Quality & Education Services

Pain Management Learning Support Package

Reviewing:
CPG:A0501 Pain Relief
# Index

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Acknowledgements go to paramedic Rupert Freeman for his contribution to the development of these notes.

For further enquiry, email QES.clinicalpractice@ambulance.vic.gov.au, Operational Quality & Improvement or your Regional Clinical Manager.
INTRODUCTION

Appropriate pain management is a fundamental aspect of patient care. Not only is prompt and effective pain management a humane thing to achieve for patients, it has been demonstrated to improve patient recovery and reduce complications (1). As paramedics, we should all aim to become skilled in the accurate assessment, diagnosis and management of pain in the pre-hospital setting.

Despite achieving pain score reductions that meet current Ambulance Victoria (AV) Key Performance Indicator (KPI) levels, pain can still be regarded as currently under managed in the pre-hospital environment. Many patients are reaching hospital with high pain scores.

The aim in ambulance should always be to relieve pain - unless there is some specific impediment to doing so. Previously held notions (that pain should not be fully relieved in the pre-hospital setting to assist the diagnosis at hospital) are now considered redundant (2). Pain is an indicator of a problem that should be addressed.

The way patients respond to interventions differs widely. The introduction of an expanded range of drugs and drug presentations has increased the likelihood of a satisfactory outcome in any given situation.

Paramedics now have a number of pain management options available to utilise and each one has its own purpose, value and potential complications.

Figures gathered from Patient Care Record (PCR) data analysis indicates a beneficial trend on reduction of final (at hospital) pain scores since the introduction of IN Fentanyl.

This document seeks to discuss pain management by AV paramedics; to clarify the CPG changes and the rationale; the pain management options; and to consider approaches and ‘blockers’ to achieving satisfactory analgesia for patients. This Learning Package should be read in conjunction with the current CPGs (3) and Clinical Work Instructions (CWIs).
BACKGROUND

Understanding Pain

Pain is a complex and poorly understood phenomenon. The human response to pain is understood to be multi-factorial, involving complex elements of physiological and psychological responses. Despite huge advances in medical understanding over the past 20 years, there are still many aspects of pain that are unknown.

Many pharmacological agents that were developed to treat particular medical conditions have been found to have beneficial effects on various types of pain. Examples of this are certain antidepressants, anti epileptics, topical nitrates, caffeine and capsaicin, just to name a few. Some pain has been found to respond better to specific medications while others, especially in certain types of chronic pain, can be poorly controlled despite combination therapy and heavy use of opioid analgesia.

Four components are understood to comprise the phenomenon of pain: nociception, pain, suffering and pain behaviour. All of these except pain behaviour are personal, internal events that cannot be measured objectively, that is, we need patients to convey what they are feeling. Pain behaviours are what can actually be observed in patients: grimacing, groaning, limping, voluntary guarding, lying down and avoidance of function.

There are four types of pain that can be distinguished in the clinical setting: transient pain (such as from a pin prick or IV insertion), acute pain, chronic pain due to cancer and chronic pain due to non-malignant diseases. Until recently the vast majority of pain research had been in the area of transient (generally reproducible) pain.

Pain as a Key Performance Indicator

AV cases are reviewed for pain score compliance. The current targets are a 3.0 mean reduction in pain score in 90% of patients with significant pain. This is evaluated from VACIS reports and presented in reports for various AV committees. The types of pain analysed in this manner are ischemic chest pain and pain of traumatic origin.

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<th>Clinical Area</th>
<th>Indicator</th>
<th>Target</th>
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<th>Oct – Jan 10</th>
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<tr>
<td>Ischemic chest pain</td>
<td>Mean reduction in pain score</td>
<td>3.0</td>
<td>3.6</td>
<td>3.7</td>
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<td>Severe pain patients with a clinically meaningful reduction</td>
<td>90%</td>
<td>92.1%</td>
<td>92.6%</td>
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<tr>
<td>Traumatic pain</td>
<td>Mean reduction in pain score</td>
<td>3.0</td>
<td>3.5</td>
<td>3.6</td>
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<tr>
<td></td>
<td>Severe pain patients with a clinically meaningful reduction</td>
<td>90%</td>
<td>88.6%</td>
<td>91%</td>
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2009 PCR data analysis has indicated a beneficial trend on reduction of final (at hospital) pain scores since the introduction of IN Fentanyl. Prior to IN Fentanyl use the mean pain score reduction had remained consistent at or near 3.0. It has since improved in latter 2009 early 2010 to around 3.6.

In the six months from July 2009 more than 4500 patients were treated with IN Fentanyl, of these approx 160 were paediatric patients.

**PATIENT ASSESSMENT**

**Recognising the Patient in Pain**

Care of the patient in pain will provide occasions when patients report significant pain from an apparently minor injury or ailment, and others who display little or no response to what subjectively would appear to be a very painful injury. It is well recognised that pain is perceived and interpreted by patients in a very individual manner, which may differ substantially from the observer's own experience and preconceptions.

