

ADVANCED CLINICAL PHARMACOLOGY AND TOXICOLOGY, THERAPEUTICS

Pain Management in Dentistry: A Review

Mukherjee Mun¹
Chatterjee Debasish²

¹MDS, BDS, West Bengal University of Health Sciences, Salt Lake City, Kolkata, West Bengal-700064, India

²PDF Surgical Oncology, MS, MBBS, FALS, DipMas, West Bengal University of Health Sciences, Salt Lake City, Kolkata, West Bengal-700064, India

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ABSTRACT

Pain management has progressed a great deal scientifically throughout the last century, in large part as a result of the introduction of the more effective pharmacologic agents and the developmental of a better understanding of the molecular principles that govern their use. Safe and effective management of acute dental pain can be accomplished with nonopioid and opioid analgesics. To formulate regimens properly, it is essential to appreciate basic pharmacological principles and appropriate dosage strategies for each of the available analgesic classes. There is still a great deal for researches and practitioners to learn about the mechanism and treatments for pain. This review article will discuss regarding the important aspects of the pain control in dentistry.

KEYWORDS

Dentistry, Pain, Management, Treatment

INTRODUCTION

The most common dental complaint is pain. It accounts for more than 80% of all dental visits [1]. A detailed history and examination will identify the cause of dentally-related pain in most emergency situations. How humans process pain is a complicated, individualized process affected by genetics, personality, life experiences and straight forward physiological process [2]. For many patients, the concept of dental pain is a true fear [3-5].

The International Association for the Study of Pain (IASP) has defined pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage” [6]. Pain impacts an individual’s quality of life. In an effort to ensure better pain management, many health care systems in the United States have required routine outpatient screening for pain. This action labels pain as the “Fifth vital sign” [7]. The other four vital signs are blood pressure, temperature, pulse and respiration.

The management of pain in dentistry encompasses a number of procedural issues, including the delivery of anesthetic and the management of post procedural pain, as well as pain diagnosis, management strategies for orofacial conditions that cause pain in the face and head, and the management of pain in special populations. Field of orofacial pain includes pain conditions that are associated with the hard and soft tissue of head, neck and all intraoral structures the diagnostic range includes headache, musculoskeletal pain, neurogenic psychogenesis pain, pain from major diseases like AIDS, TB, cancer etc., the evaluation and treatment of orofacial pain has evolved into a shared responsibility between dentist and physician with considerable overlap that is distinguished only by the individuals knowledge and training [8].

CLASSIFICATION OF PAIN

Etiopathogenic Classification of Pain:

(A) Pain due to local causes

- Pathologic changes in teeth and jaws
- TMJ and associated muscles of mastication

- c. Nose and Paranasal diseases
- d. Oral mucosal diseases
- e. Lymph node diseases
- f. Salivary gland disease
- g. Diseases of blood vessels

(B) Pain along nerve trunk and central pathways

- a. Trigeminal neuralgia and glossopharyngeal neuralgia
- b. Migraine and other types of headaches
- c. A typical facial palsy

(C) Referred pain from other organs

- a. Cervical spondylitis
- b. Angina pectoris
- c. Oropharyngeal diseases

(D) Diseases of ENT [9]

PRINCIPLES OF PAIN MANAGEMENT

1. Pain therapy is begun with non-narcotic analogies for mild to moderate pain. If these drugs are ineffective intermediate potency opioids such as codeine or its derivatives are combined with them. Opioids and Nonsteroidal Anti-inflammatory Drugs (NSAIDs) induce rapid change in pain sensation.
2. Treatment of acute pain requires location, origin and cause of pain. Management implies target short-term symptomatic relief; because the goal is to modify pain impulses during the period of tissue healing. NSAIDs can limit pain, swelling and erythema; other agents given are muscle relaxants.
3. For severe or chronic pain analgesics are given at regular interval in adequate dose. Medication should never be prescribed as needed basis because pain will not resolve abruptly, oral medication is preferred, especially long acting, unless patients factor prohibit such.
4. Analgesics adjuvant such as tricyclic antidepressants are added to the drug regime if neural environment is suspected. Other adjuncts include anticonvulsants, antiarrhythmics, antihistamines, or phenothiazines these agents usually require several days [10].

PAIN CONTROL

Pain is a complex phenomenon, which is influenced by an individual's previous experience of pain, psychosocial factors and how the brain interprets the messages it receives [11]. One of the most important aspects of practice of dentistry is control or elimination of pain. In past pain has been closely associated with dentistry that the word pain and dentistry have become synonymous.

Methods of Pain Control:

Removing the Cause: By removing the etiologic factor environmental changes would be eliminated, consequently free nerve ending would not be excited and no impulses would be initiated.

