Journal of Positive Psychology & Wellbeing
2022, Vol. 6, No. 3, 502-506

http://journalppw.com
ISSN 2587-0130

An overview root canal treatment, roles of nursing and pharmacist in pain management

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Abstract

Endodontic treatment involves the comprehensive care of symptoms before, during, and after the procedure, including the occurrence of post-operative endodontic discomfort, which can potentially become a chronic consequence. Post-operative pain is a frequent occurrence after surgery and is difficult to prevent. It has multiple causes and may be related to the acute inflammation of the area around the tooth's root, which can be caused by chemical, mechanical, host, or microbial damage during endodontic therapy. The key aspects of nursing during canal obturation encompass the implementation of aseptic technique, proficient coordination, effective instrument management, and clear communication between nurses and patients. Presented here are questions from patients on analgesic pharmacology, along with corresponding responses. The purpose is to educate patients and empower them to be more effective advocates for themselves. This study discusses the various methods by which pharmacists contribute to pain treatment and ensure the safety of prescribed drugs.

Keyword: *Endodontic treatment, root canal, pain management.*

Introduction

Although there have been significant improvements in root canal treatments, postoperative endodontic pain (PEP) remains a frequently observed negative result, with documented occurrence rates ranging from 3% to 58% [1]. PEP can occur when the

periradicular tissues are inflamed by mechanical instrumentation, irrigants, and intracanal medicaments. While root canal therapy can reduce odontogenic pain in many instances, it is often necessary to use analgesics to effectively manage post-endodontic pain (PEP) [2]. Several treatments, such as paracetamol, corticosteroids, and non-steroidal anti-inflammatory drugs (NSAIDs), help decrease post-exercise pain (PEP). NSAIDs exert both peripheral and central effects in reducing pain. Ibuprofen (IBU) and diclofenac are the two most commonly used NSAIDs, and they make up over 40% of oral NSAID sales worldwide. While the specific sales ratio of IBU and diclofenac may differ from nation to country, both drugs are commonly utilized, widely recognized, and have a longstanding presence in the market [3].

Ibuprofen (IBU) is widely recognized among dentists and endodontists and is the most extensively researched nonsteroidal anti-inflammatory drug (NSAID) in the field of endodontics. IBU is considered suitable for self-medication due to its wide range of uses, high tolerance, and safety. It has been classified as the safest conventional NSAID by the spontaneous adverse drug reaction reporting system in the United Kingdom [3].

Diclofenac is a cyclooxygenase inhibitor that belongs to the phenylacetic acid-derivative class. It is non-selective and amphiphilic in nature. Oral versions of this medication are available in combination with sodium, potassium, or both sodium and misoprostol. Across poor, middle, and high-income countries, it is the most prevalent nonsteroidal anti-inflammatory drug (NSAID) in use. The mechanisms of action of diclofenac are distinctive and separate from those of other nonsteroidal anti-inflammatory drugs (NSAIDs). The effectiveness of this substance in reducing blood cyclooxygenase levels and the production of pro-inflammatory and pain-inducing prostaglandins is 3 to 1000 times greater than other nonsteroidal anti-inflammatory drugs (NSAIDs). In addition, diclofenac exhibits a significantly greater affinity for peroxisome proliferator-activated γ receptors compared to other nonsteroidal anti-inflammatory drugs (NSAIDs), with a 50-fold difference. Consequently, diclofenac impacts the processing of pain signals in the spinal cord by stimulating these receptors and reducing the production of prostaglandins [4].