So how is the patient in pain recognised? Fortunately most patients will make it easy and tell you they are in pain. Others may be unwilling or unable to communicate this and you will need to recognise the signs.

Alone, physiological parameters such as tachycardia, bradycardia, tachypnoea, sweating and hypertension have limited merit in helping the paramedic to ascertain severity of pain, however, taken in context with patient description, pain score and pain behaviours, these parameters can assist in recognising the patient in pain and commencing appropriate treatment. Physiological parameters may take on greater significance as an indicator of pain when there is interference with the usual pathways of pain recognition such as spinal injured patients.

While physical signs may be a reasonable confirmation of pain, the absence of these signs does not necessarily indicate a lack of pain.

Where there is an impaired conscious state through dementia, disability or otherwise, look instead for alterations in patient behaviour (agitation, restlessness, rocking, guarding etc.) and by asking family members or nursing staff to assist. You may be able to find that deviation from the patient's normal behavioural state can help confirm the presence of pain\(^4\). A similar approach may be needed when assessing pain in children.

Everybody perceives and experiences pain differently. The 10/10 pain being described may actually be the patient's worst experience of pain so paramedics need to be open minded.
The patient who has their eyes closed and is lying back quietly on the stretcher may be “dozing quietly” or may be “dealing with” their pain. It is possible to sleep with some degree of pain, anyone who has woken during the night with back pain or toothache, will know that it’s possible to be woken from sleep and be immediately in pain. Just because a dozing patient has to be woken up to be asked about pain, doesn’t mean they aren’t experiencing pain.

**Underlying problem**

The severity of pain alone is a poor indicator of the severity of the underlying illness. The pain of a broken forearm may be more severe than the pain of a myocardial infarction. The severity of pain is important in designing a management plan but must be considered with all the information obtained during physical examination and history taking when determining potential severity of illness.

**Nature of Pain**

A major variable in the ability to locate and describe pain depends on the level of nerve supply between the problem area, the spinal cord and central nervous system (CNS). The skin is well innervated so pain is usually able to be specifically located to the problem site. This is somatic pain. Similarly, the body cavities are usually well lined with connective tissue that is similarly innervated. Hence a broken rib can usually be identified quite specifically to site of injury due to the pleura being affected.

In contrast, the internal structures within the body cavities are not well innervated. There are fewer nerves and usually each feed back into more than one spinal cord segment. A problem within one of these cavities usually produces pain that is not specific in location. Consider the poorly localised pain produced in cardiac disease. This is known as visceral pain.

Further clouding the paramedic’s assessment is referred pain. Given that internal structures have nerves that feed back into multiple spinal cord segments, it is not uncommon for pain to not only be hard for the CNS to locate, it may even be confused with pain from other locations that also return to the same spinal segment. This leads to the phenomenon of referred pain where the sensation of pain is felt in an area of the body distant from the problem area. An example of this is the feeling of right shoulder tip pain associated with liver or biliary tract disease or the feeling of pain down an arm associated with cardiac disease.

**Pain Assessment**

There are many ways to assess pain. Common in paramedic practice is the use of DOLOR as a mnemonic to guide the history taking process. One of the criticisms raised with DOLOR is that it is an information gathering tool rather than a decision making tool. Whenever a question is used in DOLOR, take time to consider the answers to the questions that are asked.
D = Description of the pain
Description seeks to determine the nature of the pain. Is it visceral in nature i.e. aching, burning, vague in description or is it pleuritic/somatic i.e. sharp, stabbing, knife like. It also seeks to understand the severity of the pain. This can be done using scales including rating from 0 to 10 or mild, moderate and severe.

O = Onset and Duration of the Pain
When did the pain start and how did it start. Consider such variables as onset at rest, exercise, after eating and whether it is acute or chronic. This will provide clues as to the cause of the pain including description of falls or trauma or onset after exercise. This must be interpreted cautiously, for instance, cardiac pain can originate at either rest or after exercise.

L = Location of the Pain
This ties in very closely with “description of the pain”. Location is asking “where is the pain”? Particularly in regard to the ability to localise it. This helps to differentiate between somatic/pleuritic (well localised) and visceral pains (less well localised). Also explore for referred pain and whether the pain has moved or changed location since onset. The location of pain may also change as a disease progresses. For example in appendicitis, at onset there is a vague visceral pain which changes notably to a well localised somatic pain as the parietal peritoneum becomes involved.

O = Other signs and Symptoms
The first three points have sought to clarify the pain itself. This fourth criterion seeks to explore any complaint that may be associated with the pain. Typically, looking for signs and symptoms such as nausea, vomiting, diarrhoea, coughing, breathlessness, pallor, sweating or upper or lower GI bleeding. It is important paramedics do not draw conclusions and that they pass this information on. It will be of consideration to provide symptomatic relief where appropriate such as with anti-emetics.

