GUIDELINE

Chinese specialist consensus on treatment of customary pain in orthopaedics

Chinese Orthopaedic Association

Introduction

Pain has been defined by the World Health Organization (WHO) and International Association for the study of Pain (IASP) as the unpleasant sensory and emotional experience caused by tissue injury or potential tissue damage¹. In 1995, James, the president of the American Association of Physicists in Medicine (AAPM), proposed making pain “The Fifth Vital Sign”.

Pain is one of the most common clinical problems faced by orthopaedic surgeons. Persistent pain creates pathological changes in the central nervous system. If acute pain is not controlled in its early stages, it will develop into chronic pain, which is hard to treat. Chronic pain is an unpleasant experience which can damage bodily health, extend the length of hospital stay, add to the cost of treatment, and make normal social activities impossible. Nowadays, with improvements in living standards, people have greater requirements for analgesia. So, in addition to identifying the cause of illness and curing the primary disease, control of pain as early as possible is an urgent priority for doctors. The analgesic methods referred to in this article are applicable only to musculoskeletal pain occurring in the perioperative period or caused by nonmalignant tumors, and do not relate to diagnosis and treatment of the primary disease.

The classification of pain

According to its duration and character, pain can be divided into two types: acute and chronic. Pain that comes on quickly, but lasts a relatively short time (less than three months), is defined as acute pain^{2,3}. Chronic pain usually lasts for more than three months⁴.

According to the pathologic mechanism, pain can be divided into another three types: nociceptive, neuropathic

and mixed. Nociceptive pain is caused by stimulation of nociceptive receptors. The sensation of pain is related to tissue damage. The painful syndrome caused by injuries to the peripheral or central nervous system is called neuropathic pain.

The diagnosis and evaluation of pain

During the diagnosis and evaluation of pain, checks should be undertaken to determine whether the following conditions exist: i) serious conditions that should be treated immediately, such as cancer, infection, fracture, and nerve injury; ii) mental and vocational factors that could affect rehabilitation of the patient, such as their attitude to pain, emotional state, and vocational characteristics. Clinical, mental and vocational factors should be dealt with simultaneously.

The purpose and principles of pain management

Purpose

To relieve or eliminate pain, improve the function of the body, lessen adverse reactions to medication, and improve quality of life, including improvement of physical and mental conditions.

Principles

1. Pay attention to public health education

Because pain is usually accompanied by anxious and tense emotions, it is important to educate and communicate with patients suffering with pain in order to get their confidence and achieve the ideal therapeutic efficacy.

2. Choose a reasonable method of evaluation

In the case of acute pain, the methods of evaluation should be as easy as possible. We can choose quantifying methods if the extent of pain needs to be described exactly.

3. Deal with the pain as early as possible

Once pain has become chronic, it is difficult to treat. Therefore, it is necessary to deal with pain at an early stage. Nowadays, preemptive analgesia for postoperative

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pain is advocated, meaning that analgesic therapy should be supplied before the occurrence of nociceptive stimuli.

4. Consider combined modality therapy

Allied analgesia means the combination of different drugs with different mechanisms. This can produce synergistic effects of the medication, decrease the dose and the adverse reactions of any individual drug, speed up the effectiveness and prolong the analgesia time. Nowadays, the most frequently used method is to combine weak opioid drugs with acetaminophen or nonsteroidal anti-inflammatory drugs (NSAIDs). However, it is best to avoid using the same type of drug repeatedly.

5. Individual requirements for analgesia

Patients appear to have different responses to pain and analgesic medication. Therefore, analgesic methods should be varied from person to person. The final aim of individual analgesia is to get the best analgesic effect with the smallest dose.

Standard approaches to orthopaedic pain treatment

Non-pharmacotherapy interventions

Non-pharmacologic interventions include patient education, physical therapy (including hot and/or ice compresses, acupuncture or acupressure, massage, and transdermal electrical neurostimulation), and training in diversion, relaxation and cognitive behavioral techniques. These interventions produce different results and have specific indications depending on the severity of pain. It is recommended that a reasonable non-pharmacotherapy intervention should be chosen in accordance with the illness and its progress.

Analgesics

Please read the instructions before prescribing any drug.