The solubility and absorption of various diclofenac formulations are influenced by the specific salt form used. Diclofenac potassium (DFK) is absorbed more quickly compared to diclofenac sodium [5]. Consequently, DFK immediate-release sugar-coated tablets (Cataflam®, Novartis Pharmaceuticals Corporation, Basel, Switzerland) were introduced due to their fast absorption. DFK, a faster-acting analgesic, can provide quicker pain relief, perhaps lasting longer and with greater effectiveness. This can lessen the need for repeated treatment, resulting in less frequent consumption. Thus, the rapid beginning of action of DFK [6] could be advantageous in relieving acute dental pain. Both IBU and diclofenac have demonstrated the ability to reduce PEP. An experiment shown that a single-dose combination of diclofenac sodium + paracetamol had a greater analgesic impact on postoperative pain (PEP) compared to a combination of IBU + paracetamol. However, a different study discovered that a combination of IBU + paracetamol given in a single dose did not show any significant difference compared to a combination of DFK + paracetamol given in a single dose when it came to PEP [7].

Review:

PEP experience can be influenced by various things before, during, and after the surgery. The most frequently cited prognostic factor associated with postoperative pancreatic discomfort is preoperative pain. PEP may be influenced by various aspects including gender, age, tooth type, preoperative anxiety, single- or double-visit therapy, irrigation substance, occlusal reduction, and instrumentation technique. This study only included first molars that required single-visit treatment and followed a similar endodontic treatment technique. This was done to minimize the influence of any other factors that could affect the results. Since the majority of patients encounter post-exposure prophylaxis (PEP) within the initial 24 hours following treatment, PEP scores were evaluated at 2, 4, 6, 12, and 24 hours after [8].

The results of our study contradict earlier research by showing that preoperative worry had no significant impact on PEP. Moreover, the

present study found that neither the kind of tooth (maxillary vs mandibular) nor gender had a significant impact on PEP ratings. In a similar manner, another experiment demonstrated a noteworthy decrease in PEP ratings, with no notable distinction observed between the maxillary and mandibular molars, or between females and males, while using four distinct analgesic treatment plans. The regimens consisted of a combination of IBU and paracetamol, a combination of DFK and paracetamol, and two more combinations [9]. In addition, our findings showed that the preoperative pain score and pain response to the cold test had a substantial impact on PEP scores, which is consistent with earlier research [10].

Following a significant decrease in PEP values at the 2-hour mark, both groups saw an increase in PEP scores between 2 and 4 hours, compared to the pain levels before the surgery. This could be attributed to the gradual decrease in the effects of the anesthesia, which has a half-life of 2-2.5 hours. Additionally, the half-life of ibuprofen and diclofenac, which are medications commonly used for pain relief, is approximately 1-2 hours. The increase in levels was observed consistently between the 4 and 6-hour time intervals in the DFK group, but not in the IBU group. The difference in the two drugs' half-lives and modes of action could account for this inconsistency. Across both groups, the PEP ratings decreased between the 6 and 12-hour time intervals, as well as between the 12 and 24-hour time intervals. This could be attributed to patients in both groups administering additional dosages of the drugs during these time intervals [11].

The impression of patients towards endodontic therapy can be influenced by whether or not they experience pain as a consequence, which can be categorized as either present or absent. The DFK group had a higher frequency of patients without pain, and their PEP scores were lower. The lower PEP scores suggest that DFK may have a significant benefit over IBU in providing more dependable pain relief in the maxillary and mandibular first teeth with IP. The findings could be explained by the distinct mechanisms of action for DFK and its quicker commencement of action. As far as we know, there is only one study that examines the pain-relieving impact of DFK alone on PEP using a single dose of DFK 50 mg as a premedication. The results demonstrated a notable analgesic impact, which aligns with our findings in the DFK group. Nevertheless, a separate study shown a comparable pain-relieving efficacy when using combinations of IBU+paracetamol and DFK+paracetamol. The changes can be described by using either a single dose or a combination of drugs [12].