R = Relief
Does anything improve or relieve the pain? Look for preferred positioning upright, lying down, knees drawn up etc. Enquire in regard to medications taken and whether they were of assistance. The usefulness or otherwise of the patient’s own treatment may be a guide for ongoing paramedic care.

Establishing the Pain Score
A fundamental in treating pain is establishing a baseline pain score against which effectiveness of interventions can be measured. A number of different methods for evaluating pain exist such as the Visual Analogue Scale, Numeric Pain Intensity Scale, McGill Pain Questionnaire and the Wong Baker FACES Scale. Currently the Numeric Pain Intensity Scale (0-10) is widely used by paramedics. It attempts to add a level of objectivity to a subjective assessment. A fall back position, is the simpler method of rating to three grades of pain; mild, moderate and severe.
The method of questioning patients in pain is important. Simple things like phrasing questions in a positive light can have a significant effect on the patient's perception of their pain. “You appear to be a little more comfortable now.”

What if the patient is unable to understand the pain score? An alternative will have to be found. Interpreters may be of assistance but the input of bias and patient leading in questioning cannot be removed. Look for other body language clues to assist.

What if you don’t believe the patient’s pain score rating? You simply must. The patient’s perception of pain belongs to them as does their behaviour. Again, combine what the patient states with how the patient presents but never ignore a patient’s claim they are in pain.

Is it ever ok to withhold pain relief if the patient is asking for it? Strictly speaking, no. If a patient reports pain we are obligated to try to manage that pain. If there is a clinical reason for withholding pain relief then this should be clearly documented on the PCR. The same applies if there is a belief that the patient may be drug seeking, in particular for repeat presentations with clear drug seeking behaviours. Ensure there is clear documentation on the PCR regarding the history of the behaviour.

**PAIN MANAGEMENT**

Once a pain score has been established and treatment initiated, it is important to tailor management accordingly, regularly re-evaluate results and record the effect of treatment.
Choice of Pharmacological Agents

Paramedics need to be flexible with their approach to pain management and not fall into the habit of following a certain treatment path. Pain management should be tailored to the individual patient, targeting their specific needs and response to treatment, both in therapeutic and side effects.

A number of factors need to be considered when choosing pain relief options. These include clinical suitability in the particular circumstance, but may also include:

- Time to hospital
- Age of patient
- Expedience of administration
- Severity of pain rating

Consideration of potential hospital delays and time to treatment at hospital may also play a part in the selection of a particular drug.

The use of combinations of multiple simultaneous agents e.g. Methoxyflurane™, Fentanyl and Morphine should not be routine. Aside from being costly, there will be few circumstances where considered use of one or at most two agents will be inadequate. Utilise each pain relief option to its maximum effectiveness before abandoning it and/or adding another.

CPG A0501 and P0501 allow for the combined use of all drugs in one patient with the proviso “if appropriate”. While it is allowable to use Methoxyflurane and IN Fentanyl in the same instance, it is usually not necessary. What is more realistic is the use of one or the other to provide adequate management or preceding ongoing care with IV therapy.

*Recall that while the inhalation analgesics are legitimate and effective options, the preference is for IV drug therapy when ongoing analgesia is likely to be required. Where this is anticipated, give consideration to placing an IV cannula early and commencing IV therapy as soon as practicable.*
Methoxyflurane (Methoxyflurane™)

Methoxyflurane has been shown to be a highly effective pre-hospital analgesic. It is a halogenated hydrocarbon, which describes two significant features of Methoxyflurane: it contains a halogen part (fluoride ions) and is a volatile liquid (the hydrocarbon part). At low concentration it provides an effective analgesia. Increasing the concentration allows the drug to become an anaesthetic.

There is a need to instruct the patient in its use and “sell” Methoxyflurane™ to the patient to get full effect. Simply handing the patient a Penthrox™ Inhaler is unlikely to achieve satisfactory analgesia. With proper ongoing coaching and encouragement, especially for patients having difficulty with self-administration, good results can be achieved. Patients often note the strong initial smell of Methoxyflurane and may appear initially unwilling to persevere with analgeser use.

Contraindications

Renal Disease

Pre existing renal disease or renal impairment is listed as a contraindication to the use of Methoxyflurane. As the drug is metabolised, the metabolites (based around the fluoride ions) can be nephrotoxic. In the healthy kidney, any such damage is unlikely with the restricted doses used in AV. However, it is considered too great a risk to the patient with existing kidney disease and is to be avoided.

To avoid nephrotoxicity, a maximum of 6ml is to be administered to any one patient in a 24 hour period.

Renal Colic

Particular note should be given to the patient with renal colic. This is an obstruction of the ureter and not the kidney itself. Given the transient nature of the problem and the normal function of the other kidney, renal colic is not considered renal disease as defined in this context. Renal colic can be effectively treated with Methoxyflurane.

