A Pain in the ED

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Q *What's the problem of pain?*

A Physicians working in the emergency department (ED) have long known that pain is a key symptom motivating patients to seek care. A recent study documented inadequate analgesia in emergency medicine. There is also considerable evidence to show that post-operative pain is poorly managed.

Factors contributing to poor pain management include:

- a lack of education on pain management,
- inadequate quality-management programs evaluating pain practices,
- few rigorous studies of patients with special needs (particularly in geriatric and pediatric patients) and
- inappropriate concerns about the safety of opioids compared to non-ste… matory drugs (N…

…addiction, mis-…se, namely the abuse of con-…ease oxycodone. Investigations and the prosecution of physicians treating chronic pain have …physicians might exert a "chill-…t" on pain managements.

Despite these concerns, pain management is becoming a much higher priority for hospitals, including the ED. Since 1995, the American Pain Society has campaigned to make pain the *Fifth Vital Sign*. In 2003, the Canadian Council on Health Services Accreditation announced that new pain-focused criteria would be included in its Standards Document for 2005.

Patty's pain

- Patty, 78, fell down several concrete steps.
- She presents to the emergency department (ED) complaining of pain in the lower back at eight out of 10 on the pain scale.
- The pain radiates to the inguinal region on both sides and increases to nine out of ten with activity.
- There are no accompanying motor symptoms.
- Bowel and bladder function are both normal.
- Patty's history includes:
  - osteoporosis,
  - hypertensi…

Cover photograph: Emergency equipment (Corbis®)

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What are the treatments?

Pain continues to be a significant challenge for emergency physicians. However, there is a growing arsenal of strategies to help manage most forms of pain. The key is to know the principles of pain management.

Acetaminophen

Acetaminophen is effective for mild to moderate nociceptive pain. It can also be used as an adjunct to opioid analgesics for severe pain. It is believed to act by inhibiting cyclo-oxygenase-3. A single dose of acetaminophen, 1,000 mg, has a number needed to treat (NNT) of 3.8 for at least 50% of post-operative pain for four to six hours. The maximum dose for short-term use (ten days) is 4,000 mg per day. Beyond ten days, the total dosage should be reduced to 3,200 mg per day in otherwise healthy patients. Patients with liver disease taking acetaminophen for more than ten days should take a maximum of 2,600 mg per day.

NSAIDs and coxibs

Anti-inflammatory drugs are effective for nociceptive pain. Ibuprofen, 400 mg, has a NNT of 2.4 (range 2.3 to 2.6) for post-operative pain. Diclofenac has an NNT of 2.3 (range 2.0 to 2.7), while naproxen has a NNT of 2.6 (range 2.2 to 3.2). Non-steroidal anti-inflammatory drugs (NSAIDs) in long-term use have an annual 4% risk of gastrointestinal (GI) perforations, ulcers or bleeds. Taking an NSAID for two months or more carries a 0.2% risk of an endoscopically proven ulcer and a one in 0.006% risk of a bleeding ulcer.

Valdecoxib, 20 mg, has an NNT of 1.7 (range 1.4 to 2.0), while celecoxib, 200 mg, has an NNT of 4.5 (range 3.3 to 7.2). Coxibs have roughly half the risk of GI perforations, ulcers and bleeds compared to NSAIDs. Unfortunately, rofecoxib use was found to double the risk of myocardial infarction and stroke, a finding that resulted in rofecoxib being withdrawn from the market. Presently, there are concerns that the risk of cardiovascular events is a class-based effect.

Opioid analgesics

Opioid analgesics are a mainstay for the management of severe pain in the ED. They bind to mu receptors in the brain and the spinal cord. They also have peripheral anti-nociceptive effects. There are genetically mediated, inter-individual differences in opioid efficacy and toxicity. Thus, there is no ideal opioid of choice for all patients. Morphine, hydromorphone and fentanyl have all been proven effective in severe pain management. Meperidine is being administered less and less, as repeated use causes accumulation of normeperidine, a neurotoxic metabolite.

Opioids should be titrated intravenously until the patient experiences a three digit or 20 mm to 30 mm decrease in pain scores or until unacceptable side-effects occur. Typical side-effects to opioid analgesics include sedation, mental clouding and nausea. Respiratory depression can usually be avoided through slow and careful titration. Recently, intra-articular administration of 1 mg to 2 mg of morphine in 5 cc to 10 cc of normal saline has been advocated as an alternative to corticosteroids in the management of pain due to osteoarthritis, as well as ligamentous injuries of the knee.

Local and topical anesthetics

Intradermal administration of 1% to 2% lidocaine has been used for years for local anesthesia prior to suturing, as well as incision and drainage of abscesses. Lidocaine is also used for hematoma blocks prior to the reduction of Collés fractures.

