Administration of Opioids and Nsaids for Mild to Severe Pain

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Abstract

Pain is an unpleasant sensory or emotional experience, because there is tissue damage or threatened damage or circumstances indicate the location of damaged tissue. There are several ways to determine the degree of pain, using a numerical rating score (NRS) and visual analog scale (VAS). The degree of pain varies from mild pain, medium, to severe pain, like postoperative vascular or cardiac surgery. World Health Organization (WHO) has made a pain management guidelines ranging from the provision of non-steroidal analgesic drug (NSAID) to a combination of NSAIDs and opioids with additional drugs (adjuvant). This paper will describe opioid analgesic medication for severe acute pain and administration of NSAIDs for mild pain or chronic pain according to the guidelines of the WHO.

Key word: *pain, vascular, cardiac surgery, NSAIDs, opioid*

Pain is an unpleasant sensory and emotional experience, with respect to actual tissue damage or threat of tissue damage, or described in terms of such damage. Pain serves as a protection mechanism, defensive and diagnostic support. It also caused suffering. As a protective mechanism, sensible pain allows one to react to a trauma or a cause of pain in order to avoid the occurrence of damage to body tissues. As a defensive mechanism, allowing for immobilization organs inflamed or broken so sensible perceived to subside and can speed healing. Location of pain may indicate an organ or tissue that is exposed to damage or threatened damage.

Pain can be classified according pathophysiology, such as pain or neuropathic nociception, based on etiology such as cancer or postoperative pain, or based on the affected area such as headache or low back pain. Nociception term used to describe the response to trauma or excitatory nociception/wound. All nociception stimuli produce pain, but not all pain stimuli derived from nociception. The clinicians then classify pain into two categories: acute pain, which occurs because of nociception and chronic pain that occurs because of nociception and involves psychological and personality factors often play a major role lasts than 6 months.

Mechanism of pain

The pain arises due to stimulation by substances of algesic to the pain receptors. They are often found in the superficial layers of the skin and in some tissues in the body. Pain receptors are free ends of A delta afferent nerve, and C fibers. These receptors are activated by the presence of stimuli with high intensity, for example in the form of temperature stimuli, mechanical, electrical or chemical stimulation. Algesic substances that would activate pain receptors are ion C, H, lactic acid, serotonin, bradykinine, histamine and prostaglandins.

The series of processes that accompany the tissue damage (as a source of pain stimuli) until feels pain perception is an electro-physiological process, which is referred to as nociception. There are 4 clear processes to

follow a process of electro-physiological nociception, namely:

1. Transduction. Pain stimulation process were translated or converted into an electrical activity in nerve endings.
2. Transmission. Transmission is process of distribution of sensory nerves following impulses through transduction process. This impulse will be transmitted by nerve fibers A delta and C fibers as the first of peripheral neurons to the spinal cord.
3. Modulation. The process of interaction between endogenous anti-pain system with incoming pain impulses to the dorsal horn spinal cord. The system includes anti-pain endogenous enkephalins, endorphins, serotonin, and nor-adrenaline which has the effect of pressing the pain impulses to the dorsal horn spinal cord. In this condition, the dorsal horn is described as a gate pain, which can be closed or open to the channel of pain impulses.
4. Perception. The end result of the complex and unique interaction that starts from the transduction, transmission, modulation, and ultimately produce a subjective feeling known as pain perception in the central nervous system.

ASSESSMENT OF PAIN

Various methods were used to measure the degree of pain, which is a simple way to determine the degree of pain is qualitatively as follows:

1. Mild pain is intermittent pain, especially when doing daily activities and lost at bedtime
2. Mid pain is continuous, causing disruption activity, which only disappear when the person is sleeping
3. Severe pain is pain that is continuous throughout the day, and people are not sleeping or frequent waking during sleep by pain disorders.

At this moment, determines the degree of semi-quantitative pain using a ruler who was given a number on a scale of 0 -which means no pain- to 10 for maximum pain. This method is popularly called: Numerical Rating Score (NRS). There is also a pain scale with a picture showing the face of mild to severe pain, known as the Visual Analogue Scale (VAS)

Pain management

This procedure has been recommended for pain management:

1. Prioritize clinical approaches, including psychotherapy approaches within the meaning of the broadest.
2. Engage patients and their families, and explain the possible clinical therapies that can be applied.
3. Advise patient and family to provide correct and detailed reports about pain and others, that are considered important to tell your doctor, so that can create collaboration between physicians and patients.

There are outline of pharmacological treatment strategies that can follow "Analgetic WHO Three Step Ladder" from WHO. Three steps according to the WHO analgesic ladder for the treatment of pain that consists of:

1. The first step pain management is the use of non-opioid analgesics and can be coupled with an adjuvant such as vitamin B1, sedative diazepam group.
2. If the pain still remains, it can go up to the second step, the first step plus a weak opioid drug such as codeine.
3. If it still has not subsided or settled then the third step is recommended to use the first step but using hard opioids such as morphine, or fentanyl. Can also perform peripheral nerve blocks.