Tetracycline Antibiotics

Patients currently taking Tetracycline antibiotics are also a contraindication to the administration of Methoxyflurane. In a similar fashion to Methoxyflurane metabolism, the metabolism of Tetracycline antibiotics can be mildly nephrotoxic. The combined unwanted actions are considered too great a risk to the patient and so should be avoided. This risk occurs only whilst the Tetracycline metabolites persist. Though this time frame varies, as long as the last administration was at least the previous day, Methoxyflurane administration will be acceptable. Given the alternative options available, if there is any doubt the paramedic should err in avoiding Methoxyflurane administration.
**Methoxyflurane Indications**

The administration of Methoxyflurane is indicated for all types of pain. It is useful for trauma, paediatrics, pain from a variety of regions and obstetrics. It is also suited for cardiac pain. The pain relief CPGs (A0501 and P0501) do not direct a preference for Methoxyflurane use, outside of as an alternative where IV access is delayed or not available or where pain may be managed without IV therapy being required.

Suggestions for Methoxyflurane suitable situations:
- Children in whom IV therapy is not an option or the child will not cooperate
- Obstetric situations where narcotics are contraindicated
- Initial pain relief attempts where there will be difficulty placing an IV including trapped trauma or poor venous access options such as those who are shocked.
- Sensitivities to narcotics or other first line options such as nitrates.
- Precautions with narcotics or alternatives precluding their use including hypotension, age, asthma and respiratory depression.

**Methoxyflurane in Action**

Each 3 ml dose of the drug should provide effective relief for up to 25 minutes on the proviso that its administration is continuous. If administration ceases, the drug actions should cease within three to five minutes. The paramedic can encourage the patient to continue therapy or, alternatively, instruct the patient on how to manage their own analgesia. The onset of action is variously described as eight to ten breaths or up to three to five minutes.

**Precautions in Administration**

The patient should be able to self administer the drug using the inhaler. This ensures that if the patient becomes drowsy, the most noticeable side effect from Methoxyflurane, the inhaler will simply fall away from the patient and be dropped. This minimises the risk of causing loss of consciousness. It is still permissible to administer Methoxyflurane to a patient who is unable to self administer. Examples of such instances might include a patient with burns or other traumatic injuries to the arms and hands, amputees or disabled patients. These patients will require assistance with administration. Where drowsiness occurs, the side effect usually disappears after a few minutes.

**Paediatric Use**

Paediatric administration is the same as for adults. Anecdotal observation suggests that children are more susceptible to the effects of Methoxyflurane, making it very effective as long as children can be encouraged to use it correctly. This latter aspect makes it less suitable for younger children. There is also further anecdotal description of alterations in the behaviour of some children receiving Methoxyflurane.
**Health and Safety**

Methoxyflurane is a volatile liquid achieving its effectiveness as it vaporises through the inhaler. This vaporisation leads to Methoxyflurane diffusing through air nearby to the inhaler. This leads to inadvertent inhalation of the drug by all those within proximity. To minimise all exposure to users and risk of unwanted effects, Methoxyflurane use should be restricted to environments that are well ventilated. The used inhaler should be placed in the plastic snap lock bag and sealed, to contain the remainder of the drug. Testing has identified that Methoxyflurane is safe to use but it is recommended that its use in a confined space be limited.

**Fentanyl**

Fentanyl is a synthetic narcotic analgesic that is 80 times stronger than Morphine. It has been in AV use for several years as an adjunct in sedation to enable intubation and as an alternative analgesic. It was introduced in 2009 for all paramedics as an option via the intranasal route. It is used by other Australian ambulance services and studies have concluded that it can be as effective as the IV route. Fentanyl has the advantage of fewer side effects than Morphine. However, its duration of action is shorter (30-60 minutes) making it more likely that subsequent analgesia will be required.

**Contraindications**

There are very few situations where narcotic drugs are specifically contraindicated:

- **Known Hypersensitivity:** infrequently, a patient is found to be truly sensitive to a drug. This is distinct from where side effects are produced. Side effects are common and often tolerable. Where a patient describes a more significant untoward response, the drug should be withheld. Consider the person who claims mild nausea with Morphine versus the patient who develops intractable vomiting similar to the patient who develops a headache with GTN tablets as opposed to the patient who has a hypotensive episode.
- **Late second stage labour:** the pain relief CPG states that all narcotics are contraindicated in this setting given the potential untoward depressant effect on the newborn child.

**Precautions**

The precautions with Fentanyl are numerous and not dissimilar to those for Morphine use:

- **The elderly patient:** As with many drugs the elderly are more susceptible to drug effects as they find their body systems including nervous, renal and liver less able to deal with actions and metabolise drugs. The age of 60 has been selected as the age from which more conservative doses should be used.
• Impaired renal or liver function: these are both responsible for metabolism and excretion of the drug so a reduced ability to clear the drug from the body will result in accumulation and increased likelihood of action and side effect.

