Fortnightly review

Treating acute pain in hospital

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In treating acute pain, tradition and ill informed prejudice sometimes hold sway over evidence and common sense. In this review we concentrate on simple, clinically appropriate, and evidence based treatments.

Methods

Whenever possible we based our recommendations on systematic reviews of randomised trials. A citation database of systematic reviews of pain relief can be found at <http://www.jr2.ox.ac.uk/Bandolier/painres/MAPain.html>.¹ We chose reviews for their relevance and quality. Poor quality reviews are significantly more likely to make positive conclusions.¹ We collected over 12 000 randomised trials of analgesic interventions from 1950 onwards²; these are available on the Cochrane database. We used trials from this database when there was no relevant systematic review.

What is pain?

The neurophysiology of acute pain may be complex, with sensory, affective, cognitive, and behavioural dimensions intertwined (fig 1). Although pain is influenced by all the factors in figure 1, the subjective measurement of pain has proved to be robust. At its simplest the patient reports pain, and this report is the yardstick against which doctors measure the effects of treatment. The message is "believe the patient."

Fig 1 Factors influencing the pain reported by patients

Summary points

- Opt for safety and simplicity
- Measure and record pain regularly—be proactive
- Choose evidence based interventions
- Trust patients and tailor treatment to their individual needs and allow them to have control
- Choose appropriate drug, route, and mode of delivery
- Educate staff and patients

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BMJ 1997;314:1531-5

Doctors cannot measure pain objectively, so the management of pain in patients who cannot report pain, such as babies and those who are unconscious, may pose problems.

Effective pain management is fundamental to the quality of care. We believe that good control of pain also speeds recovery, but there is still no compelling evidence that this is so. Advantage can be shown with proxy measures such as mobility or coughing, but evidence that good pain management leads to faster recovery would increase the pressure to improve current practice, which is often less than ideal. Table 1 shows the results of a survey of over 3000 recently discharged patients from 36 NHS hospitals. Not all of the patients had had surgery, but most had had severe or moderate pain, and almost a third said that it had been present all or most of the time.

Acute pain is not confined to postoperative wards, but is a problem in many clinical settings (box). Pain is predictable after surgery, but in other settings such as sudden illness or accident its onset is unexpected. Procedures need to be effective for both

Table 1 Responses to questions on pain by 3163 inpatients.³

	Proportion (%) of patients
Pain was present all or most of the time	1042/3162 (33)
Pain was severe or moderate	2755/3157 (87)
Pain was worse than expected	182/1051 (17)
Had to ask for drugs	1085/2589 (42)
Drugs did not arrive immediately	455/1085 (41)

Settings where pain is a problem

- After operations: inpatient; day surgery; wound dressing
- Medical illness: myocardial infarction; sickle cell crisis; renal colic
- Musculoskeletal disease: acute low back pain; rheumatoid arthritis
- Cancer
- Trauma
- Burns
- Childbirth

the predictable and the unexpected. The tools for treating pain are common to all types of acute pain, although particular clinical circumstances may require different management strategies (fig 2).

Drug treatment

Most acute pain is managed solely with drugs. In England during 1995 there were 32 million prescriptions for non-opioid drugs (mainly paracetamol and its combinations), 17 million for non-steroidal anti-inflammatory drugs, and 4 million for opioids.

Non-opioid drugs

Effective relief can be achieved with oral non-opioid and non-steroidal anti-inflammatory drugs. These drugs are appropriate for treating much pain after surgery or trauma, especially when patients go home on the day of the operation.

Figure 3 shows the efficacy of analgesics from randomised trials after all kinds of surgery. Efficacy is expressed as the number needed to treat—that is, the number of patients who need to receive the active drug for one to achieve at least 50% relief of pain compared with placebo over a treatment period of six hours. The most effective drugs have a low number needed to treat of about 2, meaning that for every two patients who receive the drug one patient will get at least 50% relief because of the treatment (the other patient may obtain relief but it does not reach 50%). For paracetamol 1 g the number needed to treat is 4. Combining paracetamol with codeine 60 mg improves the number needed to treat to 3. Ibuprofen is better at 2.

These comparisons of the number needed to treat are against placebo; a best number needed to treat of 2 means that while 50 out of 100 patients will get at least 50% relief because of the treatment another 20 will have a placebo response which gives them at least 50%

relief. Therefore, 70 out of 100 patients taking ibuprofen will have effective pain relief.

