5mg oxycodone. If this is tolerated, but there is an inadequate response, a further 5mg may be given after 30 to 60 minutes. Larger and more frequent doses may be necessary.*

Failure of analgesic effect may be an indication to move to titrated IV morphine.

[†]NSAIDs should be used with caution, if at all, in the elderly or in presence of renal disease and peptic ulcer disease.

Burns

Key messages:

1. Titrated boluses of IV morphine will most likely be required for effective analgesia in acute severe burns.⁴
2. Opioid dose requirements will typically be higher for burns patients than for other emergency situations.
3. Non-pharmacological interventions such as cooling and covering are important pain control measures.⁴
4. Cool water at 15°C (range 8–25°C) is an effective analgesic if used for at least 20 minutes within 3 hours of burn.¹¹ Consider if burn surface area is <10% in adults and <5% in children. Hypothermia should be avoided.

ANALGESIC TECHNIQUES

For severe pain use...

Morphine 2.5 to 5mg IV as an initial dose, then titrated to effect every 5 to 10 minutes with further incremental doses of 2.5 to 5mg IV⁸

In elderly patients or those with cardiorespiratory compromise, an initial morphine dose of less than 2.5mg IV and incremental doses of 0.5 to 1mg should be considered.

Patients should be reassessed to determine if the dose has been effective or if there are any adverse effects (especially sedation).

If morphine is contraindicated, consider fentanyl at 25 to 50 micrograms IV as initial equivalent dose.⁸

For less severe pain use...

Paracetamol 1g orally 4 hourly prn (to a maximum dose of 4g per 24 hour period)⁹

If the oral and rectal routes are contraindicated, paracetamol can be given IV 1g 6 hourly⁹

with or without

Oxycodone immediate release 5 to 10mg* orally 4 to 6 hourly prn⁹

**For moderate pain in patients who are opioid naïve, start with 5mg oxycodone. If this is tolerated, but there is an inadequate response, a further 5mg may be given after 30 to 60 minutes. Larger and more frequent doses may be necessary. Failure of analgesic effect may be an indication to move to titrated IV morphine.*

■ Cardiac pain

Key messages:

1. Patients presenting with cardiac chest pain should receive morphine and glyceryl trinitrate.¹² Therapies to ameliorate coronary ischaemia such as beta blockers and reperfusion therapies may also reduce pain.

MANAGEMENT / ANALGESIC TECHNIQUES

Aspirin 300mg oral initial dose^{11,12}

and

Glyceryl trinitrate^{11,12} sublingual spray 400 micrograms or sublingual tablet 300 to 600mg.¹¹

Repeat every 5 minutes as needed and if tolerated (monitor for hypotension) to a maximum of 3 doses

with or without

Morphine¹² 2.5 to 5mg IV as an initial dose, then titrated to effect every 5 to 10 minutes with further incremental doses of 2.5 to 5mg IV⁸

In elderly patients or those with cardiorespiratory compromise, an initial morphine dose of less than 2.5mg IV and incremental doses of 0.5 to 1mg should be considered.

Patients should be reassessed to determine if the dose has been effective or if there are any adverse effects (especially sedation).

If morphine is contraindicated, consider fentanyl at 25 to 50 micrograms IV as initial equivalent dose.⁸

Dental

Key messages:

1. Evidence for dental pain management is largely based on tooth extraction research.⁴
2. Paracetamol, ibuprofen, oxycodone and tramadol provide effective analgesia for acute dental pain.⁴
3. Dental nerve block provides effective analgesia for acute dental pain.

ANALGESIC TECHNIQUES

For severe pain use...

Morphine 2.5 to 5mg IV as an initial dose, then titrated to effect every 5 to 10 minutes with further incremental doses of 2.5 to 5mg IV⁸

In elderly patients or those with cardiorespiratory compromise, an initial morphine dose of less than 2.5mg IV and incremental doses of 0.5 to 1mg should be considered.

Patients should be reassessed to determine if the dose has been effective or if there are any adverse effects (especially sedation).

If morphine is contraindicated, consider fentanyl at 25 to 50 micrograms IV as initial equivalent dose.⁸

and/or

Ibuprofen 400mg orally 6 hourly prn⁹

and/or

Dental nerve block[†]

For less severe pain use...

Oxycodone immediate release 5 to 10mg* orally 4 to 6 hourly prn⁹

and

Paracetamol 1g orally 4 hourly prn (to a maximum dose of 4g per 24 hour period)⁹

or

Ibuprofen 400mg orally 6 hourly prn⁹

**For moderate pain in patients who are opioid naïve, start with 5mg oxycodone. If this is tolerated, but there is an inadequate response, a further 5mg may be given after 30 to 60 minutes. Larger and more frequent doses may be necessary. Failure to respond to oxycodone may be an indication to prescribe titrated IV morphine.*

[†]This technique should only be undertaken by clinicians with skills and specific training in administering dental nerve blocks.

■ Fractures and dislocation

Key messages:

1. Immobilisation, resting the injured site, ice and elevation of a suspected fracture are important pain control measures.⁴
2. Femoral nerve block in combination with IV opioids are more effective than IV opioids alone in treating pain from fractured neck of femur.⁴
3. Anticipate procedures where some movement is required, such as x-ray, and ensure adequate analgesic cover.

ANALGESIC TECHNIQUES

For severe pain use...

Morphine 2.5 to 5mg IV as an initial dose, then titrated to effect every 5 to 10 minutes with further incremental doses of 2.5 to 5mg IV⁸

In elderly patients or those with cardiorespiratory compromise, an initial morphine dose of less than 2.5mg IV and incremental doses of 0.5 to 1mg should be considered.

Patients should be reassessed to determine if the dose has been effective or if there are any adverse effects (especially sedation).

If morphine is contraindicated, consider fentanyl at 25 to 50 micrograms IV as initial equivalent dose.⁸

For less severe pain use...