• Respiratory depression: the CNS actions of narcotics reduce the desire to breathe irrespective of blood gas stimulus. Patients with impaired pulmonary function are particularly susceptible to further respiratory depression, particularly chronic obstructive pulmonary disease (COPD) patients. Rigidity of the diaphragm has been described as an uncommon side effect of Fentanyl and is reported as being more likely with rapid IV injection.

• Current asthma is a precaution in the use of narcotics. Fentanyl and Morphine can both stimulate an immune response and the asthma patient may be more susceptible to this response. Seek clarification as to prior administration, need for narcotic versus alternative analgesia and monitor any effects post administration.8

• Patients on Monoamine Oxidase Inhibitors (MAOI): Fentanyl has a slight serotonin re-uptake inhibitor activity. When this is combined with the actions of MAOI drugs there is a slight possibility of serotonin toxicity being induced. Balance the need for analgesia, particularly Fentanyl, when these drugs are found. MAOIs are less common today than they were several years ago.

• Known addiction to narcotics: again, not a contraindication. A narcotic addict with significant pain, such as from a fracture, still requires analgesia. Ensure that they are in pain and not seeking drugs and treat accordingly. Consider any impact you may have if the patient is attempting to withdraw from illicit drug use.

• Oral Amiodarone: the interaction of Amiodarone and Fentanyl has been uncommonly reported to induce significant side effects including profound hypotension and bradycardia. Any patient likely to require, or who has received Amiodarone, should not be given Fentanyl as concurrent use is a contraindication.

• Rhinitis and Rhinorrhea: self explanatory, the IN route requires functioning mucosa for the drug to be absorbed. These problems would form a barrier to such absorption and facilitate the drug flowing from the nose.

• Facial trauma: similarly, if the nose and its blood supply are not intact, the IN route will prove ineffective for drug administration.

**Routes of Administration**

**Intranasal:**

The highly vascular nasal mucosa is capable of absorbing drugs directly into the blood stream. The dose absorbed is less than that injectable into a vein or muscle, so a greater amount needs to be made available to compensate. However, given that the liver is bypassed in the first instance, the drug availability in the blood is most of that originally absorbed.
Given that a larger dose of drug is needed to be administered into a small volume (there is only so much actual drug that can be administered into the nose without it leaking back out) the presentation of IN drugs are notably more concentrated. Fentanyl for IN use is in ampoules of 900mcg/3ml or 600mcg/2ml for use. Volumes of drug administered into one nostril should not exceed 1ml. If a larger volume is required, consider administering half of the quantity into each nostril separately.

IN drugs require an atomiser designed to break the fluid into very small micro-droplets to assist absorption. The atomiser must be primed with an amount of drug first as there will always be a residue left after administration. This is an effective and very safe method of administration. There is no sharp risk. It must be remembered though, that the atomiser is a single use only device. Once it has been inserted into a nostril for use, it must be discarded and a new one selected for subsequent administration.

Correctly calculating and drawing up Fentanyl continues to be an area of difficulty for many people. The current stock presentations being carried have the potential to cause significant overdose, especially in the paediatric patient group. With this in mind, care should be taken and all doses double checked with your partner (and/or with the AV Clinician if unsure) before any administration takes place.

When the IN route is chosen, a few tips will improve effectiveness of delivery.
- The patient can be asked to blow their nose prior to administration.
- Sit the patient leaning back at a 45 degree angle to reduce the amount of drug that will run back out.
- Angle the atomiser toward the back of the nasal cavity and not straight up the nose. This exposes a greater part of the septum for absorption.
- Push the syringe plunger in quickly. If it is pushed in slowly there is ineffective atomisation of the drug and reduced absorption. Pushing a drug in quickly is the opposite of the usual slow push technique applicable via the IV route.
**Intravenous:**

Where a patient is found to be unsuitable for Morphine administration due to drug sensitivity, IV Fentanyl can be administered by MIC A. Remember that Fentanyl is 80 times more potent than Morphine, it is administered in bolus doses of 25 – 50 mcg IV at 5 minute intervals titrating to pain and side effects.

The incidence of side effects is less than with Morphine. Despite this, the preference is for paramedics to choose Morphine via the IV route and only defer to Fentanyl when a problem exists with Morphine administration.

**Intramuscular**

Currently, where IV access is not obtainable, the first options for analgesia are Methoxyflurane or IN Fentanyl. IM Morphine is another suitable alternative for such circumstances. The IM route is not a preferred one as the uptake of drug through muscle in patients unwell, traumatised and suffering various levels of sympathetic stimulus is variously affected. Drug actions can be unreliable and unwanted effects more difficult to predict.