The clear message from figure 3 is that non-steroidal anti-inflammatory drugs perform best of the oral analgesics and that paracetamol alone or in combination with another drug such as codeine is also effective. Initial prescription of oral non-steroidal anti-inflammatory drugs may be supplemented with paracetamol. As pain wanes the prescription should be based on paracetamol, supplemented if necessary by non-steroidal anti-inflammatory drugs.

Route and mode of delivery—There is an old adage that if patients can swallow it is best to give drugs by mouth. There is no evidence that non-steroidal anti-inflammatory drugs given rectally or by injection perform better (or faster) than the same drug at the same dose given by mouth (R A Moore *et al*, unpublished systematic review). These other routes become appropriate when patients cannot swallow. Topical non-steroidal anti-inflammatory drugs are effective in acute musculoskeletal injuries—ibuprofen has a number needed to treat of 3 for at least 50% relief at one week compared with placebo (M R Tramèr *et al*, unpublished systematic review).

Adverse effects—Gastric bleeding is the main adverse effect from long term treatment with non-steroidal anti-inflammatory drugs, and ibuprofen is rated the safest in this respect.⁷ Renal and coagulation problems are the main concerns during the treatment of acute pain. Acute renal failure may be precipitated in patients with pre-existing heart or kidney disease, in those taking loop diuretics, and in those who have lost more than 10% of blood volume. Non-steroidal anti-inflammatory drugs significantly lengthen bleeding time, but it usually stays within normal values. This effect may last for days with aspirin and hours with other non-steroidal anti-inflammatory drugs.

Other drugs

Inhaled nitrous oxide provides analgesia that has a fast onset and is short acting and therefore has a special role in, for example, obstetrics and wound dressing. Corticosteroids are used to reduce pain and swelling after head and neck surgery and when swelling causes pain in cancer. Ketamine is used for emergency analgesia and anaesthesia.

Fig 2 Methods of treating pain

Opioids

Opioids are firstline treatment for severe acute pain. Intermittent opioid injection may provide effective relief of acute pain.⁸ Unfortunately, adequate doses are withheld because of traditions, misconceptions, ignorance, and fear. Doctors and nurses fear addiction and respiratory depression, but addiction is not a problem with opioid use in acute pain. Opioids given to people who are not in pain or in doses larger than necessary to control the pain can slow or indeed stop breathing, irrespective of the route of administration.

The key principle for the safe and effective use of opioids is to titrate the dose against the desired effect—pain relief—and minimise unwanted effects (box). If the patient is still complaining of pain and you are sure that all of the drug has been delivered and absorbed then it is safe to give another, usually smaller, dose. For example, more drug may be given 5 minutes after intravenous injection, 1 hour after intramuscular or subcutaneous injection, and 90 minutes after oral administration. If the second dose is also ineffective repeat the process or change the route of administration to achieve faster control. Delayed release formulations, oral or transdermal, should not be used in acute pain because a delayed onset and offset are dangerous in this context.

Principle for safe and effective opioid use

Titrate to effect—if the patient is asking for more opioid then it usually signals inadequate pain control:

- Too little drug
- Too long between doses
- Too little attention having been paid to the patient
- Too much reliance on rigid (inadequate) regimens

There is no compelling evidence that one opioid is better than another, but there is good evidence that pethidine has a specific disadvantage¹⁰ and no specific advantage. Given in multiple doses the metabolite nor-pethidine can accumulate and act as a central nervous system irritant, ultimately causing convulsions, especially in patients with renal dysfunction. Pethidine should not be used when multiple injections are needed. The old idea that pethidine is better than other opioids at dealing with colicky pain is no longer tenable.¹¹

Morphine (and its relatives diamorphine and codeine) has an active rather than a toxic metabolite, morphine 6-glucuronide. In renal dysfunction this metabolite accumulates and results in a greater effect from a given dose because it is more active than morphine. If dose is being titrated against effect this will not matter as less morphine will be needed. Accumulation can be a problem in unconscious patients in intensive care whose renal function is compromised and who are being treated according to a fixed dose schedule.

