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Analgesics in Post-Operative Pain Control after Removal of Third Molar Impaction

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Abstract:
The aim of this study is to review the usage of analgesics in pain control after removal of third molar impaction.Analgesic, any drug that relieves pain selectively without blocking the conduction of nerve impulses, markedly altering sensory perception, or affecting consciousness.In the majority of cases analgesics are prescribed to relieve pain without significantly altering consciousness. Removal of molar involves severe laceration and tissue trauma to tissues causing pain, swelling. The apparent interactions between the mechanisms of action of non-steroidal anti inflammatory drugs (NSAIDS) and steroids suggest that co-therapy may provide beneficial inflammatory and pain relief in the absence of side effects. Analgesics such as diclofenac, bupivacaine, ibuprofen, paracetamol, many other drugs can control pain and prevent patients from unpleasant situations. To review some of the analgesics used in control of pain after removal of third molar impaction.

INTRODUCTION :

Pain and swelling are two of the most common problems experienced by patients who have undergone surgical removal of impacted third molars. These problems result from inflammation following on surgical trauma [1]. The primary obligation and ultimate responsibility of oral health care providers is not only to restore function, but also to relieve pain [2]. Pain is a common complaint often occurring with inflammatory processes after a tooth extraction [3]. The removal of the impacted third molar and the resultant tissue and cellular destruction brings about the release and production of several biochemical mediators involved in the pain process, in particular, histamine, bradykinin and the prostaglandins [4]. Numerous analgesics are available, and the recent introduction of new agents provides even more options from which to choose [5]. Few complications like stomach irritation, indigestion, tachycardia, nausea, insomnia, metallic taste in the mouth are present, but it all depends on the dose and mode of administration of the drug [6]. The most prevalent methods include administration of analgesics like Non-steroidal anti-inflammatory drugs(NSAIDs) [7]. NSAID has a short onset and provides a long duration of analgesia, and numerous studies have promoted its use in minor oral surgery [8]. NSAID use is however associated with several serious treatment side effects, with considerable associated morbidity and mortality. Many of these side effects may be prevented by careful consideration of the patient's risk factors and by subsequent implementation of preventive strategies [9]. Opioids, and non opioid analgesics are among the most frequently prescribed therapeutic classes [10]. When opioids are indicated for pain conditions not effectively managed by non opioids, selecting an agent requires due consideration of a number of factors. The selection is based on the severity and pattern of pain; the patient's age, medical comorbidities, and prior opioid exposure and experience(including efficacy and adverse effects); drug-specific differences; available formulations; cost; and personal experience [11].

NSAIDS:
Nonsteroidal anti-inflammatory drugs (NSAIDs) reduce pain and edema by suppressing the formation of prostaglandins, by inhibiting the activity of the enzyme Cyclooxygenase (COX-1 and COX-2) [12]. NSAIDs are very effective in the alleviation of pain, fever and inflammation.

Mechanism Of Action:
NSAIDs produce analgesic and anti-inflammatory actions by inhibition of cyclo-oxygenase, thereby reducing the synthesis of arachidonic acid metabolites such as prostaglandins and thromboxanes [13].

Pharmacokinetics:
Readily absorbed from stomach or small intestine and widely distributed in all tissues (e.g. CSF, peritoneal cavity, synovial fluid). Bound to plasma proteins therefore, aspirin can displace other drugs from these proteins and increase their toxicity [14].

Adverse Effects:
Although the NSAIDs are extremely effective for the management of acute dental pain, several adverse effects can occur. The adverse effect profile of the acute administration of ibuprofen includes gastro-intestinal complaints and somnolence [15]. Cumulative consumption of NSAIDs (but not aspirin) over a lifetime increases the risk of end-stage renal disease, Dyspepsia, Gastric mucosal damage, Increased bleeding, Possible renal impairment, Anaphylactoid reactions [16].

Doses:
Conventional oral formulations are very effective over a dose range of 200-800mg Although the 800mg dose produces maximum analgesic effects, clinicians should only consider this dose if the benefit for treating severe intense pain outweighs the increased risks of adverse effects. Under most conditions, 400-600mg of ibuprofen taken every six hours is very effective for treating moderate inflammatory pain [17].