Paracetamol 1g orally 4 hourly prn (to a maximum dose of 4g per 24 hour period)⁹

If the oral and rectal routes are contraindicated, paracetamol can be given IV 1g 6 hourly⁹

with or without

Oxycodone immediate release 5 to 10mg* orally 4 to 6 hourly prn⁹

**For moderate pain in patients who are opioid naïve, start with 5mg oxycodone. If this is tolerated, but there is an inadequate response, a further 5mg may be given after 30 to 60 minutes. Larger and more frequent doses may be necessary. Failure to respond to oxycodone may be an indication to prescribe titrated IV morphine.*

For fractured neck of femur...

Femoral nerve block in combination with IV Morphine.⁴

...continued over page

ANALGESIC TECHNIQUES

...continued from previous page

For reduction of dislocations...

To facilitate reduction of dislocations of major joints, anaesthesia with an agent such as propofol (1 mg/kg titrated to effect) may be considered.⁹ These techniques should only be performed in a monitored clinical area with sufficient staffing levels by clinicians with advanced airway skills and specific training in the use of these medications.

Gout

Key messages:

1. There is controversy over the respective roles of NSAIDs, corticosteroids and colchicine for gout.
2. There is evidence that NSAIDs and colchicine are effective first line analgesics for acute gout attacks.^{13,14}
3. Corticosteroids such as prednisolone may be preferred for patients with renal impairment or complex medical problems.¹⁵
4. Colchicine has a low therapeutic index and is a potent cellular toxin in overdose.¹³

ANALGESIC TECHNIQUES

Ibuprofen 400mg orally 6 hourly prn¹⁴

or

Indomethacin 50mg orally 8 hourly as tolerated^{13,14}

when NSAIDs are contraindicated or ineffective

Colchicine 1 000 micrograms orally, then 500 micrograms 1 hour later (maximum 1 500 micrograms per course) ideally within 12 hours of acute episode¹⁶

Do not repeat the course within 3 days. In renal dysfunction (CrCL < 30mL/min) do not repeat course within 2 weeks. Consider use of prednisolone.¹⁶

when NSAIDs and colchicine are contraindicated or ineffective

Prednisolone 50mg orally daily (for 5 days then review)¹⁵

■ Herpes zoster

Key messages:

1. Antivirals commenced within 72 hours of onset of the rash reduces duration of pain, duration of rash and reduces ophthalmic complications.⁴
2. Herpes Zoster therapy and associated pain management should be treated early and aggressively as it is more difficult to treat once established.

ANTIVIRAL THERAPY

If within 72 hours of onset of rash use...

Famciclovir 250mg orally 8 hourly for 7 days⁹

If immunocompromised use 500mg orally 8 hourly for 10 days

or

Valaciclovir 1g orally 8 hourly for 7 days⁹

or

Aciclovir 20mg/kg (up to 800mg) orally 5 times a day for 7 days⁹

ANALGESIC TECHNIQUES

Paracetamol 1g orally 4 hourly prn (to a maximum dose of 4g per 24 hour period)⁹

If the oral route is contraindicated, paracetamol can be given IV 1g 6 hourly⁹

and/or

Aspirin 300 to 600mg orally 4 hourly prn⁹

with or without

Oxycodone 5 to 10mg* orally 6 hourly prn⁹

**For moderate pain in patients who are opioid naïve, start with 5mg oxycodone. If this is tolerated, but there is an inadequate response, a further 5mg may be given after 30 to 60 minutes. Larger and more frequent doses may be necessary.*

If pain is severe consider adding...

Prednisolone[†] 50mg orally once daily for 7 days, then tapered over 14 days

and/or

Amitriptyline 10mg to 25mg orally nocte initially; titrate up to a maximum nocte dose of 150mg⁹

[†]If no contraindications. Aspirin/NSAIDs should be used with caution with Prednisolone due to the increased risk of gastrointestinal bleeding.

■ Migraine (common and classic)

The International Headache Society¹⁷ classifies a headache as a **common** migraine when:

1. the pain has at least two of the following features; (PUMA)
 - a. pulsatile
 - b. unilateral
 - c. moderate to severe
 - d. aggravated by movement
2. there is at least one of the following associated symptoms:
 - a. nausea
 - b. vomiting
 - c. photophobia
 - d. phonophobia
3. the headache lasts for between 4 and 72 hours
4. no evidence of any other diseases that may cause these symptoms.

In addition, **classic** migraine can be diagnosed when at least three of the following symptoms occur:

- one or more completely reversible aura symptoms. Aura symptoms include: alterations in vision; numbness or tingling in the face, arm, or hand on one side of the body; muscular weakness or mild paralysis on one side of the body; and/or difficulty speaking or loss of speech
- at least one aura symptom develops gradually over > 4 minutes
- two or more symptoms that occur at the same time
- no aura symptom lasts > 1 hour
- headache follows aura within 1 hour.

Red flags for headache include:¹⁷

- sudden onset of severe headache especially if associated with confusion, drowsiness, vomiting or neurological signs (e.g. consider subarachnoid, intracerebral haemorrhage, dissection)

- recent onset with fever, confusion or drowsiness (e.g. consider meningitis, encephalitis)
- age > 50 years (increased rate of tumours, temporal arteritis, glaucoma, subdural haemorrhage and herpes zoster)
- trauma.