Basically, the principle of the "Three Step Analgesic Ladder" can be applied to chronic pain or acute pain:

1. In chronic pain following the step ladder up 1-2-3 (WHO Three Step Analgesic Ladder)
2. In acute pain, otherwise follow the step ladder down 3-2-1 (WHO Three Step Analgesic Ladder)

The use of opioids in acute pain

Opiate or opioid analgesic that has an analgesic effect and other side effects include analgesia broad, dysphora, euphoria, somnolence, respiratory depression, decreased bowel movements, change the system hemodynamics, urinary retention, histamine release and physical dependence (Barkin and Barkin, 2001). Morphine dose should be tailored to the characteristics of the patient. Older patients tend to be more sensitive than younger age. Heavy sedation may occur in patients with hepatic cirrhosis. This is caused due to the buildup of the active metabolite morphine-6-glucuronic morphine.

Meperidine or pethidine is a syntetic opioid. Normoperidine, an active metabolite, does not react with the provision of naloxone. It is eliminated in the kidneys, and can cause respiratory arrest, neurotoxic that form hyper-reflexia, myoclonus, seizures grandmal, and agitation. These effects occurred in less than 24 hours after administration, both in young and old age, and on renal function in normal or impaired. Serious anticholinergic effects, such as urinary retention requiring catheterization, supraventricular tachycardia and atrial flutter.

Fentanyl is a highly lipophilic opioid analgetic. The initial starting dose of 2Sug/h. Kurihara, et al (2008) showed that 90% of child patients with a continuous infusion of 1 mg/kg/h fentanyl, indicating satisfactory analgesia without respiratory depression requiring emergency action.

The use of opioids should be careful because of serious side effects such as a decrease in respiratory ventilation induced by opioids. In these conditions, it is necessary adjust the therapeutic dose or dose titration for each patient in order to reduce depression of ventilation.

Route of administration of opioids:

1. Oral administration postoperative procedures are rarely done, because most patients were fasted. Decreased gastric peristalsis, which often accompanies surgery would interfere with the absorption thus eliminating the ability to decrease pain
2. Giving rectal probably has little benefit because they are not dependent on gastric emptying and is not affected by nausea and vomiting. The lack of this method is included resistance, slow onset and variable of absorption.
3. Opioid first sub-lingual prevent flow through the heart as seen in the oral way. Buprenorphine has many telltales in this way because it is very lipophilic, does not stimulate mucosal and it's still good.
4. Narcotics rapidly absorbed intranasal because the nasal mucosa is rich with blood vessels. Many of opioids can be used in this way, among others butorfanal and sufentanil.
5. Giving intravenous opioids produce the most rapid onset of action and effect can be expected. Method of intravenous administration of principle that has 2 bolus and continuous
   a. Bolus. Small doses of opioid agonists (e.g. morphine 0.05- O.lmg / kg) given intravenously every 10-15 minutes the titration up to receive analgesia.
   b. Continuous infusion. Administration by continuous infusion may be given to profess glittering plasma levels maintained. This method can provide the pethidin 50-100 mg bolus at an early stage within 30-60 minutes: 5-15mg morphine: fentanyl 150 mg followed by maintenance infusion pethidin 15-50mg: 1-5mg morphine; 39-120mg or fentanyl/hour. Maintenance infusion rate can be adjusted to produce adequate analgesia with minimal side effects.

Administration of opioids in patients with a history of opioid dependance, may require a dose of its own that is sometimes difficult to estimate. **In** these patients, the necessary provision of multimodal analgesia with opioid administration, plus a non-steroidal anti-inflammatory drugs and other adjuvant (Mehta and Langford, 2006)

Non-narcotic analgesics

1. Non-steroidal anti-inflammatory drugs that have the ability analgesia, anti-inflammatory and antipyretic. This drug works by inhibiting the production of prostaglandins, substances endogenous potential as a trigger pain.

2. Ketorolac which also includes non-steroidal analgesics, has been recognized can be used for postoperative analgesia. Intramuscular ketorolac 30 mg equivalent to 10 mg morphine or 100 mg of pethidine. Analgesia effect started 10 minutes after injection and lasts up to 4-6 hours.

3. Clonidine is known as anti-hypertensive drugs, has analgesic properties, can be given 4-6 micrograms/kg intravenously shortly before the operating produce, postoperative analgesia and prevent postoperative shivering equivalent to 0.3 mg i.v administration.

Adjuvant Analgesics

Adjuvant analgesics are defined as drugs with a primary indication other than pain that have analgesic properties in some painful conditions. Many classes of medications commonly used as non-opioid adjuvants include antidepressants, corticosteroid, anticonvulsant (Onal, 2006)

1. Corticosteroids

   These drugs can be heightened mood is declining, and then are anti-inflammatory, anti-emetics, improve appetite and help overcome cachexia and anorexia.

2. Anticonvulsants

   This drug can be useful for clarifying the nature of neuropathic pain stabbed and burned. Should be used with caution in patients who are undergoing chemical therapies (chemotherapy) and radiation therapy.

3. Antidepressants

   Antidepressants work is central to the stage of the perception of pain and analgesic properties that work on pain receptors. Helpful in reducing neuropathic pain, can act as a central analgesic efficacy strengthening.

CONCLUSION

Acute severe pain require proper handling to enable patients feel comfortable and do not become chronic pain. Treatment of mild to severe pain, can use the procedure from "Pain ladder of WHO". We need knowledge about the use of opioid analgesics and non-opioid and way of administration in order to reduce the incidence of side effects.

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