Therapeutic Uses:
Anti-inflammatory, Antipyretic, Antidysmenorrheal, Antiplatelet action, pain relief, reduce inflammation and reduce fever (headache, minor injuries, dysmenorrhea, symptoms and fever of cold or flu, acute bursitis) Chronic Inflammation: osteoarthritis, rheumatoid arthritis, ankylosing spondylitis [18].

NSAIDS as Analgesic:
A recent study has succeeded in demonstrating the analgesic efficacy of single oral doses of tramadol, for impacted third molar extraction, with an acceptable incidence and severity of side effects, over the first 6 hours following extraction. Tramadol was found to be more effective postoperatively than preoperatively [19]. Ibuprofen has been evaluated in several different formulations. One recent modification is the use of gel caps that provide faster absorption and therefore a quicker onset for meaningful analgesia that occurs about 25-30 minutes after ingestion[20].The selective cox-2 inhibitor has high effective than the conventional NSAIDs and has low gastro intestinal and high cardiovascular side effects than to the conventional NSAIDs [11]. In a recent study it is described the analgesic effect of combination of dexamethasone and diclofenac K that the potency and dosage of dexamethasone within the first 24 h (total of 16 mg, including

pre-operative dose) was adequate to enhance the efficacy of diclofenac K. It appears that steroids are preferably administered preoperatively, extending the coverage up to 24 - 48 hours after surgery [21].

Opioids:

Opioids produce a powerful and selective reduction in the human and animal response to a strong and otherwise noxious stimulus and alter the clinical pain state.Opioids, such as morphine, oxycodone, oxymorphone and fentanyl are potent analgesics [22].

Mechanism of Action:

The opioids produce analgesia by activation of opioid receptors. Three major families of opioid receptors have been cloned: the mu, kappa and delta opioid receptors.The mu opioid receptor is activated by most clinically used opioids including codeine, hydrocodeine, oxycodone, hydrocodone, tramadol and morphine. The kappa opioid receptor is activated by drugs such as pentazocine and buprenorphine. No currently approved drugs are selective for the delta receptor. Opioid analgesia occurs by activation of opioid receptors expressed on neurons in supraspinal sites, spinal sites and in peripheral tissue.In general, the opioid receptors are thought to inhibit neuronal activity and their analgesic efficacy is attributed in part to the observation that opioid receptors are expressed at most of the major pain processing areas in the central nervous system [23].

Adverse Effects:

The adverse effect profile of the opioids is well recognized and includes nausea, emesis, constipation, urinary retention, and falls and respiratory depression [24].

Pharmacokinetics :

Absorption - opioids are well absorbed. After intramuscular injection the peak therapeutic effect is achieved in about 1 hour and it lasts for 3-4 hours. Bioavailability is approximately 30%. Protein Binding is 30-40% [25].

Therapeutic Uses:

Analgesia,such as the relief of pain from myocardial infarction,terminal illness,surgery. Opioids may help with shortness of breath particularly in advanced diseases such as cancer and COPD among others.

Doses:

Opioids are frequently combined with paracetamol59 or more recently with ibuprofen in treating acute dental pain. The combination of 600-650mg of paracetamol with 60mg of codeine produces very effective analgesia in post-operative pain patients [26].

Opiods as Analgesic:

Opioid analgesics have been used as medicinal agents, especially for the treatment of acute and chronic pain, for thousands of years. Ancient Greeks first identified and used these medicines, which were originally derived from opium , the latex of immature seed capsules of the poppy flower [27]. Morphine is the most commonly used opioid analgesic in the postoperative period, but some practitioners prefer other agents, such as hydromorphone [28]. Codeine or dihydrocodeine are useful for mild to moderate pain, but the side-effects (nausea and constipation) make them unsuitable for long-term use [29]. In a study it has been reported that Buprenorphine has a longer duration of action than morphine and has an effect sublingually for 6-8 hours. It is, however, less effective than morphine and needs a high concentration to achieve a reasonable degree of analgesia [30].

CONCLUSION:

This review has focused on oral analgesics as a component for pain and discomfort associated with third molar surgery. Patients should be treated with NSAIDs or paracetamol as 'first choice' drugs at doses that are proven to be effective and balancing the patient's analgesic requirements with the potential for adverse effects. Opioids should be considered adjunctive drugs that act to enhance overall analgesia at the cost of increased adverse effects.These drugs produce significant pain relief and improve the quality of patient's life in the immediate post-operative period. Proper prescribing practices as well as physician and patient education can help manage tolerance issues, adverse events, as well as common and uncommon side effects.

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