Adverse effects of opioids include nausea and vomiting, constipation, sedation, pruritus, urinary retention, and respiratory depression. There is no good evidence that the incidence is different with different opioids at the same level of analgesia. The risk of adverse events is increased when high tech approaches are used for drug administration.¹²

Fig 3 Effectiveness of oral analgesics. Horizontal lines show 95% confidence intervals

Risk management

We believe that there are persuasive reasons for using only one opioid so that everyone is familiar with dosage, effects, and problems, thus reducing their risks. We prefer morphine. Whichever drug is chosen, simple changes to the way opioids are used, good staff education, and implementing an algorithm for intermittent opioid dosing have a powerful impact on pain relief and patient satisfaction.⁸

Nurse administered intermittent opioid injection requires good staffing to minimise delay between need and injection. A shortage of staff, the distractions of a ward, and controlled drug regulations all increase the delay. Patient controlled analgesia overcomes these logistical problems. The patient presses a button and receives a preset dose of opioid from a syringe driver connected to an intravenous or subcutaneous cannula. This delivers opioid to the same opioid receptors as an intermittent injection, but it allows the patient to circumvent delays. Not surprisingly there is little difference in outcome between efficient intermittent injection and patient controlled analgesia.¹³ Good risk management with patient controlled analgesia should emphasise the same drug, protocols, and equipment throughout the hospital.

New routes of opioid administration may prove to have advantage over conventional routes, to have different kinetic profiles, or to be more convenient, but their place in mainstream care is unproved.

Regional analgesia

The perceived advantage of regional analgesia over local anaesthesia is that it can deliver complete pain relief by interrupting pain transmission from a localised area, so avoiding generalised adverse effects from drugs. This advantage is more obvious when further doses can be given through a catheter, extending the duration of analgesia. Details are given in table 2.

There is a necessary distinction between blocks done to permit surgery and blocks done together with a general anaesthetic to provide postoperative pain relief. There is clear evidence that blocks provide good relief in the initial postoperative period¹⁴ but no evidence to suggest that patients with blocks then experience rebound and need more postoperative pain relief. The risk of neurological damage is the main drawback,¹⁵ and, ideally, blocks should not be done on anaesthetised patients.

Table 2 Indications for, advantages of, and problems with different types of regional analgesia

	Indications	Advantages	Problems
Low tech			
Topical agents	Surface surgery	Simple	Short duration
Wound infiltration	Most wounds	Simple	Short duration
Peripheral nerve blocks	Surgery to arms and legs; trauma	Catheter may be used	
Plexus blocks	Surgery to arms and legs	Catheter may be used	Nerve damage and motor block
High tech			
Epidural (including caudal)	Major surgery (thoracoabdominal, legs)	Catheter may be used; risk of thromboembolism is reduced	Surveillance of adverse effects
Intrathecal infusion	Major surgery (thoracoabdominal, legs)	Long duration relief is possible from single injection of low dose opioid	Surveillance of adverse effects

Epidural analgesia

Epidural infusion through a catheter can offer continuous relief after trauma or surgery to legs, spine, abdomen, or chest. Currently, a mixture of opioid and local anaesthetic is considered to be optimal. Opioids and local anaesthetics act synergistically, so lower doses of each are required for equivalent analgesia and produce fewer adverse effects.¹⁶ Epidurals are widely used for pain relief in labour.

The risks of epidural analgesia are those of an epidural (dural puncture, infection, haematoma, nerve damage), those of the local anaesthetic (hypotension, motor block, toxicity), and those of the opioid, (nausea, sedation, urinary retention, respiratory depression, pruritus) (box). Wrong doses may be given,¹² so increased surveillance is mandatory. The risk of persistent neurological sequelae after an epidural is about 1 in 5000.¹⁷ Debate continues about whether patients with epidural infusions should be nursed on general wards. These techniques are appropriate only for major trauma or surgery, when the potential benefits outweigh the risks.

Adverse effects of regional analgesia

- Damage to nerves, pleura, dura, or viscus
- Intravenous injection of local anaesthetic
- Overdose of local anaesthetic
- Motor block
- Autonomic blockade--hypotension, urinary retention
- Respiratory depression (with spinal opioids)

Other techniques

Although experts can obtain good results with specialised procedures such as paravertebral or interpleural injections, the evidence that less skilled operators obtain better results with these procedures than with standard methods is often lacking. Systematic reviews support the use of epidurals in back pain (with caveats),^{18 19} but they do not support the use of shoulder joint injections.²⁰

Physical and psychological methods

Transcutaneous electrical nerve stimulation is not effective for postoperative pain²¹ and is of limited value for labour pain.²² Systematic reviews of acupuncture are confined to chronic pain.