Key messages:

1. Aspirin with metoclopramide is effective in migraine with mild symptoms⁴ and is the treatment of first choice.
2. Triptans are effective in migraine.⁴
3. Parenteral prochlorperazine and chlorpromazine are effective in the treatment of migraine.⁴
4. Aspirin, paracetamol and NSAIDs are effective alone or in combination in treatment of tension headaches.⁴
5. Oxygen and sumatriptan are effective in the treatment of cluster headache.⁴

ANALGESIC TECHNIQUES

Once a diagnosis of migraine has been made and there are no “red flags”, use:

Aspirin 600 to 900mg orally and metoclopramide 10mg IV stat¹⁸

If this fails / has failed OR for severe pain

Chlorpromazine 25mg IV in 1000mL sodium chloride 0.9% or Hartman's solution IV over 60 minutes. This can be repeated once if necessary.¹⁸

or

Prochlorperazine 12.5mg slow IV¹⁸

or

Sumatriptan 6mg subcutaneously¹⁸

Tension headache

ANALGESIC TECHNIQUES

Aspirin 600 to 900mg orally stat and repeat in 4 hours if needed⁹

or

Ibuprofen 400mg orally stat and repeat in 6 hours if needed⁹

**NSAIDS should be used with caution, if at all, in the elderly or in presence of renal disease and peptic ulcer disease.*

with or without

Paracetamol 1g orally 4 hourly prn (to a maximum dose of 4g per 24 hour period)⁹

If the oral route is contraindicated, paracetamol can be given IV 1g 6 hourly prn⁹

■ Renal colic

Key messages:

1. Analgesia does not hinder the diagnostic process in abdominal pain.⁴
2. Non-selective NSAIDs and opioids provide effective analgesia for renal colic.⁴
3. There is no difference in efficacy between pethidine and morphine in the treatment of renal colic.⁴

ANALGESIC TECHNIQUES

For severe pain use...

Morphine 2.5 to 5mg IV as an initial dose, then titrated to effect every 5 to 10 minutes with further incremental doses of 2.5 to 5mg IV⁸

In elderly patients or those with cardiorespiratory compromise, an initial morphine dose of less than 2.5mg IV and incremental doses of 0.5 to 1mg should be considered.

Patients should be reassessed to determine if the dose has been effective or if there are any adverse effects (especially sedation).

If morphine is contraindicated, consider fentanyl at 25 to 50 micrograms IV as initial equivalent dose.⁸

and

Ibuprofen[†] 400mg orally 6 hourly prn⁹

Administer NSAIDs rectally if not tolerating oral medications

For less severe pain use...

Ibuprofen[†] 400mg orally 6 hourly prn⁹

with or without

Oxycodone immediate release 5 to 10mg* orally 4 to 6 hourly prn⁹

**For moderate pain in patients who are opioid naïve, start with 5mg oxycodone. If this is tolerated, but there is an inadequate response, a further 5mg may be given after 30 to 60 minutes. Failure to respond to oxycodone may be an indication to prescribe titrated IV morphine.*

[†]NSAIDs should be used with caution, if at all, in the elderly or in the presence of renal disease or peptic ulcer disease.

■ Soft tissue injury

Acute musculoskeletal pain

Key messages:

1. Regular paracetamol, and then if ineffective, NSAIDs may be used for musculoskeletal pain.¹⁰
2. NSAIDs if used for acute musculoskeletal injury should be used short term.¹⁹
3. Short term oral opioids may be required for breakthrough pain particularly at initial presentation.¹⁰

ANALGESIC TECHNIQUES

For severe pain use...

Oxycodone immediate release 5 to 10mg* orally 4 to 6 hourly prn⁹
with

Paracetamol 1g orally 4 hourly prn (to a maximum dose of 4g per 24 hour period)⁹

and/or

Ibuprofen[†] 400mg orally 6 hourly prn⁹

For less severe pain use...

Paracetamol 1g orally 4 hourly prn (to a maximum dose of 4g per 24 hour period)⁹

and/or

Ibuprofen[†] 400mg orally 6 hourly prn⁹

*For moderate pain in patients who are opioid naïve, start with 5mg oxycodone. If this is tolerated, but there is an inadequate response, a further 5mg may be given after 30 to 60 minutes. Larger and more frequent doses may be necessary.

[†]NSAIDs should be used with caution, if at all, in the elderly or in the presence of renal disease or peptic ulcer disease.

Section 3

Paediatric Pain Scenarios

Painful presentations:

Abdominal pain	Burns
Earache	Fractures and dislocation
Headache	Soft tissue injury

Considerations for paediatric pain management:²⁰

- Pain management should be considered as an integral part of the care of children with painful conditions or undergoing painful procedures.
- Children feel pain. They may react differently to adults with pain and may lie still and quiet rather than cry and moan.
- Children do not develop a tolerance to pain but rather experience lower pain thresholds with repeated painful experiences.
- Where possible, titrate medications to effect but do not under-medicate for fear of side effects. Adjust initial opioid doses in young infants (for whom cardiorespiratory effects are more common).
- A balanced approach to pain management in children includes use of both non-pharmacological and pharmacological techniques and may utilise a combination of different analgesic medications with different modes of action.
- Careful positioning and distraction techniques reduce pain during clinical procedures.⁴ The Royal Children's Hospital's (Melbourne) 'Comfort Kids' program website has further information and helpful resources on this topic.

Go to: **www.rch.org.au/comfortkids/**

■ Abdominal pain

Important points:

1. Provision of analgesia does not interfere with the diagnosis of acute surgical causes of abdominal pain (e.g. appendicitis) in children.²⁰
2. Intranasal fentanyl is an effective alternative to deliver strong opioids if IV access is unavailable.⁴

ANALGESIC TECHNIQUES

For severe pain use ...

Fentanyl 1 to 1.5 micrograms/kg to a maximum of 100 micrograms intranasally as an initial dose. This is an effective alternative if IV access is unavailable

Further doses of 1 microgram/kg may be titrated to effect every 5 to 10 minutes until IV access is achieved if required^{21,22}

or

Morphine 0.1 mg/kg to a maximum of 2.5 mg IV as an initial dose, then titrated to effect with further incremental doses of 0.05 mg/kg.⁸ Reassess every 5 to 10 minutes

Patients should be reassessed to determine if the dose has been effective and to determine if any adverse effects, especially sedation, have occurred.

and

Paracetamol 15 mg/kg/dose orally 4 hourly prn (maximum 1000 mg/dose, maximum 4 doses per 24 hour period) should be given in addition to opioid as it has a synergistic effect.^{9,22}

If the oral and rectal routes are contraindicated, paracetamol can be given IV 15 mg/kg/dose 6 hourly.⁹

For less severe pain use...