The greatest factor with IM administration is body size. Larger body masses generally contain greater adipose tissue. This interferes with drug uptake and distribution. As such, patients with a body weight greater than 60kg receive a 10mg IM bolus if required. This can be repeated once with a 5mg dose only after 15 minutes, a reference to the unpredictable uptake rate of the drug. For the patient with a weight of 60kg or less, a 0.1mg/kg dose is used. In this instance, there is no repeat dose as the leaner patient will have a greater uptake of the drug and pose a greater risk of adverse action. If pain persists consult for further advice.
Morphine Sulphate

Morphine is a fast acting narcotic analgesic of longer duration and effect than Fentanyl. It has long been considered the first choice analgesic for severe pain. It comes in various forms including oral formulations for indications such as chronic back and cancer pain. Morphine has been used for centuries as an analgesic derived from opium.

Morphine, like all narcotics, acts directly on the CNS. It is known for its potential to cause physical and psychological addictions. This is more commonly associated with Morphine (and Heroin) than other narcotics. Patients treated for true pain tend not to develop addiction in the short term though addiction is more associated with longer term or ongoing therapy.

**Pharmacology**

Morphine provides actions on both the CNS and the CVS. Primarily Morphine is a CNS depressant. It binds with opioid receptors allowing for the therapeutic indications of analgesia and sedation. This can lead to depression of respiration, cough reflex, pinpoint pupils and a euphoric response. Morphine also causes CNS stimulation, with euphoria, which can be a side effect of benefit and can produce unwanted nausea as well.

The cardiovascular actions of morphine pertain to a mild vasodilation and a slight decrease of conduction velocity through the AV node. These actions can produce varying drops in blood pressure and slight slowing of heart rate. The latter may be more noticeable in patients suffering AV nodal difficulties such as inferior infarction. In these settings, preparation for IV fluid administration or management of problematic bradycardia is prudent.

A tolerance to the analgesic actions of Morphine can develop. A potential impact for ambulance practice is that patients who take long term narcotic medications may also require additional analgesic to assist with acute or exacerbations of chronic pain.

Withdrawal symptoms from the effects of Morphine can be observed in as little as a few hours but will not usually pose a problem in the acute paramedic administration setting. These effects may be seen in patients who are attempting to withdraw from illicit narcotic use. Known addiction is listed as a precaution as patients may be deliberately seeking narcotic drugs. Patients with discernable severe pain (such as a fracture) should still be managed with analgesia.

**Primary Emergency Indications**

Given that the major opioid receptor action will lead to analgesia and sedation, it is no surprise that pain relief and sedation to facilitate intubation are the major indications. Morphine can be very effective when doses are correctly titrated to the particular clinical circumstance.
Morphine can be administered via various routes but specifically IV and IM in AV use. IV is preferred as the uptake and distribution is quicker, more predictable and reliable than through muscle with varying degrees of compromised perfusion. Where IM is opted for, it is always considered a fall back position and always given in limited bolus numbers with further restrictions on time intervals. For patients who have severe pain or pain that is unlikely to be readily relieved (many AV patients) IV Morphine is the drug and route of preference.

The most common presentations warranting Morphine are cardiac and trauma, particularly musculoskeletal from falls and sports injuries. Opioids and nitrates have a strong role in the management of cardiac patients where their use can be concurrent, alternate or sequential dependant on initial presentation and the effects of drugs administered.

Morphine can also be administered to the patient in acute left ventricular failure. The primary intent is to provide slight sedation to the patient suffering severe anxiety and allow for more effective care. Other actions that may be occurring through a slight vasodilation may also be of some benefit. Given that these patients are usually elderly, have a reduced ability to compensate and are being treated with other interventions such as nitrates, a greatly reduced dose is indicated in this setting – no more than 1-2 mg IV.

**Contraindications**

Similar to those described with Fentanyl use.

**Precautions**

- Hypotension is of concern since the actions of Morphine include vasodilation. This can potentially worsen hypotension already present. In practical use, patients that are in severe pain suffer these actions less, surmised to be as a result of catecholamine action. Though it is a precaution, pain can be concurrently managed whilst fluid administration or other measures to restore BP occurs.

- Acute Alcoholism should be read as a warning that this group of patients will be difficult to assess (particularly conscious state) and are susceptible to deterioration including changes in consciousness. Any patient in pain should have suitable analgesia provided but intoxication must be kept in mind.

- Respiratory tract burns involve a significant immune response characterised by significant oedema of the airway. Similar to asthma, the immune response effects prompted by the administration of Morphine may exacerbate this. Respiratory depression is also undesirable in this group of patients. Such patients are time critical and warrant intensive care paramedic support and likely early intubation. Pain relief should not be withheld but needs to be administered with the above in mind.

- Patients on MAOI have been discussed under Fentanyl. It is worth noting that the serotonin re-uptake inhibitor action afforded to Morphine is less than Fentanyl making it a safer alternative in this setting.

