

PERIOPERATIVE ANALGESIA I

Introduction and Definition

Pain has been defined as an unpleasant sensory or emotional experience associated with actual or potential tissue damage. Because the anatomical structures and neurophysiological mechanisms leading to the perception of pain are remarkably similar in humans and animals, it is reasonable to assume that, if a stimulus is painful to a person, it must also be considered to be painful to an animal. Adverse effects of postoperative pain on systems make pain management inevitable during pre and intraoperative periods; like in postoperative process. Aims to prevent or reduce pain before its occurrence, put forward the concept of preemptive analgesia

Physiology of Pain

Pain occurs when nerve cells in the skin or deep tissues receive a noxious stimulus; which are harmful stimuli that have the potential to cause tissue damage. These can be chemicals, temperature, ischemia, mechanical injuries (such as incisions), inflammation or tissue damage (prostaglandin, leukotriene, bradykinin, proteolytic enzymes, histamine, serotonin). Receptors that respond to these stimuli are called “nociceptors” and the response to stimuli are

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called nociception. Pain is the conscious perception of nociception. Some researchers argue that the term “analgesia” should be used only in humans and that the term “antinociception” is more appropriate in animals. Noxious stimuli lead to the activation of nociceptors and primary afferent fibers and turn into nociceptive impulses in these fibers. All nociceptive impulses in the peripheral tissues are transmitted to the neurons in the dorsal horn of the spinal cord. Here, the painful stimulus is controlled by the effect of neural hormones such as substance P and cholecystokinin. However, when the intensity of stimulation is superior, pain stimulation is transmitted to thalamus and sensory cortex of the brain through sensory afferent fibers. Thus, perception of pain is translated into informational codes. The loss of communication with outside does not alter the fact that pain may exist. In addition, pain may occur when there is no stimulation through peripheral nociceptors (eg phantom limb pain or CNS-induced pain). In humans and animals, standard pain memory is the reason why pain cannot be standardized, and this concept forms the basis of pain management. The main factors that shape pain memory are the animal's behavioral model, environmental factors, pain expectation and intensity of painful events.

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Pain that occurs after a noxious stimulus is called “physiological pain”. Physiological pain is a protective response by the central nervous system to prevent tissue damage. The type of pain that occurs after actual tissue damage is called “pathological pain” or “clinical pain”. Types of pathological pain are hyperalgesia (more pain than should be in the presence of noxious stimulation), allodynia (pain caused by a severe, non-toxic stimulation that is not low enough to cause pain normally), causalgia (spontaneous pain), or reflected pain (the occurrence of a feeling of pain in a region different from the actual pain factor).

Monitoring Pain

Monitoring pain symptoms in animals is a complex and difficult process. The reactions to pain vary according to species, race, age, gender and individual characteristics; the patient's living space and education may also cause this difference. It can be seen that some animals conceal pain symptoms or react differently to pain based on their immediate psychological state. Some may look restless, tired, and make a lot of noise, while others may be depressed and quiet.

The severity of postoperative pain varies depending on the surgical intervention. This situation necessitated the determination of

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different pain levels (low, moderate, severe) that would be created by different surgical interventions according to individuals. For this purpose, many pain assessment scales have been established. Each hospital has a pain scale that can be regularly performed for their patients and they are easy to apply. The aim of creating a scale is to prevent different perceptions and different interventions of pain in the animal by the observers. Nowadays, there are improved pain scales which give the actual pain levels of the animals, which were developed by scoring and evaluating acute pain. The most common of these is the Melbourne Pain Scale.

Pain Control

When the body is under trauma or stress, neurons in the central nervous system secrete some chemicals such as beta endorphins and dinorphins. These chemicals bind to opioid receptors to provide natural analgesia within the body. By acupuncture electrically stimulating the nerve, release of these chemicals can be triggered. In addition, massage therapies, cold application (in acute period), hot application (in chronic period), magnetic therapy and homeopathic treatments are applications to control pain. Pain relief is important to relieve the patient's restlessness. Ensuring that the animal is clean and comfortable, creating a quiet and safe

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environment can reduce the pain it will feel. In the studies performed, it was observed that acupuncture and electrical applications used in the preoperative period of some soft tissue operations provided a strong analgesia and that there was no need for analgesic application to these patients.

Although there are many non-pharmacological methods in animals, analgesic agents are often needed to prevent or treat pain. These agents eliminate pain by many different mechanisms or prevent the occurrence of pain. Postoperative pain is an acute condition accompanied by an inflammatory process due to surgical trauma. The emergence of the negative effects of postoperative pain on the systems has once again demonstrated the importance of pain control in the perioperative period. This has led to the concept of preemptive analgesia.

Preemptive Analgesia

Preemptive analgesia is the use of analgesics before the animal begins to feel pain during the perioperative period. In animals without any analgesic agents, noxious stimuli associated with surgical intervention cause the emergence of pain-aggravating chemicals in the spinal cord. This event is called ‘Windup phenomenon’. The animal does not perceive pain under general

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anesthesia. However, the patient starts to feel pain when the consciousness starts to come out of the anesthesia. This time a much higher dose of analgesics is needed to relieve pain. The goal of preemptive analgesia is to stop the pain mechanism before these mediators appear.