Paracetamol 15 mg/kg/dose 4 hourly prn (maximum 1000 mg/dose, maximum 4 doses per 24 hour period)^{9,22}

with or without

Oxycodone 0.1 to 0.2 mg/kg orally (maximum 5 mg) 4 to 6 hourly prn²²

■ Abdominal pain (*cont.*)

Practice point...

Oxycodone is a more reliable opioid analgesic than codeine and the preferred option in combination with paracetamol for moderate pain. If oxycodone is not available, a paracetamol/codeine combination (e.g. Painstop) may be considered,²⁰ however there have been a number of conflicting studies highlighting variable efficacy of codeine in children and adults.⁴

■ Burns

Important points:

1. Titrated boluses of IV morphine will most likely be required for effective analgesia in acute severe burns.⁴
2. Intranasal fentanyl is the preferred alternative to IV morphine where IV access is unavailable.²³
3. First aid treatment (cooling under running water) helps with both analgesia^{4,24} and prevention of burn extension.²⁴
4. Application of clear plastic cling wrap assists with analgesia by reducing air passage across the burn surface and by decreasing the need for repeated removal of a dressing for inspection.
5. For extensive burns, debridement and dressing may best be performed under general anaesthetic.

■ Burns (cont.)

ANALGESIC TECHNIQUES**For severe pain use...**

Fentanyl 1 to 1.5 micrograms/kg intranasally to a maximum of 100 micrograms as an initial dose. Further doses of 1 microgram/kg may be titrated to effect every 5 to 10 minutes until IV access is achieved^{21,22}

then

Morphine 0.1 to 0.2mg/kg IV to a maximum of 5mg IV as an initial dose, then titrated to effect with further incremental doses of 0.05mg/kg. Reassess every 5 to 10 minutes²²

Patients should be reassessed to determine if the dose has been effective and to determine if any adverse effects, especially sedation, have occurred.

and

Paracetamol 15mg/kg/dose orally 4 hourly prn (maximum 1000mg/dose, maximum 4 doses per 24 hour period) should be given in addition to opioid as it has a synergistic effect^{9,22}

If the oral and rectal routes are contraindicated, paracetamol can be given IV 15mg/kg/dose 6 hourly⁹

For less severe pain use...

Paracetamol 15mg/kg/dose orally 4 hourly prn (maximum 1000mg/dose, maximum 4 doses per 24 hour period)^{9,22}

If the oral and rectal routes are contraindicated, paracetamol can be given IV 15mg/kg/dose 6 hourly⁹

with or without

Oxycodone 0.1 to 0.2mg/kg orally (maximum 5mg) 4 to 6 hourly prn²²

Practice point...

Oxycodone is a more reliable opioid analgesic than codeine and the preferred option in combination with paracetamol for moderate pain. If oxycodone is not available, a paracetamol/codeine combination (e.g. Painstop) may be considered,²⁰ however there have been a number of conflicting studies highlighting variable efficacy of codeine in children and adults.⁴

■ Earache

Important points:

1. Topical agents should not be used if the tympanic membrane is perforated.
2. Topical and oral agents appear to be effective for ear ache.²²

ANALGESIC TECHNIQUES

Oral analgesic options ...

Paracetamol 15mg/kg/dose orally 4 hourly prn (maximum 1000mg/dose, maximum 4 doses per 24 hour period)^{9,22}

with or without

Oxycodone 0.1 to 0.2mg/kg orally (maximum 5mg) 4 to 6 hourly prn²²

and/or

Ibuprofen 10mg/kg/dose orally 6 hourly prn (maximum 400mg/dose, maximum 4 doses per 24 hour period)^{9,22}

Topical analgesic options (used as adjuvant therapy)...

Lignocaine 2% topical aqueous ear drops (ampoule solution applied topically) to the ear canal(s) up to every 3 hours²²

or

Phenazone / benzocaine drops (e.g. Auralgan drops: phenazone 54mg/mL, benzocaine 14mg/mL²⁵) fill ear canal 3 times daily

Practice point...

Oxycodone is a more reliable opioid analgesic than codeine and the preferred option in combination with paracetamol for moderate pain. If oxycodone is not available, a paracetamol/codeine combination (e.g. Painstop)²⁰ may be considered,²⁰ however there have been a number of conflicting studies highlighting variable efficacy of codeine in children and adults.⁴

■ Fractures and dislocation

Key messages:

1. Local application of ice, elevation and splinting of the affected limb are effective forms of analgesia for known or suspected fractures.⁴
2. Intranasal fentanyl is effective in paediatric patients with long bone fractures.⁴

ANALGESIC TECHNIQUES

For severe pain[†]:

Fentanyl 1 to 1.5 micrograms/kg to a maximum of 100 micrograms intranasally as an initial dose. Further doses of 1 microgram/kg may be titrated to effect every 5 to 10 minutes until IV access is achieved^{21,22}

Patients should be reassessed to determine if the dose has been effective and to determine if any adverse effects, especially sedation, have occurred.

and

Paracetamol 15mg/kg/dose orally 4 hourly prn (maximum 1000mg/dose, maximum 4 doses per 24 hour period) should be given in addition to opioid as it has a synergistic effect^{9,22}

If the oral or rectal routes are contraindicated, paracetamol can be given IV 15mg/kg/dose 6 hourly⁹

then

Topical anaesthesia to facilitate IV cannulation, e.g. Lignocaine 2.5% | Prilocaine 2.5% cream (e.g. EMLA) or Amethocaine 4% (e.g. AnGel)⁹

then, if needed

Morphine 0.1 to 0.2mg/kg to a maximum of 5mg IV as an initial dose, then titrated to effect with further incremental doses of 0.05mg/kg. Reassess every 5 to 10 minutes²²

Patients should be reassessed to determine if the dose has been effective and to determine if any adverse effects, especially sedation, have occurred.

Consider: appropriate nerve or regional blocks for analgesia and or reduction.