- Other precautions: elderly patients, respiratory depression, current asthma and known addiction to narcotics have been discussed under Fentanyl.
Adverse events with IV Morphine are uncommon within indicated doses; be wary of accumulated doses and possible adverse effects.

**Side Effects**

The side effects of Morphine are described in the AV CPG Pharmacology D020. They are all attributable to the actions described therein. It is worth discussing suggested responses to these side effects during patient management:

- **Nausea/vomiting**: perhaps the most common side effect observed in typical administration, so much so that concurrent anti-emetic administration was once the norm. This is less favoured now as this unwanted side effect has been found to be less prevalent than first feared. Patients who describe previous nausea can be offered an anti-emetic. Particularly consider the patient who describes more severe nausea and vomiting following previous administration. Patients will not benefit from nausea and vomiting and should be offered an alternative analgesic including Fentanyl.

- **Respiratory depression and drowsiness** can be found together. At times this may be produced easily in the susceptible patient (i.e. the elderly) or it may follow a more aggressive treatment regime. It may not be necessary to do anything other than monitor such a patient and consider less, or ceasing further narcotic administration. Considering the use of Fentanyl due to a patient becoming drowsy would not be of assistance.

- **Euphoria** is not commonly seen in pre-hospital care given the underlying acute problem distracting the patient.

- **Pinpoint pupils** are a strong indicator that a patient has received too much narcotic and should not receive any more. This sign is a standard prompt when managing a Heroin overdose.

- **Occasionally patients may demonstrate a distinct reddening along the lines of veins in limbs where Morphine has been injected.** This is attributable to a histamine release and should be explained to patients. Unless it becomes significant, this is not an allergy and should not preclude any further administration.

**Adverse Drug Actions**

Management of adverse drug actions to narcotic drugs is usually one or both of two options:

- Managing side effects symptomatically
- Reversing the narcotic with an antagonist

It must be remembered that any patient who receives narcotic analgesic will remain in need of the desired analgesic actions. It is only the unwanted actions that need to be avoided or treated. The first consideration must be of the seriousness of the unwanted action. Many side effects are relatively benign and transient and can simply be monitored. A slight bradycardia without significant blood pressure drop is possible as is slight drowsiness. Nausea is a reasonably common unwanted effect. It is a mild problem and can be addressed in the first instance with an anti-emetic.
More significant unwanted actions, such as hypotension, can be managed with IV fluid therapy if authorised as per the relevant CPG. Once side effects become apparent, it is advisable to cease the narcotic drug and choose an alternative.

Note: Side effects of Morphine, such as nausea or mild hypotension, are a good reason to cease its administration and change over to Fentanyl. More serious adverse effects such as respiratory depression or alteration in consciousness will likely be worsened by all further narcotics regardless of type and all administration should cease at this point.

For severe adverse reactions, including vomiting that cannot be managed with an anti-emetic, the use of the narcotic antagonist naloxone is indicated. Respiratory depression is the most significant indication for such an approach though other indications might include:

- Significant hypotension not readily correctable with positioning and fluid
- Nausea and vomiting not manageable by other means. Few people would appreciate exchanging pain for continued vomiting.
- Alteration in consciousness more than easily roused drowsiness.

Paediatric Analgesia

Pain will be more difficult to assess in children, particularly younger children. Parents are always a good guide to pain levels as they will be able to identify differences in behaviour and appearance. Parents usually have some “sense” of something wrong. They must be informed and permission sought for management. Parents that are anxious may transmit those concerns to their child making it more difficult to placate the child.

CPG P0101 advocates the mnemonic for overall management:

Q = Question the child
U = Use pain rating scales
E = Evaluate behaviour and physiological changes
S = Secure parents’ involvement
T = Take cause of pain into account
T = Take action and evaluate results

For children less than three, the FLACC scale can be utilised allowing the paramedic to quantify apparent pain through considering physical appearance parameters including restlessness, crying, ability to be consoled and position of the child. The Wong-Baker scale is another adjunct and estimates pain severity based on facial expression, apparent from smile to clear distress.
Children pose particular problems for the paramedic including:

- Drug calculations will be dose per body weight requiring a calculation prior to administration.
- Children are often distrustful and may not readily accept your care. Those experienced with health professionals may be more accepting. Others will need time invested to gain their trust through distracting conversation, maintaining parent-child contact and other strategies such as the use of favourite toys. Be honest with the child. Do not say it won’t hurt if it will.
- There will be a more timid approach with children as you do not want to hurt or upset them. This may let the child dictate terms more than they should.

Analgesic options are very similar to adult options with the exception of the weight based dose calculations:

- Methoxyflurane: works very well in the paediatric setting. Common feedback is frequent alteration in conscious state including drowsiness and behavioural change. Children typically become less inhibited.
- Narcotic: typically works well such that single dose therapies are often adequate in many instances. As with all IM options, uptake is slower and unpredictable and Methoxyflurane or IN Fentanyl are better options in the first instance. As IV therapy is restricted in the paediatric setting to MICA, IM Morphine is an effective fallback option when first options prove unsatisfactory. For more than one dose consultation is required, but even fracture and scald pain are often resolved with a single dose. IV Morphine is advocated to a maximum of 0.2mg/kg without consultation for MICA paramedics.