Psychological approaches help.²³ Cognitive behavioural methods may reduce pain and distress in patients with burns. Preparation before surgery may reduce the amount of analgesia required postoperatively.

Recommendations

General

The tenets of good management of acute pain are that, with good staff education in place, appropriate drug doses are given when needed by the appropriate route and delivery method. Schemes have to be flexible enough to respond to individual patients' needs in different clinical settings. Figure 4 gives a general strategy.

There is controversy about the optimal timing of initial analgesia. Most randomised trials comparing the same intervention given before or after the start of pain have not shown so called pre-emptive analgesia to be clinically advantageous.²⁴ Whether poorly controlled acute pain generates chronic pain is also controversial.

The factors that need to be considered when choosing treatment are coexisting illness, the number of staff available, the equipment available, the risks and unwanted effects of the various options, the appropriateness of the chosen intervention for the pain, the evidence of efficacy for the chosen intervention, and cost. The steps to successful management are regularly assessing pain and adverse effects; developing protocols for monitoring and treating pain and adverse effects; titrating doses at short intervals until pain is relieved; not being afraid to use more than one approach; providing appropriate back up from identified staff; and providing continuing inservice training and education.

Problem pains and patients

Standard interventions and protocols will cope with most problems of acute pain, but some patients will require special management (box). Expertise may exist in specific units, but if it is not available seek the advice of the acute pain service. In particular do not let pain in children go untreated.

Fig 4 Overview of management of acute pain

Predictable problems

- Babies and infants—communication, drug handling
- Elderly people—coexisting illness, drug handling
- Respiratory disease—respiratory depression, non-steroidal anti-inflammatory drugs and asthma
- Renal failure—drug handling, non-steroidal anti-inflammatory drugs
- Head injury or impaired consciousness—assessment, dose titration
- Drug addiction or patient already taking opioids—dose titration, weaning, respiratory depression after nerve block to stop pain
- Sickle cell disease—assessment, varying analgesic needs

Acute low back pain

The Clinical Standards Advisory Group made firm recommendations for managing acute low back pain.²⁵ Firstly, the doctor should perform diagnostic triage. Secondly, the early stages of pain should be managed by simple analgesics, physical treatments, and up to three days of rest. Prolonged rest is not recommended. Thirdly, early activity should be encouraged, with a biopsychosocial assessment at six weeks. Finally, patients should receive active rehabilitation.

Pain charts

Pain charts used as part of normal practice will improve quality of care.^{8, 26} The presence of a chart is important rather than its form. The degree of pain should be recorded along with sedation, respiratory frequency, and nausea. The chart may also be used for audit. An example is the Burford chart.²⁷ There are special scales for children.²⁸

Acute pain services

One remedy for poor management is to provide an acute pain service.²⁹ There is dispute about what should be provided, ranging from a full service that includes all the high tech options³⁰ to a service limited to supervision of good practice guidelines for low tech approaches and staff education.^{8, 26} We think that training and education should be the main tasks of an acute pain service.

Conclusion

The key to successful management of pain is education, not new drugs or high tech delivery systems. Existing tools can do the job if doctors and nurses are educated both about dispelling the myths and misconceptions and about taking responsibility for providing good pain control. It is much easier to dispel myths when you have the evidence. For many years patients were not given adequate analgesia for abdominal pain in case it masked the signs necessary for diagnosis. This was wrong.³¹

Pain relief should not be seen as someone else's responsibility or simply dismissed because in the end the pain and the patient go away. Freedom from pain is important to patients. In 1846 the first anaesthetic provided pain free surgery. One hundred and fifty years later patients should not have to endure unrelieved pain anywhere in hospital.

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Correction

Grand round: Hazards of running a marathon

An author's error occurred in this article by G R Thompson (5 April, pp 1023-5). The authors gave the wrong date for the year in which the physician ran the London and New York marathons. The first line of the case history should therefore have read: "A 61 year old physician volunteered to run in the 1994 [not 1993] London marathon" and the first line of the fourth paragraph on p 1024 should have read: "Up to and including 1994 there were two deaths...."

1 Jadad AR, McQuay HJ. Meta-analyses to evaluate analgesic interventions: a systematic qualitative review of their methodology. *J Clin Epidemiol* 1996;49:235-43.