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■ Fracture/dislocation (cont.)

ANALGESIC TECHNIQUES

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For mild to moderate pain:

Paracetamol 15mg/kg/dose 4 hourly prn (maximum 1000mg/dose, maximum 4 doses per 24 hour period)^{9,22}

with or without

Oxycodone⁴ 0.1 to 0.2mg/kg orally (maximum 5mg) 4 to 6 hourly prn²²

For procedural analgesia during fracture reduction consider †*...

Nitrous oxide 30% to 70% in oxygen inhaled, titrated to effect^{9,20}

or

Ketamine 0.5 to 1.5mg/kg IV initially, then titrated to effect with increments of 0.5mg/kg^{9,20}

with or without

Midazolam 0.05 to 0.1mg/kg IV^{9,20}

† Relevant nerve or regional blocks should be considered for analgesia and or reduction.

*These techniques should only be performed in a monitored clinical area with sufficient staffing levels by clinicians with advanced paediatric airway skills and specific training in the use of these medications.

Practice point...

Oxycodone is a more reliable opioid analgesic than codeine and the preferred option in combination with paracetamol for moderate pain. If oxycodone is not available, a paracetamol / codeine combination (e.g. Painstop) may be considered,²⁰ however there have been a number of conflicting studies highlighting variable efficacy of codeine in children and adults.⁴

■ Headache

Important points:

1. Headache is a common symptom in children and adolescents presenting to the ED and the vast majority have a benign aetiology (e.g. viral illness, otitis media).
2. Most sinister causes (e.g. brain tumour) have features on history or examination to separate them from benign aetiologies.
3. Nausea often accompanies headache and the addition of antiemetic therapy may be effective in helping relieve the patients discomfort.
4. Little evidence is available on the treatment of migraines in children – most data is derived from adult studies.

ANALGESIC TECHNIQUES

Paracetamol 15mg/kg/dose orally 4 hourly prn (maximum 1000mg/dose, maximum 4 doses per 24 hour period)^{9,22}

with or without

Oxycodone 0.1 to 0.2mg/kg (maximum 5mg) orally 4 to 6 hourly prn²²

and/or

Ibuprofen 10mg/kg/dose orally 6 hourly prn (maximum 400mg/dose, maximum 4 doses per 24 hour period)^{9,22}

and/or

Sumatriptan 10mg to 20mg into one nostril may be effective in children over the age of 12 years of age and over. (Maximum 40mg in 24 hours)⁹

If nausea is associated with the headache, consider

Ondansetron 0.15mg/kg (up to 4mg) slow IV for children 2 years old and over²²

Practice point...

Oxycodone is a more reliable opioid analgesic than codeine and the preferred option in combination with paracetamol for moderate pain. If oxycodone is not available, a paracetamol/codeine combination (e.g. Painstop) may be considered,²⁰ however there have been a number of conflicting studies highlighting variable efficacy of codeine in children and adults.⁴

■ Soft tissue injury and musculoskeletal pain

Key messages:

1. Local application of ice, elevation of the affected body part and rest/immobilisation are effective forms of analgesia for soft tissue injuries.⁴
2. The medications below may be used in combination for maximal effect.

ANALGESIC TECHNIQUES

Paracetamol 15mg/kg/dose orally 4 hourly prn (maximum 1000mg/dose, maximum 4 doses per 24 hour period)^{9,22}

with or without

Oxycodone 0.1 to 0.2mg/kg (maximum 5mg) orally 4 to 6 hourly prn²²

and/or

Ibuprofen 10mg/kg/dose orally 6 hourly prn (maximum 400mg/dose, maximum 4 doses per 24 hour period)^{9,22}

Practice point...

Oxycodone is a more reliable opioid analgesic than codeine and the preferred option in combination with paracetamol for moderate pain. If oxycodone is not available, a paracetamol/codeine combination (e.g. Painstop) may be considered,²⁰ however there have been a number of conflicting studies highlighting variable efficacy of codeine in children and adults.⁴

Procedural Pain Management

Procedural pain management:

Foreign body removal	Intramuscular injection and immunisation
Laceration repair	Lumbar puncture
Nasogastric tube insertion	Suprapubic aspiration
Urethral catheterisation	Venepuncture/IV cannulation

■ Foreign body removal

Important points:

1. Choice of removal technique should be influenced by type of foreign body, position and by use of the least painful method first.

ANALGESIC TECHNIQUES

Appropriate **positioning** (e.g. swaddling), distraction, relaxation or other coping strategies^{20,26}

and

EAR

Lignocaine 2% topical aqueous ear drops (ampoule solution applied topically) to the ear canal a few minutes before attempted removal of an ear canal foreign body²⁷

NOSE

Lignocaine 5% with **phenylephrine** 0.5% spray (e.g. Cophenylcaine Forte spray), one to two sprays, to the nose decreases pain and may facilitate nasal foreign body removal by decreasing mucosal swelling⁹

■ Intramuscular injection and immunisation

Important points:

1. Use of topical anaesthetic has not been shown to reduce antibody response to childhood immunisation.²⁰
2. Except for immunisations, try to avoid the intramuscular route for drug administration in children.²⁰
3. Combination of oral sucrose and topical local anaesthetics in infants reduces the behavioural and physiological response to immunisation.^{4,26}
4. Topical local anaesthetics in children aged 4 to 12 years old reduces pain scores during immunisation.⁴

ANALGESIC TECHNIQUES

Appropriate **positioning** (e.g. swaddling), distraction, relaxation or other coping strategies^{20,26}

and

Sucrose 24% or 25% solution, 1 to 2mL orally applied to a pacifier or given directly into the mouth approximately 2 minutes before the injection for children up to 6 months of age^{4,26}

and

Amethocaine 4% (e.g. AnGel) apply an amount approximately 2cm in diameter, cover with an occlusive dressing. Apply 30 to 60 minutes prior to procedure²⁰

or

Lignocaine 2.5% **Prilocaine** 2.5% cream (e.g. EMLA). Apply approximately 1.5g of cream, cover with an occlusive dressing. Apply 60 minutes prior to procedure²⁰