Blocking the Pathways of Painful Impulses: This is the most widely used method during minor oral surgeries in dentistry. By this method a suitable, possessing local analgesic properties is injected in to tissue in proximity to the nerves involved. The local anesthetic solution prevents depolarization of nerve fibers at the area of absorption thus preventing fibers from conducting any impulses centrally beyond that point. As long as solution is present in the nerve in sufficient concentrate to prevent depolarization, the block will be in effect.

MANAGEMENT

Analgesic Agents: Analgesics are "the drugs that selectively relieves pain by acting in the Central Nervous System (CNS) or on peripheral pain mechanism, without significantly altering consciousness". Pain has some value in monitoring progress in patient's condition. As a general rule the objective of analgesic should

not be to eliminate pain altogether. It helps and guides the patients when his actions are excessive or abusive the main objective of analgesic is to make pain tolerable to the patient [12].

Types:

1. Non-narcotic analgesics/nonopioids
2. Narcotic analgesics/opioids
3. Adjuvant analgesics

Formerly, it was believed that opioids acted only within the brain and spinal cord, but the action of nonopioids was confined to the periphery (i.e., The site of injury). This explanation is no longer tenable, however; both are known to act centrally and peripherally [13,14].

Nonopioid Analgesics

These include NSAIDs, which have analgesic, anti-pyretic, anti-platelet, anti-inflammatory actions. Most cases of postoperative dental pain include an inflammatory component. For this reason, NSAIDs are the most rational first-line agents-often superior to conventional dosages of opioids. NSAIDs inhibit the formation of Cyclooxygenase-2 (COX-II), the enzyme responsible for the production of harmful prostaglandins which produce pain, fever, and inflammation. However, NSAIDs also inhibit the formation of COX-I, the enzyme responsible for the production of beneficial prostaglandins that produce gastrointestinal mucous lining, regulate normal platelet activity, maintain adequate blood flow to the kidneys, and regulate bronchodilation. Since the therapeutic and adverse effects of NSAIDs are also dose related, the use of lower doses in a combination analgesic product is considered advantageous [15,16].

Opioid Analgesics

These include morphine and morphine like drugs. Opioids produce most of their therapeutic and adverse effects by acting as agonists at opioid receptors. These are activated by a variety of endogenous ligands, collectively called endorphins. Three major families of opioid receptors have been cloned: the mu, kappa and delta opioid receptors [17].

Anesthetic Agents

These are used for diagnosis as well as pain management it can be used topically and in injection form.

Topical: These are available as solution, spray, and ointments. Water-soluble ointment containing topical anesthetic and germicide used for managing dental alveolitis. Analgesic balms are agents that give soothing palliative relief of inflammatory pain of superficial deep categories when applied locally to exposed tissue. Aloe Vera juice is an ancient remedy for superficial pain; balsam of pura; eugenol and guaiacol are other well-known balms. These are useful in controlling of pain from exposed/ulcerated cuteness and mucogingival tissue, exposed dentin and acute alveolitis [18,19].

Injectable Local Anesthetic (LA): Varieties of LA are available in different concentration with or without vasoconstrictor. Long acting LA such as bupivacaine HCl is useful, even though it has higher risk of toxicity. Proper dosage, technique adequate precaution, readiness of emergency is essential for safety and effectiveness of all LA.

Extreme precaution is required when vasopressor agents are used in patients receiving MAO inhibitor or anti-depressant triptyline type because severe prolonged hypertension may result. Therefore, most unwanted reaction with LA is critical in intravenous injection.

Injection of 0.02% morphine sulphate around peripheral nerve has been repeated to yield LA that is equal to bupivacaine in onset and duration small dose of one mg or less of morphine does not produce systemic effect [20].

DISCUSSION

The management of acute dental pain due to inflammation is a common clinical problem. Effective pain management depends on an accurate diagnosis. The decision to use a NSAID or a combination NSAID/opioid depends on the severity of the pain. Opioid analgesics

are controlled substances and have many adverse side effects. Thus, most acute dental pain can be managed with the proper NSAID. Although NSAIDs and short-acting opioids may be helpful in relieving acute pain, they should not be used on a daily basis for chronic pain. The chronic use of NSAIDs may be associated with significant side effects, including renal disease.

CONCLUSION

Careful selection of an effective analgesic regimen should be based on the type and amount of pain the patient is expected to experience. One must remember that analgesics are a second-best means of managing pain; the best means is to remove the source as quickly as possible. Therefore, if the patient is able to present to the dental clinic and local anesthesia can be achieved, then the source of pain should be dealt with, whether by means of a pulpectomy, an extraction or incision and drainage. We have numerous analgesics at our disposal. Our goal should be to use these drugs optimally to treat pain most effectively.

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