Intra-articular lidocaine can be as effective as intravenous analgesia and sedation with drugs, such as opioids and midazolam or opioids and proposal, but with faster recovery. To infiltrate the shoulder, inject 20 cc of 1% lidocaine (without epinephrine) via a 1 in., 20 gauge needle inserted 2 cm inferior and directly lateral to the acromion in the lateral sulcus left by the absent humeral head.

Recently, nebulized lidocaine (4 cc 10%) has been shown to reduce visual analog scale pain scores by 21.6 mm. However, the use of nebulized lidocaine has been shown to be associated with an increased risk of epistaxis, which may be due to trauma to insensate turbinates. Another option is to use topical lidocaine gel instead.

Calcitonin

Calcitonin has been shown to relieve pain associated with osteoporotic vertebral compression fractures. The recommended dosage is 200 IU per day, by implementation monitoring, or 400 IU per day by nasal spray (one 200 IU spray per nostril). A systematic review of combined results from five randomized, controlled trials involving 246 patients found that calcitonin reduced the severity of pain using a visual analogue scale following diagnosis and also shortened the time to mobilization.

Special procedures

Some patients with painful conditions may benefit from special procedures. For instance, patients with multiple fractured ribs may benefit from nerve blocks and epidural administration of opioid analgesics and local anesthetics. Patients with osteoporotic vertebral compression fractures may benefit from vertebroplasty, a procedure in which the fracture is reduced and fixated via percutaneous administration of a semisolid mixture of polymethylmethacrylate.

Q How is pain assessed in the ED?

A The patient's pain should be assessed immediately after their arrival to the ED and they should be administered analgesics and other interventions. The Numberic Pain Distress Scale is the easiest method of assessment. This scale asks the patient to rate their pain on a scale from zero to 10 (10 being the worst pain ever experienced). Descriptive expressions, such as "Distressing Pain," are associated with the scale numbers. Patients finding it difficult to rate using numbers should be encouraged to choose an expression to describe their pain.

The Visual Analog Scale (VAS) can also be used. The patient is shown a 10-cm scale with "No Pain" written on the left-hand side of the scale and "Pain as Bad as it Could Possibly Be" written on the right-hand side, and is asked to mark where on the scale they would rate their pain. The bottom line with these assessments is that the patient is asked to subjectively rate their pain.

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Pain is assessed to determine its severity at baseline and to evaluate response to treatment. In practical terms, a 30-mm reduction of pain on the VAS or a reduction of three digits on the Numeric Pain Distress Scale would be considered a clinically meaningful reduction in pain.

Some patients may exaggerate their pain beyond the range of the scale, fearing that physicians and nurses only respond to high numbers. Patients will only learn to use rating systems reliably if they're convinced that health-care professionals will respond to their needs appropriately.

Q What are the principles of managing pain?

A There are four principles of good pain management, many of which have been used for years in the management of post-operative pain:

1. ***Find and treat the source of tissue damage or inflammation.*** It's important to do a complete history and physical examination and to order appropriate diagnostic tests to pinpoint and resolve the cause of pain.
2. ***Manage pain preemptively.*** This means giving analgesics before doing painful procedures, such as the reduction of fractures and dislocations, incisions and the drainage of abscesses. In patients with spontaneous pain (*e.g.*, renal colic), preemptive pain management means treating pain as early as possible following arrival to the ED. Evidence from patients treated with patient-controlled analgesia shows that the earlier pain is treated, the more effective the treatment and the lower the required dosage of analgesia.
3. ***Use multimodal approaches.*** Multimodal pain management aims to take advantage of

the additive effect of analgesics, with fewer side-effects. For example, unless there are contraindications, patients undergoing day surgery receive an NSAID, such as naproxen, 500 mg, orally, 30 to 90 minutes prior to surgery, as well as acetaminophen, 1,000 mg, orally, on the day of surgery. Prior to surgery, the incision and portal sites are infiltrated with local anesthetic, as is the joint being operated on.

During the operation, patients receive an NSAID injection, as well as opioid analgesia. Post-operatively, patients receive opioid analgesics, NSAIDs and acetaminophen for several days at most.

4. ***Manage pain continuously***. Studies have shown that the inflammatory response to tissue damage may last beyond the time the patient is in the ED. Thus, pain should be treated continuously until the inflammatory response is exhausted. That means making certain patients not only receive adequate analgesics in the ED, but also receive them when discharged from the hospital. Dx

More on Patty

Patty was initially treated with acetaminophen and codeine, but the combination was ineffective at relieving her pain. She was switched to controlled-release oxycodone, 10 mg, every 12 hours in the ED and was started on calcitonin, 400 IU per day intranasally. Because of hypertension, non-steroidal anti-inflammatories were not used with Patty. She was also encouraged to take acetaminophen, 3,200 mg per day, and was prescribed lactulose for constipation. Home-care nursing was arranged to assist her with mobilization and homemaking. Within two days, her pain improved significantly. Four weeks later, Patty was able to look after herself without nursing assistance.

References available—contact *The Canadian Journal of Diagnosis* at **diagnosis@sta.ca.**