■ Laceration repair

Important points:

1. Wherever possible, the least invasive technique of wound repair (skin glue and/or steristrips) should be employed as long as cosmetic result is equivalent.²⁰
2. Cyanoacrylate skin glue provides equivalent cosmetic outcomes to suture repair for simple lacerations in children.²⁰
3. When sutures are required topical agents such as *Amethocaine-Lignocaine-Adrenaline* solution should be used in preference to injected lignocaine.^{4,20}

ANALGESIC TECHNIQUES

Appropriate **positioning** (e.g. swaddling), distraction, relaxation or other coping strategies^{20,26}

and

Topical **amethocaine** 0.5%, **lignocaine** 4%, **adrenaline** 0.1% (e.g. Laceraine or ALA) 0.1 mL/kg body weight OR 1 mL for each 1 cm of laceration (Use the dose that gives the lesser volume of solution. Maximum dose = 5 mL)^{20,25}

NB. amethocaine is also known as tetracaine

with or without

Nitrous oxide⁴ 30% to 70% in oxygen inhaled, titrated to effect²⁰

For more complicated lacerations (e.g. involving face)*...

Ketamine 0.5 to 1.5 mg/kg IV titrated to effect with increments of 0.5 mg/kg^{9,20}

with or without

Midazolam 0.05 to 0.1 mg/kg IV^{9,20}

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■ Laceration repair (cont.)

ANALGESIC TECHNIQUES

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Also consider...

If infiltrated lignocaine is required, pain of injection can be decreased by:²⁰

- buffering 1% lignocaine 9mL with 8.4% sodium bicarbonate 1mL
- warming the solution to body temperature
- using the smallest needle available (27G)
- injecting through the wound rather than through intact skin
- injecting as slowly as is practical.

**These techniques should only be performed in a monitored clinical area with sufficient staffing levels by clinicians with advanced paediatric airway skills and specific training in the use of these medications.*

■ Lumbar puncture

Important points:

1. The potential for prolonged duration and the need for holding still increase the importance of adequate analgesia in this procedure.²⁰
2. Do not delay provision of antibiotics while waiting for topical anaesthetic to work in cases of suspected meningitis.
3. Topical anaesthesia is effective for lumbar puncture related pain.^{4,20,26}

ANALGESIC TECHNIQUES

Appropriate **positioning** (e.g. swaddling), distraction, relaxation or other coping strategies^{20,26}

and

Sucrose 24% or 25% solution, 1 to 2mL orally applied to a pacifier or given directly into the mouth approximately 2 minutes before the injection for children up to 6 months of age^{4,20,26}

and

Amethocaine 4% (AnGel) apply an amount approximately 2cm in diameter, cover with an occlusive dressing. Apply 30 to 60 minutes prior to procedure²⁰

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ANALGESIC TECHNIQUES

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or

Lignocaine 2.5% / **Prilocaine** 2.5% cream (e.g. EMLA). Apply approximately 1.5g of cream, cover with an occlusive dressing. Apply 60 minutes prior to procedure²⁰

Also consider...

Nitrous oxide²⁰ 30% to 70% in oxygen inhaled, titrated to effect

Infiltrating **Lignocaine** 1% but recognise that pain of injection may be as bad as the pain of the procedure.

If infiltrated lignocaine is required, pain of injection can be decreased by:²⁰

- buffering lignocaine 1% 9mL with 8.4% sodium bicarbonate 1mL
- warming the solution to body temperature
- using the smallest needle available (27G)
- injecting as slowly as is practical.

Nasogastric tube insertion

Important points:

1. Nasogastric tube insertion is a common procedure performed in children and is often associated with significant pain and distress.⁴

ANALGESIC TECHNIQUES

Appropriate **positioning** (e.g. swaddling), distraction, relaxation or other coping strategies^{20,26}

and

Sucrose 24% or 25% solution, 1 to 2mL orally applied to a pacifier or given directly into the mouth approximately 2 minutes before the procedure for children up to 6 months of age^{4,26}

and

Lignocaine 5% with **phenylephrine** 0.5% spray (e.g. Cophenylcaine spray), one to two sprays to the nose decreases pain and may facilitate tube passage by decreasing mucosal swelling⁹

■ Suprapubic aspiration

Important points:

1. Do not delay provision of antibiotics while waiting for topical anaesthetic to work in cases of suspected sepsis.
2. Topical anaesthesia reduces pain scores in neonates and infants undergoing suprapubic aspiration.⁴

ANALGESIC TECHNIQUES

Appropriate **positioning** (e.g. swaddling), distraction, relaxation or other coping strategies^{20,26}

and

Sucrose 24% or 25% solution, 1 mL to 2mL orally applied to a pacifier or given directly into the mouth approximately 2 minutes before the injection for children up to 6 months of age^{4,26}

and

Amethocaine 4% (e.g. AnGel) apply an amount approximately 2cm in diameter, cover with an occlusive dressing. Apply 30 to 60 minutes prior to procedure²⁰

or

Lignocaine 2.5% / **Prilocaine** 2.5% cream (e.g. EMLA). Apply approximately 1.5g of cream, cover with an occlusive dressing. Apply 60 minutes prior to procedure²⁰

■ Urethral catheterisation

Important points:

Do not delay provision of antibiotics while waiting for topical anaesthetic to work in cases of suspected sepsis.