Other Options

Pain relief is not restricted to drug therapy options. All pain management must be supportive of basic care therapies:

- Burn Aid dressings: contain Malaleuca Oil that is a mild analgesic as well as providing cooling.
- Ice/cool packs.
- Slings and splints: the role of splinting can be greatly underestimated and underutilised. Analgesia may be required to move limbs and fully splint (i.e. to realign limbs).
- Pillows/padding to help achieve position of comfort.
- There is a significant role for rest and reassurance in most circumstances involving pain.
DOCUMENTATION

Documenting the Effectiveness of Interventions

As reduction in pain is a measurable KPI, it is important to not only accurately assess pain, but to document the effect (or in some circumstances the lack thereof) of our interventions on pain scores.

Ensuring documentation is accurate allows analysis of the effectiveness of treatments and enables future research into other pain relief options. Importantly, documentation also provides the justification for your choice of dose, type of drug, time of administration and recording of effects and side effects.

It is important when completing PCRs for patients in pain that you include:

- A description of the pain and its severity. The description will prove useful for later reference if pain is relieved. Severity will form a baseline against which to measure the effectiveness of analgesia.
- A description of the analgesia provided including dose and route.
- A description of the effectiveness of each component of your analgesia. It can be misleading simply printing “effective” then proceeding with further similar administrations. Ensure pain score is added to the vital sign chart and that notes are recorded if side effects or unwanted actions occur.
**Pain Relief**

**Clinical Practice Guidelines**

**Special Notes**
- The term used is **Methoxyflurane in canister** unless specified.
- If an anesthetic is not available or delayed, consider implications of **Fentanyl** and use **Methoxyflurane**.
- Assist in positioning using **Fentanyl** and **Morphine** in concentrate. Ohme dosages will be required.
- Ensure respiratory depression occurs due to anesthetic. Administration should be restricted as per CNS A0501 Management of Extradural.
- If used with intraglass anesthesia, i.e. new entrant, sufentanil prior to surgery cannot be given **Morphine** by Ambulance. **Pain Management** refers to consultation with a Medical Officer at the referring hospital. **CPG** Pain Management may administer **Fentanyl** or **Ketamine** in this setting without consultation.

**Fentanyl (1% 50mg/ml) prepreparation**

<table>
<thead>
<tr>
<th>Age ≤ 50kg</th>
<th>100kg</th>
<th>150kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial dose</td>
<td>50mg</td>
<td>50mg</td>
</tr>
<tr>
<td>Ultra dose</td>
<td>25mg</td>
<td>25mg</td>
</tr>
<tr>
<td>Ultra dose</td>
<td>25mg</td>
<td>25mg</td>
</tr>
</tbody>
</table>

At initial intake 0.5 to 1.5 hours of additional daily doses. Cheek has been updated on the current guidelines.

**To add Fentanyl 1% 50mg/ml, give up desired volume according to dose table for the corresponding weight and age, then administer to the patient.**

The input amount to be calibrated into any number of ml. In some instances it may be appropriate to administer half of the volume into each of the two sides at each shot, over a period of 5 to 10 minutes, to avoid hypotension. This is also dependent on P1 compliance.

**Non IV Therapy**
- Patient already under control by non IV therapy or
- Unable to obtain IV

- **Action**
  - Consider **Methoxyflurane** and/or **Fentanyl** IV,
  - Methoxyflurane 3ml
  - Repeat 3ml (up to max. 18ml)
- **Fentanyl**
  - If age < 40 and ≤ 60kg: Fentanyl 200mg IV
  - Repeat up to 50mg IV (W/S-G) limited to patient
  - If age ≥ 40 and ≤ 60kg: Fentanyl 100mg IV
  - Repeat up to 50mg IV (W/S-G) limited to patient
  - If pain not controlled by above give IV for IV therapy

**IV Therapy**
- **Morphine** up to 5mg/kg
  - Tapered up to 50mg IV (W/S-G) limited to pain or side effects
- **Action**
  - Unable to get IV access
  - **Morphine** 50mg IV
  - Repeat 25 - 50mg IV (W/S-G) limited to pain or side effects

**Narcotic**
- **Action**
  - Per CPG A0501: Nausea and Vomiting

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**REFERENCE MATERIAL**

**Clinical Practice Guidelines**

**QES - Continuing Professional Education**

**Version 3 September 2010**

**QES/Pain Management/2010/002**

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Reference List


(10) Kestin, Dr I, Update in Anaesthesia: Morphine, Pharmacology Issue 3 (1993) Article 6: P1