Oral administration of NSAIDs has been associated with many adverse effects, such as cardiovascular, gastrointestinal, and hepatic problems. A recent study examining the pain-relieving effectiveness of diclofenac sodium on postoperative pain (PEP) over a three-day period found that two patients (4% of the participants) had vomiting, while one patient (2% of the participants) reported earache. No adverse effects were reported by any of the patients in either group during the 24-hour duration of the study. Recent research conducted using a placebo control group found that the administration of a single dose of DFK or diclofenac sodium resulted in side effects at a similar rate as the placebo. These contentious findings may arise due to variations in the dosage of pills administered or the duration of the trials. Nevertheless, it is important to acknowledge the potential for reporting adverse effects that are not directly attributable to the drugs. Spontaneous adverse drug reaction studies have shown that IBU is regarded as the safest conventional NSAID. In this study, patients in the IBU group did not report any ill effects, similar to previous investigations. Despite diclofenac having several modes of action and the possibility for early pain alleviation, studies have indicated that it may have a higher risk of causing cardiovascular and gastrointestinal side effects compared to IBU [14]. Nevertheless, this distinction may not be evident in the uptake of three doses within a single day, but it could be observed when these pain relievers are administered over a period of 30 days or more. Based on the existing literature on analgesic usage in dentistry and the results of our investigation, it can be concluded that using both DFK and IBU for a single day is safe. Nevertheless, it is advisable to conduct meticulously planned future investigations to reexamine the accuracy of this claim [14].

Community pharmacists are reclaiming their often overlooked position as integral members of the healthcare team, contributing to the

enhancement of the quality of life for individuals experiencing pain. Modern pharmacists are not solely responsible for dispensing medications, but also play a crucial role in assisting patients in resolving their health-related issues. Approximately 80% of visits to community pharmacies are related to pain concerns, making pharmacists directly involved in providing pain management. It is crucial to bear in mind that your pharmacist is a knowledgeable professional in pharmaceuticals who can provide answers to inquiries regarding both prescribed and non-prescribed (OTC) medications. In addition, the individual can assess whether you are currently using any medications that may potentially result in hazardous interactions. The pharmacist possesses expertise in evaluation and proficient interaction. An appointment is not necessary to consult with a pharmacist, and they are accessible during times when individuals experiencing pain want immediate solutions, such as evenings and weekends. They serve as advocates who empower patients and assist them in making informed decisions on self-care [15].

Pharmacists have a vital role in providing patients and their caregivers with information on the correct dosage, how to administer medications, potential side effects, how to properly dispose of medications, and the expected time it will take to relieve pain. By means of education, they can advocate for a prudent utilization of analgesic medicine and provide guidance to patients regarding whether to pursue referrals for other treatments. It is crucial to recognize that there exists an illegal market for the drug contained in your bottle, and it is imperative that you safeguard it just as diligently as the pharmacist did before it was dispensed from the pharmacy. Having a safe in your house is essential and is frequently mandated by pain experts. If you possess huge containers, kindly request an extra little container that is appropriately labeled to accommodate a day's supply of medication for portability purposes. Always ensure that you do not store your medicines in vulnerable areas such as your automobile, kitchen cabinet, bathroom cabinet, or any other unprotected locations. Regrettably, even individuals who come to visit, such as family members and friends, might be responsible when prescriptions go missing [15].

Conclusion:

Nurses and pharmacists, when working together in dental clinics, can provide high-quality pain management treatments for post-dental root canal pain. Their collaborative approach incorporates various disciplines and takes into account the overall well-being of the patient. These services have the capacity to not only alleviate the workload on secondary care but also to diminish lengthy waiting periods for referral to secondary care. Additional study is necessary to substantiate the creation of referral recommendations for these services based on evidence. Hence, it is imperative to inform patients that they may experience pain following the treatment. Additionally, practitioners should accurately identify odontogenic pain and determine its underlying causes. If feasible, they should modify clinical methods based on evidence-based research. In addition, the clinical protocols described aim to improve pain control after endodontic surgery. These protocols should be combined with the recommendations for oral medication after surgery. The first choice treatment is to use ibuprofen alone (600 mg) or in combination with acetaminophen (1000 mg). Alternatively, ketoprofen (50 mg) or naproxen (500 mg) can be taken 6 hours after surgery. It is important to minimize drug intake, especially in fragile and elderly individuals.

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