ANALGESIC TECHNIQUES

Appropriate **positioning** (e.g. swaddling), distraction, relaxation or other coping strategies^{20,26}

and

Sucrose 24% or 25% solution, 1 to 2mL orally applied to a pacifier or given directly into the mouth approximately 2 minutes before the injection for children up to 6 months of age^{4,26}

and

Topical **Lignocaine** lubricant should be used during the procedure²⁰

NB. 10 minutes is required for Lignocaine gel to take optimal effect⁴

■ Venepuncture and intravenous cannulation

Important points:

1. This is often the procedure children fear most so always consider whether or not the procedure is warranted.²⁰
2. Venepuncture is less painful than heel lancing for blood sampling in neonates.²⁰
3. Sucrose and topical anaesthesia are effective for venepuncture in neonates.²⁰

ANALGESIC TECHNIQUES

Appropriate **positioning** (e.g. swaddling), distraction, relaxation or other coping strategies^{20,26}

and

Sucrose 24% or 25% solution, 1 to 2mL orally applied to a pacifier or given directly into the mouth approximately 2 minutes before the injection for children up to 6 months of age²⁰

and

Amethocaine 4% (e.g. AnGel) apply an amount approximately 2cm in diameter, cover with an occlusive dressing. Apply 30 to 60 minutes prior to procedure²⁰

or

Lignocaine 2.5% / **Prilocaine** 2.5% cream (EMLA). Apply approximately 1.5g of cream, cover with an occlusive dressing. Apply 60 minutes prior to procedure²⁰

with or without

Nitrous oxide 30% to 70% in oxygen inhaled, titrated to effect²⁰

Section 4

Analgesic Prescribing Considerations

Amitriptyline

- Best avoided in patients at risk for urinary retention, falls and epilepsy.
- May cause significant postural hypotension, confusion, sedation and constipation, especially in elderly patients.

Aspirin

- If anti-platelet therapy is required where aspirin is contraindicated, consult a cardiologist for a suitable alternative. Aspirin alternatives are dependent on the patient assessment, planned intervention and treatment.

Chlorpromazine

- Do not use in patients with Parkinson's disease or previous history of dystonic reactions associated with dopamine-2 antagonists.
- Be aware that chlorpromazine can cause significant hypotension. Patients should be closely monitored for this adverse effect. Intravenous hydration should be prescribed concurrently.

Colchicine

- Recommend patients take paracetamol while waiting for colchicine to take effect.
- Patients with renal or hepatic impairment should not take strong CYP3A4 inhibitors or p-glycoprotein inhibitors at the same time as colchicine (e.g. clarithromycin, erythromycin, cyclosporine, statins, diltiazem, verapamil). For more information see Australian Medicines Handbook.⁹

- Cease use if signs of toxicity occur (abdominal pain, nausea, vomiting or diarrhoea) irrespective of whether joint pain has been relieved.
- Consider only prescribing the number of tablets required for an acute flare, rather than a full bottle.

Famciclovir/Valaciclovir/Aciclovir

- Dose reduction is required in renal impairment, consult specific texts.

Glyceryl trinitrate

- Avoid nitrates if the patient has used sildenafil (Viagra) or vardenafil (Levetra) within the previous 24 hours or tadalafil (Cialis) in the previous 48 hours.

Ibuprofen

- Avoid in patients with NSAID induced asthma.
- Contraindicated in patients with possible active or untreated peptic ulcer disease.
- Avoid in patients with renal impairment (especially if not on dialysis), cirrhosis, congestive heart failure, dehydration/volume depletion, on warfarin, diuretics, ACE inhibitors (e.g. perindopril), ATII antagonists (e.g. irbesartan) or salt reduced diets.

Morphine

- Elderly patients and those with reduced cardio-respiratory reserve often require lower doses of morphine. An initial morphine dose of less than 2.5mg IV and incremental doses of 0.5–1mg should be considered.
- Doses in this manual assume patients are opioid naïve. Patients taking long-term opioids, e.g. MS Contin, OxyContin, Fentanyl patches, will generally require higher doses to manage acute pain. Seek further advice.
- Monitoring of patients receiving IV morphine must include sedation score (e.g. Glasgow Coma Scale), respiratory rate and arterial oxygen saturation, if possible. Doses must not be administered in the waiting room environment.

- Morphine should be used with caution in patients using partial agonists such as buprenorphine tablets (Subutex, Suboxone). It is controversial as to whether morphine should be used in patients using buprenorphine patches (Norspan). Seek specialist advice.

Nitrous oxide

- Available in a commercial product as a 50:50 mixture with oxygen. Can also be delivered by variable concentration devices where the concentration of nitrous oxide varies between 30–70%.
- In the ED setting a demand valve device is usually used to deliver nitrous oxide, where gas flow is triggered by patient inspiration. This requires a good seal between the face and the T-piece or mask, but is inherently safer than constant gas flow devices.
- Monitoring should consist of pulse oximetry. Resuscitation equipment should be available.
- A gas scavenging system should be used in closed areas to minimise occupational exposure.
- Nitrous oxide expands gas containing cavities, therefore is contraindicated in pneumothorax and recent ear surgery.
- Nausea and vomiting can occur, although mainly when higher anaesthetic doses are used. Sedation can occur but is usually minor when demand valve devices are used.

Oxycodone

- Doses in this manual assume patients are opioid naïve. Patients taking long-term opioids, e.g. MS Contin, OxyContin, Fentanyl patches, will generally require higher doses to manage acute pain. Seek further advice.
- Immediate release products should be used for managing acute pain, e.g. OxyNorm capsules, Endone tablets.
- Doses of immediate release oxycodone can be repeated after 30–60 minutes until adequate pain relief is achieved. If a patient not previously taking opioids does not achieve pain relief after 20mg given over approximately 4 hours, the diagnosis should be reviewed.

Paracetamol

- Avoid giving a dose within 3–4 hours of a previous paracetamol dose.
- Maximum daily doses less than 4g may be preferred in adult patients with liver disease or at risk for paracetamol hepatotoxicity.
- Liver function tests should be checked in patients with alcohol abuse, suspected liver disease or malnourishment.
- IV paracetamol is significantly more expensive than oral and rectal doses, but no more efficacious. IV paracetamol should be reserved for patients in whom the oral or rectal routes are contraindicated.

Prednisolone

- Monitor blood sugar levels in diabetic patients.
- Monitor for mood changes.
- May mask underlying infections.