1. Topical administration

Topical preparations such as NSAID creams, gels, pastes and capsaicin scrubs can effectively relieve superficial pain caused by myofascitis, enthesopathy, tenosynovitis, osteoarthritis and rheumatoid arthritis.

2. Systemic administration

(i) Acetaminophen⁵

Acetaminophen relieves fever and pain by suppressing prostaglandin synthesis in the central nervous system. A daily dose of no more than 4000 mg produces minimal side effects. Overdosage may induce liver injury. Acetaminophen is recommended for mild and moderate pain.

(ii) Nonsteroidal anti-inflammatory drugs⁶

NSAIDs, including conventional nonselective NSAIDs and selective COX-2 inhibitors, are recommended for syn-

Table 1 Risk factors for prescribing NSAIDs

Onset location	Risk factors for adverse effects
Upper gastrointestinal	Age $\geq$ 65 years Long term usage of NSAIDs Concurrent corticosteroid therapy History of upper gastro-intestinal ulcer/bleeding Concurrent anticoagulant therapy History of alcohol abuse
Cardiovascular	Age $\geq$ 65 years
Cerebral	History of cerebral accident (stroke or onset of transient ischemia attack)
Renal	History of cardiovascular disease Concomitant administration of angiotensin-converting enzyme inhibitors (ACEI) or diuretics Perioperative period of coronary artery bypass grafting (completely contraindicated)

ergistic treatment of mild to moderate and severe pain. These drugs can be administered by the oral, intramuscular, or rectal route.

NSAIDs should not be used unless their instructions have been read and the risk factors assessed in advance (Table 1). For patients at high risk of gastrointestinal side-effects, H₂-receptor antagonists, proton pump inhibitors or gastric mucosa protectors combined with nonselective NSAIDs are recommended in order to prevent the gastrointestinal side-effects which can be induced by NSAIDs or selective COX-2 NSAIDs. Effectiveness and safety also have to be balanced when NSAIDs are administered to patients with a high risk of cardiovascular disease. Simultaneous use of two types or more of NSAIDs should be avoided. NSAIDs with a good safety record for liver, gastrointestinal and renal system are highly recommended for the elderly.

(iii) Opioid analgesics⁷

The opioids relieve pain by targeting opioid-receptors in the central or peripheral nervous system. They include codeine, oxycodone, morphine, and fentanyl. The most common side-effects of opioids are nausea, vomiting, constipation, lethargy, over-sedation and respiratory inhibition.

Tramadol is an analgesic that binds weakly to μ -opioid receptors and inhibits the reuptake of serotonin and norepinephrine. Neither of these effects alone can account for the medication's analgesic efficacy, which appears to result from an additive effect of the two mechanisms.

Opioids, when used to treat chronic pain, require continuous monitoring of severity of pain and appropriate tapering of the dosage in order to avoid drug dependence.

Figure 1 Procedure for musculoskeletal pain management.

(iv) Compound analgesics^{8,9}

Compound analgesics, designed to achieve a cooperative effect, involve two or more preparations with different analgesic mechanisms. The most common compound analgesic is a combination of acetaminophen and tramadol¹⁰. the daily dose of acetaminophen in the compounds should not exceed 2000 mg.

(v) Local block therapy

Local block therapy is implemented by local injection of a mixture of steroid solution and local anesthetic in certain concentrations and amounts into painful joints or fascia. Glucocorticoids are extensively used in the clinic for their anti-inflammation effects. They help to minimize injuries caused by pathogenic factors through improving microvascular permeability and reducing inflammation reaction. Common steroids include methylprednisolone and dexamethasone. Examples of local anesthetics include lidocaine, procaine and ropivacaine. They can be used for block therapy of distal or peripheral nerve trunks.

(vi) Addition of co-analgesics

Adding co-analgesics can be helpful for patients whose pain is only partially responsive to opioids. Narcotics, antidepressants, anxiolytics and anticonvulsants are all optional co-analgesics.

Procedure for musculoskeletal pain management^{11–13}

Treatment of musculoskeletal pain (Fig. 1) includes the following main steps: (i) evaluation of patient history and physical examination; (ii) formulation of strategies for pain control; (iii) comprehensive pain assessment, then reassessment of efficacy and side-effects of the selected strategies; (iv) conversion or rotation of the pain control plan if necessary; (v) patient education and ongoing reevaluation.