Prochlorperazine, metoclopramide

- Do not use in patients with Parkinson's disease or previous history of dystonic reactions associated with dopamine-2 antagonists.

Sucrose

- Useful for minor procedures in infants less than 3–6 months of age. Only effective if given orally directly onto the infant's tongue. Not effective if given via an orogastric or nasogastric tube.
- Analgesic effects last 5–8 minutes, therefore useful only for short-term pain.
- Effect is enhanced by encouraging non-nutritive sucking.

Sumatriptan

- Contraindicated in patients with ischaemic heart disease, Prinzmetal's angina or uncontrolled hypertension.
- Do not use triptans within 24 hours of ergotamine.

Pregnancy and breast-feeding considerations

Pregnancy: The exact definition of each medication category in pregnancy is available at: <http://www.tga.gov.au/hp/medicines-pregnancy-categorisation.htm>.

Breast-feeding: Discontinuing breast-feeding should never be the first choice if medications are to be used concurrently. Additional information can be obtained from Australian Medicines Handbook. A useful free access website is “Lactmed” from the National Library of Medicine, available at: <http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?LACT>

Medication	Pregnancy ^{8,9}	Breast-feeding ^{8,9,28}
Aciclovir	Category B3 <ul style="list-style-type: none"> • use with caution in 1st trimester • may be used in 2nd and 3rd trimesters • seek advice from infectious diseases specialist 	<ul style="list-style-type: none"> • safe to use • moderate amount excreted in breast milk, but dose received by infant expected to be less than neonatal therapeutic dose
Amitriptyline	Category C <ul style="list-style-type: none"> • increased risk of reversible withdrawal symptoms, not congenital malformations 	<ul style="list-style-type: none"> • use with caution • small amounts excreted into breast milk • if needed, best taken as single daily dose • monitor infant for adverse effects e.g. sedation

Medication	Pregnancy ^{8,9}	Breast-feeding ^{8,9,28}
Aspirin	Category C <ul style="list-style-type: none"> alternatives should be considered for analgesia during all trimesters use not recommended in 3rd trimester 	<ul style="list-style-type: none"> small amounts excreted into breast milk consider Reye's syndrome occasional or low doses may be used, but avoid high or prolonged dosing avoid breast-feeding 1 to 2 hours after a dose to minimise amount infant receives ibuprofen and diclofenac are the NSAIDs of choice in breast-feeding mothers
Chlorpromazine	Category C <ul style="list-style-type: none"> use only if this is the drug of choice seek advice of a neurologist 	<ul style="list-style-type: none"> use with caution small amounts excreted in breast milk monitor infant for adverse effects e.g. sedation
Colchicine	Category D <ul style="list-style-type: none"> use not recommended use prednisolone as alternative first line 	<ul style="list-style-type: none"> use with caution prednisolone preferred for gout variable amounts excreted in breast milk
Famciclovir	Category B1 <ul style="list-style-type: none"> more experience with aciclovir in pregnancy seek advice from infectious diseases specialist 	<ul style="list-style-type: none"> use not recommended – limited data aciclovir preferred

Medication	Pregnancy ^{8,9}	Breast-feeding ^{8,9,28}
Glyceryl trinitrate	Category B2 <ul style="list-style-type: none"> consider alternatives use minimal effective dose in acute situations 	<ul style="list-style-type: none"> use with caution excretion in breast milk unknown monitor infant for adverse effects
Ibuprofen	Category C <ul style="list-style-type: none"> alternatives should be considered for analgesia during all trimesters use not recommended in 3rd trimester 	<ul style="list-style-type: none"> may be used not detected in breast milk in standard doses ibuprofen and diclofenac are the NSAIDS of choice in breast-feeding mothers
Indomethacin	Category C <ul style="list-style-type: none"> alternatives should be considered for analgesia during all trimesters use not recommended in 3rd trimester 	<ul style="list-style-type: none"> may be used in the short term small amounts are excreted in the breast milk ibuprofen and diclofenac are the NSAIDS of choice in breast-feeding mothers
Morphine	Category C <ul style="list-style-type: none"> use only if this is the drug of choice high or prolonged use near term can cause respiratory depression and withdrawal in the infant 	<ul style="list-style-type: none"> use with caution trace amounts excreted in breast milk, but therapeutic doses can be reached with repeated doses or long-term use monitor infant for adverse effects e.g. sedation and respiratory depression

Medication	Pregnancy ^{8,9}	Breast-feeding ^{8,9,28}
Oxycodone	Category C <ul style="list-style-type: none"> • use only if this is the drug of choice • high or prolonged use near term can cause respiratory depression and withdrawal in the infant 	<ul style="list-style-type: none"> • may be used for occasional or short-term use • excreted in breast-milk • monitor infant for adverse effects e.g. sedation and GI effects
Paracetamol	Category A	<ul style="list-style-type: none"> • may be used • small amounts excreted into breast-milk • if infant needs paracetamol, give standard dose
Prednisolone	Category A <ul style="list-style-type: none"> • Monitor blood glucose levels 	<ul style="list-style-type: none"> • may be used • if dose is > 20mg, with-hold feeds for 3 to 4 hours after each dose
Prochlorperazine	Category C <ul style="list-style-type: none"> • may be used if first line agents are ineffective • avoid high doses near term 	<ul style="list-style-type: none"> • use with caution • excretion in breast-milk expected. • monitor infant for adverse effects e.g. sedation
Sumatriptan	Category B3 <ul style="list-style-type: none"> • use not recommended • seek advice from a neurologist 	<ul style="list-style-type: none"> • use with caution • small amounts excreted into breast milk, but there is limited safety data in infants • consider expressing and discarding milk for 8 hours after the dose in pre-term infants

Medication	Pregnancy ^{8,9}	Breast-feeding ^{8,9,28}
Valaciclovir	Category B3 <ul style="list-style-type: none"> • more experience with aciclovir in pregnancy • seek advice from infectious diseases specialist 	<ul style="list-style-type: none"> • use not recommended – limited data – Aciclovir preferred

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