Perioperative pain management program for orthopaedic patients

Perioperative pain in the practice of the orthopaedics includes the pain resulting from the primary disease and/or from the surgical intervention.

The goals of perioperative analgesia

1. Lessening postoperative pain and improving quality of life.
2. Improving the patient's preoperative evaluation
3. Beginning rehabilitation training as soon as possible
4. Decreasing the incidence of postoperative complications.

Perioperative pain management in orthopaedic surgery

Effective perioperative pain management may be needed in three phases^{14–19} (Fig. 2): the preoperative, intra-operative and postoperative phases. Because the second phase is controlled by anesthesiologists, this is not covered in this guideline.

1. Preoperative analgesia

This should take account of the increased risk of bleeding with certain medications (e.g. aspirin). Where patients have been taking such analgesics preoperatively for the management of their primary disease, the drugs should be discontinued or changed to another one.

2. Post-operative analgesia

Post-operative pain and inflammatory response may be severe; the degree and the duration of post-operative pain vary greatly depending on the site and type of the surgery (Table 2). If the patients can take food immediately after surgery, they can take oral medications; otherwise these medications should be given by intravenous injection or other routes as necessary.

Figure 2 Perioperative pain management protocol.

The general method for evaluation of pain intensity

*Numerical rating scale*²⁰

Differences in pain intensity can be expressed on a numerical scale of 0–10: 0 is no pain; 1–3 is mild (the pain has no influence on sleep); 4–6 is moderate pain; 7–9 is severe pain (cannot sleep or pain wakes the patient); and 10 is extreme pain (Fig. 3). The pain intensity should be ascertained and recorded, or the patient can choose the most appropriate number themselves. This method is commonly used in clinical practice.

Table 2 The post-operative pain grades of common orthopaedic surgery

Grades	Type of the surgery
Low grade	Joint lavage, soft tissue surgery, removal of the internal fixation and so on
Moderate grade	Joint ligament reconstruction, spinal fusion, laminectomy and so on
High grade	Bone tumor operation, joint replacement, fracture internal fixation, amputation and so on

Figure 3 A sketch map of the numerical rating scale.

Verbal description scales²¹

Verbal description scales have four levels: grade 0 is no pain; grade I is mild (the pain can be endured, life is normal and sleep is not interrupted); grade II is moderate (the pain is significant and unbearable, tranquilizers are needed and sleep is disturbed); grade III is severe (the pain is severe and unbearable, tranquilizers are needed and sleep is seriously disturbed). Some patients have disturbances in the parasympathetic system or are lie in a passive body position.

Visual analogue scale²¹

This entails drawing a line on paper using a 10 cm long ruler, one end of which represents no pain while the other end represents severe pain. Patients are asked to mark “X” on the paper or ruler to indicate the severity of their pain. The degree of the patients’ pain is represented by their marks.

The evaluation of pain is performed not only at rest, but also during activity for patients who are using analgesics. Only when pain is relieved during activity will exercise be encouraged and complications prevented. Although the visual analogue scale is widely used in the clinic, it still has some disadvantages: (i) it is not suitable for mentally ill patients or patients on tranquilizers; (ii) it requires that patients have normal vision and basic sporting ability; and (iii) it requires the patients to estimate, and doctor or nurse to measure.

Pain scale according to facial expression^{22,23}

The pain scale according to facial expression, which originated from the visual analogue scale method, is objective and convenient to use. Six different faces ranging from happy to sorrowful and weeping are shown to the patient (Fig. 4). This method is easy to understand, and has broad application. Even children who cannot express themselves verbally very well also can use this method.

McGill pain questionnaire (MPQ)²⁴

The main aim of MPQ is to evaluate the character of pain. It includes a body sketch to show the location of

Figure 4 A schematic version of the pain scale by facial expression.

pain. There are 78 words to describe different kinds of pain, which are arranged according to ascending pain intensity. It includes four sections covering sensation, emotion, evaluation and a non-specific group. This is a multi-factor pain investigation and evaluation method. It is designed precisely, emphasizing the character of the pain, special characteristics, intensity and accompanying state. It also observes different compound factors and their inter-relation of the patient after the treatment of pain. The MPQ is used mainly in clinical research.

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